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The journal of Canada's avalanche community

"MINORS IN THE MOUNTAINS"

TEACHING AVALANCHE SAFETY TO TEENS

SNOWPACK TROUBLEMAKERS

AGM ROUNDUP

New Probes,
Members on Everest
and more!

Volume 85 Summer 2008
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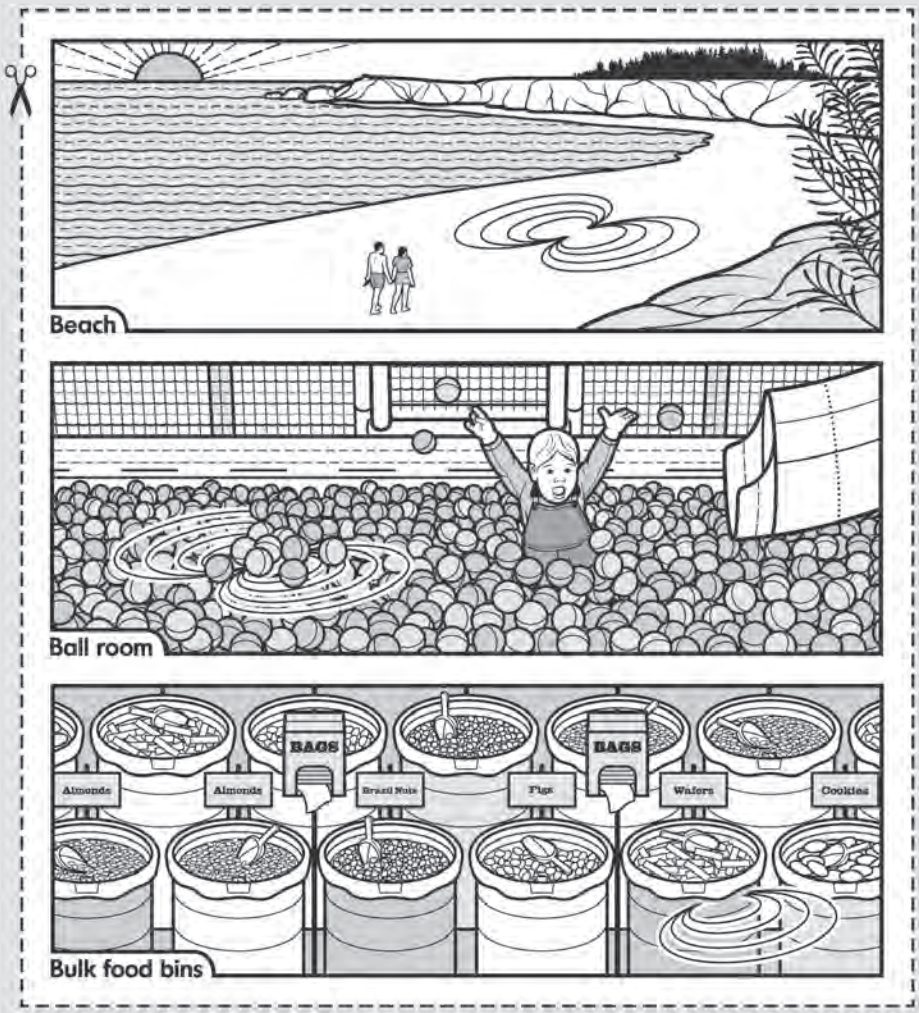

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Cover shot: Jody Goodwin snoapped this shot this spring on the way to President's Pass in the Little Yoho valley.

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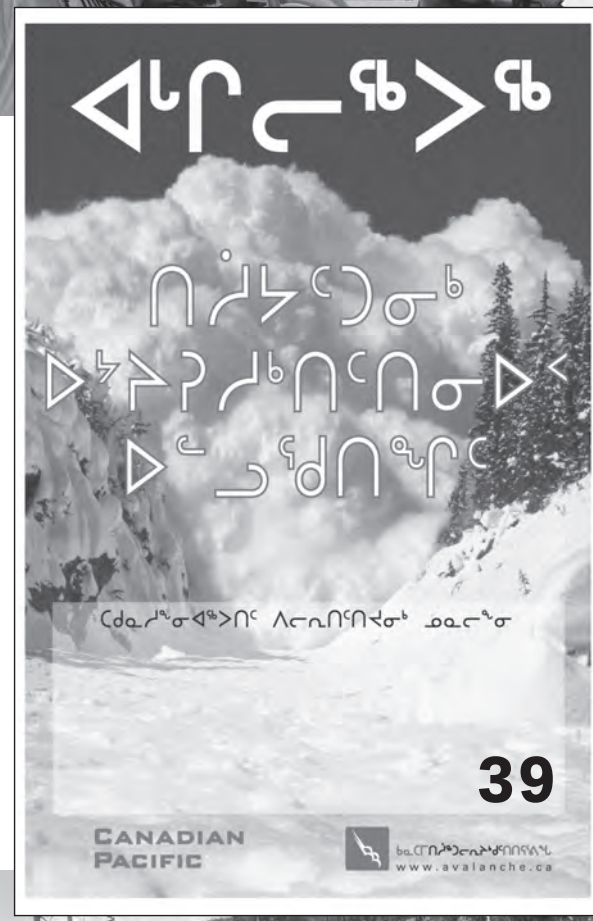

Cliff Umpleby

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Volume 85 Summer 2008

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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Public Education and More

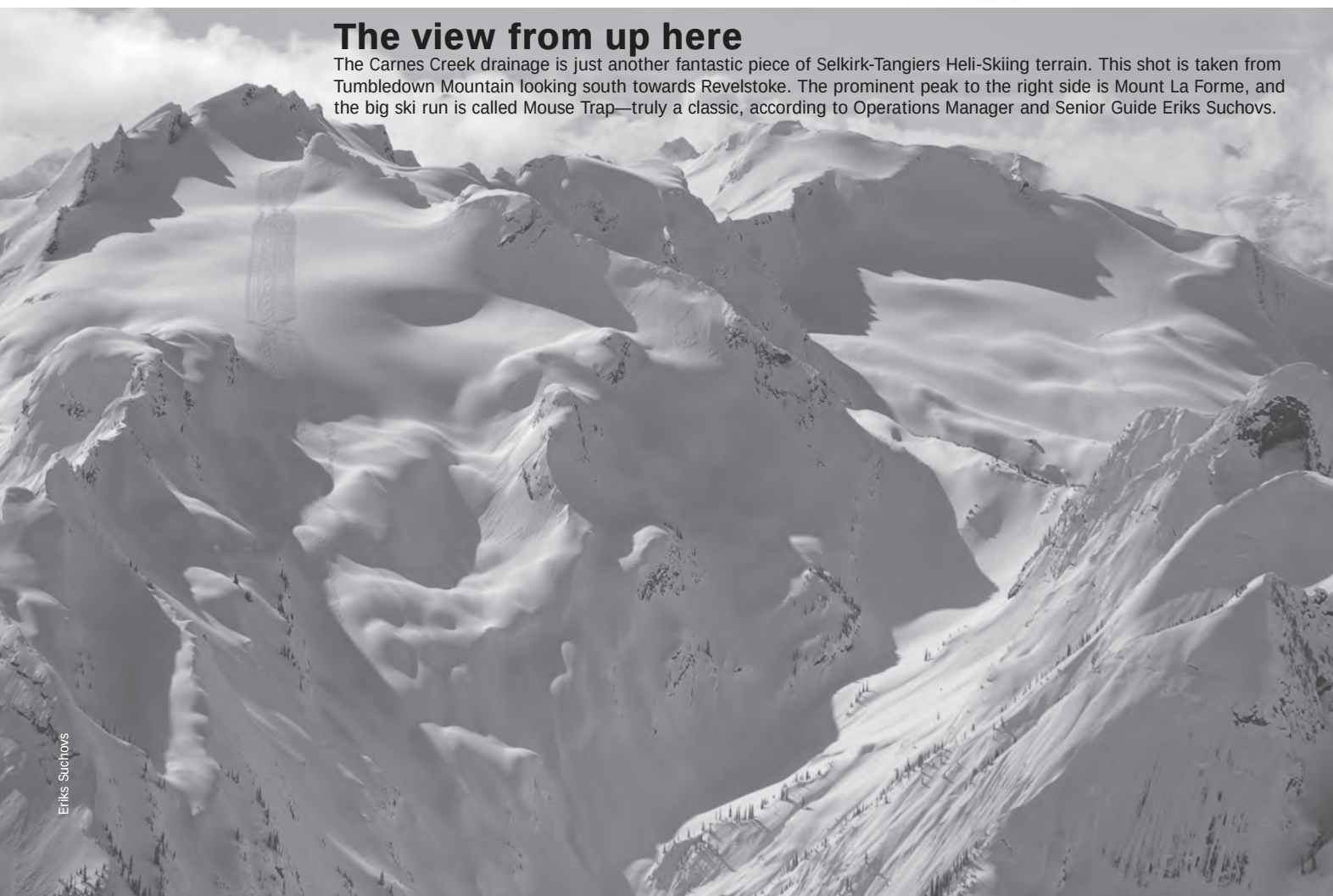
Welcome to the summer issue of avalanche.ca. As usual after the busy annual general meetings, this issue is full of new information and reports on what's cooking in the avalanche world. To me, the best part of the spring meetings is the chance to speak, face to face, with such a wide variety of members. In the corporate world it's known as "networking" but really it's just plain old getting to know each other a bit better. Our members are talented and interesting people and I truly appreciate the luxury of five days to meet more of you.

When the subject turns to this journal (which happens a lot because, I admit, I bring it up a lot) I get some great feedback. And by "great" I don't always mean positive. There's always constructive criticism in there, along with complaints of spelling errors. While it's great to hear input on what we've done (or haven't done) I also love to hear ideas on what we could do.

One idea that came up was the incredible amount and variety of public avalanche education that's going on, so we've highlighted some of that work in this issue. For example, Cliff Umpleby is a Ski Guide and Operations Manager at TLH Heliskiing. When he's not guiding, he teaches avalanche awareness courses to a lot of teenagers. Cliff shares some of the tricks he's learned along the way in his article on page 52. I asked Dave Stark, Director of Operations with Yamnuska Mountain Adventures, to share his views on how the new AST curriculum developed by the CAC has affected avalanche education. You can find his report on page 36.

That's just a taste of what you'll find in terms of public education in this issue. But of course that's not all. While summer is down time for our community, this is also the season for assessment and planning, looking back on the events of the winter and thinking about on what we want to continue and what we want to improve. WorkSafe BC regulations are high on the agenda and you'll find plenty on that issue in these pages, along with some thought-provoking ideas from CAA Executive Director Clair Israelson and President Steve Blake on the future of the CAA.

One last note—George Field announced his retirement from the CAA's Industrial Training Program this spring. After 20 or so years of teaching aspiring avalanche professionals, George is turning in his field book. You can read an interview with him on page 34. It's been a great run George, and your legacy will be felt for many years to come. Thanks!



The view from up here

The Carnes Creek drainage is just another fantastic piece of Selkirk-Tangiers Heli-Skiing terrain. This shot is taken from Tumbledown Mountain looking south towards Revelstoke. The prominent peak to the right side is Mount La Forme, and the big ski run is called Mouse Trap—truly a classic, according to Operations Manager and Senior Guide Eriks Suchovs.

Eriks Suchovs

A "Litmus Test" for the work of the CAA?


CAA Archives

It was a great privilege for Ian Tomm (CAA Operations Manager) and me to be a part of the annual CAA/CAC Board Development Workshop last weekend. Frances Picherack, a well-known policy strategist and regulatory trends analyst was brought in to help our boards better appreciate the complex and rapidly evolving societal context that we all operate in. I am sure the learning that occurred over the weekend will empower our boards to provide wise policy and strategic direction for the CAA and CAC. By the end of the weekend everyone was excited; the organizational roles and trajectories for the CAA and CAC have been validated and clarified, providing a clear direction for moving forward. CAA President Steve Blake's article on page 12 will explain why the CAA's role is especially appropriate and influential in the current social and regulatory construct.

On reflection, Ian and I realized that these board discussions had generated insight for us to create a "litmus test" for the CAA activities that we manage or administer. In this article I'd like to summarize our thinking, propose a framework for vetting CAA programs, services and materials, and illustrate these concepts using the recent WorkSafeBC (WSBC) initiatives as an example of this proposed litmus test in action. The concepts that follow are still to be adopted by our Board of Directors and membership. I offer these ideas here so that you can think about these things over the summer and be prepared for the important discussions that will take place at the CAA's Special General Meeting at the International Snow Science Workshop at Whistler in September.

Ian and I started with a few simple questions and a white board. Here's what resulted.

What is the CAA's role?

The CAA serves society by offering programs, services and materials that enable others to deliver world class avalanche safety (see the CAA Constitution for specifics)

What are the CAA's core values?

- *Excellence*
- *Inclusion, diversity*
- *Fairness*
- *Life-long learning*
- *Altruism*
- *Forward thinking*
- *Respect*
- *Accountability*
- *Integrity*
- *Collaboration, teamwork*
- *Voluntary participation*
- *Transparency*

How does the CAA do its work?

The sciences inform our membership; our membership informs the scientists.
Real world experience and the collective wisdom of our membership inform operational practices.
Experts collaborate to develop and/or deliver CAA programs, services and materials, in keeping with current science and operational best practices.
The CAA offers these programs, services and materials to stakeholders and members of the international avalanche community, enabling them to provide the best front line avalanche safety programs possible.

A litmus test for CAA initiatives?

The CAA should take leadership of an initiative under consideration only when the answer to all of these questions is "yes."

- Will it enable others to deliver enhanced avalanche safety?
- Will it be perceived as serving the greater societal interest of public safety?
- Will it be based on good science and/or best operational practices?
- Will it be validated by the real world experience and collective wisdom of our membership?
- Will it be created by experts, through collaboration?
- Will it be congruent with all of our core values?
- Will it benefit more than one individual or organization?
- Will stakeholders see the CAA as the right organization to do this work?
- Will it be economically feasible within our not-for-profit structure?

Let's use the CAA's efforts in the recent WSBC regulatory development initiative as an example of this litmus test in practice.

Will it enable others to deliver enhanced avalanche safety? Yes. Workplace safety is an issue the CAA has been concerned with for many years. Appropriate and effective safety regulations enable employers and workers in front line avalanche operations to enhance safety in their workplaces. Our efforts are also intended to assist the regulator (WSBC) in crafting regulations that will be workable and effective.

Will it be perceived as serving the greater societal interest of public safety? Yes. Worker safety is clearly an area where a greater societal interest exists; society as a whole is impacted and carries the costs when workers are killed or injured.

Will it be based on good science and/or best operational practices? Yes. The CAA's submissions to the WSBC are in keeping with current social science relating to worker safety, and reflect best operational practices in avalanche safety operations.

Will it be validated by the real world experience and collective wisdom of our membership? Yes. Our recommendations to WSBC have been repeatedly validated by the CAA membership. Specific elements, such as recommended qualifications for planners, have been approved by the CAA Board of Directors and ratified by a vote of the membership at our most recent annual general meeting.

Will it be created by experts, through collaboration? Yes. Experts representing all sectors of the avalanche community, as well as representatives of stakeholder organizations such as APEGBC had input into the development of the CAA's recommendations regarding the proposed WSBC regulation.

Will it be congruent with all of our core values? Yes. Our recommendations to WSBC, and the process used to develop those recommendations, are fully congruent with all CAA core values.

Will it benefit more than one individual or organization? Yes. Development of an appropriate worker safety regulation benefits all workers, employers and WSBC.

Will stakeholders see the CAA as the right organization to do this work? Yes. No other organization is able to represent the expertise of the full spectrum of avalanche related activities that will be impacted by this WSBC regulation. The CAA's influence is enhanced because our motives are altruistic. The CAA has nothing to gain or lose from the outcome of this regulatory development process; our only motivation is to do the right thing for the entire avalanche community.

Will it be economically feasible within our not-for-profit structure? The CAA has the financial means to engage in these "community representation" activities, and it is the clear wish of our membership that we continue to engage in initiatives that enable them to deliver enhanced avalanche safety in their front line operations.

When I measure every other activity the CAA does against the litmus test described above, they all fit. What does this mean for our membership? It means the CAA is beyond the perceived self interest of many professional associations with legislated right to title and right to practice. Over the years our membership has collectively created the CAA's identity—strong core values, high ideals, and serving the greater societal interest.

In addition to all of the expected training courses and experience requirements for work in avalanche operations, the people that hold CAA membership are voluntarily and publicly declaring their personal commitment to all of the values and ideals that the CAA stands for. In the 21st century what better qualification could there be?

I welcome your thoughts and comments on this article. Have a great summer and I hope to see you at ISSW in Whistler in September.

Stay safe,

Clair Israelson
Executive Director,
Canadian Avalanche Association

WorkSafe BC Public Hearings

On May 26, 2008, CAA Executive Director Clair Israelson made this oral presentation at the public hearings of WorkSafe BC.

I am Clair Israelson, Executive Director for the Canadian Avalanche Association (CAA). The CAA is representing workers in these matters. The following comments on behalf of the CAA are pursuant to the proposed Part 4, General Conditions relating to avalanches.

Background and context

The CAA is a not-for-profit, non-government organization that represents the people and collective expertise of the Canadian avalanche community. We've been serving and supporting the avalanche community since 1981.The CAA has over 800 members. Our members are employed as ski patrollers, mountain guides, provincial and federal avalanche technicians, wardens, rangers, engineers, geo-scientists, foresters, other registered professionals, researchers, consultants and in other occupations.

In its Constitution, the first two Purposes for the CAA are as follows:

1. To represent persons who are professionally engaged in avalanche-related activities in Canada.
2. To establish and maintain high standards of professional competence and ethics for persons in avalanche-related activities.

The CAA believes that our work pursuant to this proposed WSBC regulation is congruent with the CAA's Purposes, and that the CAA is uniquely positioned to offer knowledgeable comment on all aspects of the proposed regulation. Worker safety has been an important issue for the CAA for many years. As we stated at these sessions a year ago, we fully support a well crafted WSBC regulation that will help to improve the safety of workers exposed to avalanches. We would like to commend WSBC on your efforts over the past eight months to engage in meaningful consultation with stakeholders.

General comments regarding the proposed regulation

The CAA is generally supportive of the March 2008 version of the proposed regulation. We believe this regulation is now conceptually workable and will enhance worker safety for all three categories of workers we identified in our oral submission last year – unprotected workers, protected workers and avalanche workers.

The proposed regulation explicitly references several CAA technical or guidance documents. I am pleased to state that this month the CAA unanimously ratified training and experience qualifications for persons who would serve in the role of "qualified avalanche planner" under the proposed regulation, and that these qualifications will be published to the CAA website and elsewhere once the WSBC regulation is finalized.

Through this spring and summer the CAA will be continuing to work with experts from the various sectors within the avalanche community to further revise and clarify other CAA guidance referenced in the proposed regulation. Specifically, we intend to enhance the following:

- Guidance for avalanche risk assessments for wilderness operations.
- Guidance for preparation of active avalanche safety plans.
- Recommended minimum training and experience qualifications for avalanche workers with responsibilities for decisions affecting workplace safety.

When completed, these revised guidance documents will be published and widely circulated by the CAA. We do suggest that clarification is required to explicitly state that the requirements of section 4.1.2(2)(a), which calls for an avalanche risk assessment prepared by a "qualified registered professional" or "QRP" will not be required for ski slopes in downhill ski resorts that have active avalanche safety programs.

The ski resort operators already know which of their ski slopes are capable of generating avalanches. In fact, the product that these ski resorts advertise most often is their steep double black diamond ski terrain that is by definition avalanche prone. The resort operators do not need an engineer to tell them they are skiing in avalanche terrain; what they do need is a well qualified avalanche planner to devise an active avalanche safety program that will provide high levels of worker and public safety.

We also request clarification that if an avalanche risk assessment that would now fall under proposed section 4.1.2(2)(a) has been conducted by a QRP in the past, then there will be no need for this work to be repeated when this regulation comes into force. (Example, —Coquihalla Highway, BC Ministry of Transportation.) We suggest that safety plans be reviewed at least every five years, rather than three, or whenever operating circumstances change significantly.

The role of QRPs

The CAA believes there is a critical role for engineers, geo-scientists and foresters (QRPs) with sufficient training and experience, in the delivery of avalanche protection for workers and public safety in BC. The CAA applauds the requirement for QRPs

and qualified avalanche planners to work together in circumstances where worker safety is in question for regularly occupied workplaces such as buildings, construction sites, logging, transportation corridors, etc.

The APEGBC – ABCPF - Joint Practices Board Technical Bulletin entitled "Snow Avalanche Assessments in the Forest Sector – Skill Sets for QRPs" specifies the training and experience requirements for QRPs involved in snow avalanche assessments in BC.

The CAA feels obliged to bring to the attention of this panel that we believe the professional qualifications contained in that Technical Bulletin are inadequate, conceptually flawed, and possibly unsustainable. Also, despite Codes of Ethics intended to be enforceable on members, it appears that only a few (perhaps eight or 10) APEGBC or ABCPF members who are presently conducting avalanche risk assessments in BC comply with all of the "essential requirements" stated in this Technical Bulletin.

For the record, the CAA contends that this situation has the potential to jeopardize the lives of workers in BC. For this reason we request that WSBC continues to carefully monitor issues regarding QRPs and avalanche assessments in BC. Within the next few weeks the CAA will be engaging APEGBC and the ABCPF, and will be requesting their urgent attention to these issues. We trust that these issues will be resolved in an appropriate and timely manner.

Implementation considerations

A year ago I stated that *"we need a full year to work with professional associations and employers' organizations to develop consensus based qualifications and sector-specific guidance for persons who will conduct avalanche risk assessments, and create and implement avalanche control plans in BC."* I am pleased to report that I believe these tasks will be substantially complete by this fall (October, 2008).

A year ago I stated that *"we believe employers will need one additional year to do the avalanche risk assessments and prepare the avalanche control plans for the spectrum of operations in BC where workers are exposed to avalanche hazards."* In many cases these risk assessments have already been done and well designed active avalanche safety programs are already in place. For those that have not already been completed, the CAA contends that rather than rushing poorly designed safety programs into the workplace, it is preferable to give all stakeholders a reasonable amount of time to produce high quality risk assessments and safety plans.

A year ago I proposed the fall 2009 or some later date as determined by WSBC as the implementation date for this regulation. Respectfully, and not withstanding the urgency for action toward our common goal preventing workplace accidents due to avalanches, I suggest again that fall 2009 is the earliest reasonable date that this regulation should be implemented. In our work on this issue over the past year I have become more keenly aware of the challenges facing the commercial snowmobiling sector in their efforts to develop professional qualifications, operating standards and other quality assurance mechanisms. I believe this sector may be asking WSBC for an exemption from this regulation until the fall of 2010.

For the record, and in consideration of my point a moment ago that *"it is preferable to give all stakeholders a reasonable amount of time to produce high quality risk assessments and safety plans,"* the CAA would not object if WSBC granted an additional year to the snowmobile sector to fully comply with the proposed regulation. The CAA will be sending you a written submission that will contain suggestions for minor wording changes for clarification. Thanks for this opportunity to speak to these issues.

Getting It Right


Brad White

Here's where I'm at. Another successful AGM behind us and I'm feeling positive about my participation. We have two new board members at the table and my sense is that the membership's trust in the board is high. It never ceases to amaze me, the enthusiasm and energy that our members bring to the AGM week in Penticton. The learning, networking and social opportunities are second to none.

Last year the board was tasked to explore options for more formalized credentials our members. This issue has been on the CAA's agenda for discussion a number of times over the past decade or so, and for various reasons this goal was never realized. Concepts suggested by members included scope of practice guidelines, trades or technical certifications, or even pursuing a registered professional designation with exclusive right to title and right practice.

The board decided to dig deeper into these issues at our recent board development workshop. We brought in a consultant who specialises in regulatory trends to help us better appreciate the complex and rapidly evolving regulatory and societal context that we operate in. The weekend proved to be invaluable, clarifying the issues we face and consolidating the board's mental model for what the CAA's role should be, and how we should best contribute to avalanche safety programs in Canada. Today I believe it is very fortuitous that we never made the attempt to become a guild, a union or a registered profession.

In the current regulatory/political/societal environment, trades or technical certifications for avalanche workers are

> **"I believe it is very fortuitous that we never made the attempt to become a guild, a union or a registered profession."**

not viable options. The pool of workers is too small, there is significant specialization within each of the sectors, and our craft cannot be learned and examined in school. Designating avalanche work as a registered profession could be possible. It would however, be politically difficult, prohibitively expensive, onerously time consuming and, the board believes, in pursuit of an antiquated concept. In the modern era any certification model that moves us towards a monopoly on right to practice and creates barriers to mobility will not likely be endorsed by government and will not enjoy unqualified support from employers or society.

The public is increasingly sceptical of self-governing professional associations with exclusive right to title and right to practice. Numerous reports from federal and provincial agencies on all sorts of self-regulating professions reveal this trend. Essentially, the growing perception is that these organizations are too often self-serving, placing their members' personal interests ahead of the public's interests.

Over the years the CAA has proudly presented itself as principled organization that does the right thing for the right reasons. As an organization we strive to serve an important societal interest, empowering others to deliver high quality avalanche safety programs that protect life and property. When I look back at old meeting notes and PowerPoint slides, I see this ideal recurring again and again. Because of our tradition of putting the societal interest first, we have become a truly influential voice within the regulatory regime for avalanche safety operations.

Protection from avalanches is about public safety, a key societal interest in the modern era. Effective regulation of avalanche protection operations is achieved through a continuum of "hard" and "soft" regulatory instruments. Hard regulatory instruments are laws and regulations, the written rules created by governments to define, prohibit and punish socially unacceptable behavior. Soft regulatory instruments include things like self-imposed standards, operational guidelines and even to concept of good faith. This "regulatory regime" is not a formal entity; it is a dynamic environment where government agencies,

industry and professional associations, front line operators (employers), workers, educational institutions and other entities all play a distinct and complimentary role. The CAA's role is to enable others—our members and their employers—to carry out their diverse responsibilities for avalanche safety. The mechanisms and accountabilities for quality assurance in those front line operations are, and should be, fully independent of the CAA.

The CAA also serves an important "soft" regulatory role with its members. Our membership collectively sets the rules that all CAA members are required to meet. Members must be professionally engaged in avalanche-related activities, meet the training and experience qualifications specified in the bylaws, and conduct their activities in accordance with our Code of Ethics and other policies. We have developed the Recommended Qualifications for Avalanche Workers documents that you endorsed this spring. These are absolutely relevant to avalanche safety programs in Canada, but it is not the role of the CAA to police how an individual operator chooses to integrate these guidelines into their operations. Employers have their own regulatory obligations, operational needs and economic realities, among other things, to balance.

I'm proud that our membership has been proactive, anticipating rising societal expectations for avalanche safety, and has responded by tasking the board to propose additional structures that will assist our members to publicly demonstrate their capacity for excellence in the important public safety work that they do. The board will not be proposing creation of a trade, technical or registered professional designation for avalanche workers. Those structures do not suit our needs, values or our style. Instead, we will be proposing a principled, modern and transparent mechanism that is in keeping with the needs of the Canadian avalanche community and societal expectations in the 21st century.

Over the summer the board will be drafting a Code of Conduct for all CAA members. I see this document fully addressing the worker qualifications and scope of practice issues that were such a strong theme at our AGM this spring. When finalized and ratified by the membership, this Code of Conduct will enable members to demonstrate a voluntary, personal commitment to delivering avalanche safety programs of the highest quality possible. Our goal needs to go beyond the old concept of professionalism; our goal should be operational excellence. In this way we serve the best interests of society and enhance the credibility and reputation of all CAA members. As always, your ongoing involvement and feedback is essential.

Have a great summer,

Steve

Troy Grant

CAA Annual General Meeting

May 6, 2008, Penticton, BC

President Steve Blake started the meeting with a report from the Board of Directors. The BOD created some policy and directional documents this winter, including the Enterprise Conflict Avoidance Policy, complaint resolution mechanisms, software development, foreign membership policy, and documents for WorkSafe BC.

The intent of the conflict avoidance policy is to protect the interest and investment of CAA members. If a member wants to start a business enterprise that is similar to a service or product provided by the CAA, the board would like to discuss the matter with the member first, to determine if there are direct conflicts or potential partnerships. If someone is wilfully trying to damage the interests of the membership, the BOD will bring the matter to the attention of the membership at a forum like the AGM for a decision on how to proceed.

Members asked for clarification in what would constitute a competing product. Steve discussed the conflict that can occur when individuals wear two "hats" (the CAA, and their own). Steve added that we want to foster and encourage innovation, and there is good synergy to be gained with people working together towards a common goal.

Steve was asked how this policy differs from Intellectual Property rights, and he explained that the IP policy is more of an ownership issue. The membership requested that this policy not be seen as putting up roadblocks, and wanted more clarification in the wording. The policy needs to be written clearly so people aren't discouraged from taking on initiatives.

Vice-President Rob Rohn explained the process that would occur. This policy gives the BOD no new authority, and any decision would require a vote from the membership. The action item from this discussion is that the BOD will clarify the policy and present it to the membership in the future.

Steve explained the Complaint Resolution Process and summarized the numerous steps, all of which involve the Professionalism and Ethics Committee. There are different levels of investigative responsibilities, and how each step is applied is incident specific.

The BOD received two complaints about member conduct and used this process for resolution. The Professionalism and Ethics Committee investigated one complaint and forwarded their recommendations to the BOD. The Board then notified both parties of the resolution that had been achieved. The other complaint is still ongoing.

Software development was a big challenge in the past year and the BOD is currently analyzing a consultant's report, which reviews our strengths and weaknesses and provides some recommendations.

Special Resolution to Dissolve CAA Alberta:

Following the Special Resolution made at the AGM 2007, Steve explained that the CAA discovered we could not intra-provincially register the BC society in Alberta under the same name if the CAA Alberta society was to be dissolved. This may not be the best course of action. The CAA is continues to explore options to deal with this issue. A motion to request the BOD further investigate the dissolution of the CAA Alberta society was carried unanimously.

Executive Director's Report

Clair Israelson began by thanking the members of the BOD for their many hours of diligent work on behalf of the membership. Clair also asked everyone in the audience who had ever served on any CAA committee to stand, and noted the CAA is driven by its membership. All who had volunteered their time on the board or on committees were given a big round of applause.

Clair also acknowledged the staff of the CAA and provided an overview of member services undertaken in 2007/08. Representation was a huge focus (e.g. WorkSafe BC, BC Coroners Service, MSC, media and stakeholder agencies and various other points of contact). This work furthers our collective interests and works in partnerships to take the association forward.

The BOD tasked the CAA to put more focus on CAA member communication. Our quarterly journal *avalanche.ca*, special members e-mail, and monthly newsletters have been instituted. He also discussed the AGM and CPD seminars to benefit members. There is major recruitment ongoing for ITP and CAA projects. Emphasis on members and customer service was a key strategic goal, and Clair discussed the incremental improvements to IT, financial and operational support systems. There was more use of operating revenues to fund ITP, InfoEx, CAIS and SnoInfo upgrades, which reduced IPDF dollars for program upgrades. However, CAA operating revenues were up 6% to $1.07 million.

Clair listed some internal projects that were undertaken from IPDF including OGRS, InfoEx, Avalanche Accidents in Canada Volume 5, and new project developments. Nearly $30,000 was spent on these internally funded projects. The CAA has completed year one of a two-year NIF project "eTraining for Mountain Operations & Avalanche SAR." This project is successful to date, leading edge and very exciting. Ken Wylie has left the project and Mark Bender has now taken on the role of content developer for the project. There is a strong production team from the University of Calgary in place. Clair acknowledged and thanked all subject manner experts and content advisors.

Clair reviewed his "report card" for the CAA and stated it has a highly functioning BOD and committees with good governance policies and financial management systems. Staff members are highly capable and motivated, and there is high customer satisfaction with most CAA programs and services. The CAA has strong potential for continued growth in products and services. It enjoys a growing national and international recognition.

The challenges for 2008/09 include decisions regarding data management software services (InfoEx, CADs, GIS). There are increasing demands for ITP programs. As well, there are increased expectations of the CAA regarding issue resolution for members, employers and other organizations, and government. Staff workload, burn out and retention continues to be a challenge.

Clair closed by discussing some opportunities for 2008/09. This includes redesigning concepts or systems, ITP offerings and engaging new markets, WorkSafe BC regulations, associated guidelines, and recognition of the professionalism of the membership.

Financial Report

Secretary-Treasurer John Hetherington provided a six-year comparison of the balance sheet for the CAA and then reviewed the finances for the year 2008. He reviewed liabilities and surpluses, and discussed reimbursement of the Intellectual Property Fund, and depreciation for property, plant and equipment. Detailed financial statements are available to any members upon request and were provided. The CAA Statement of Operations for March 31, 2008, was presented.

CAA Operations Manager

Ian Tomm spoke of the high demand for Level 1 and Level 2 courses and explained that employers have the opportunity to reserve course spots for their staff. Traditionally they have filled between 50-75% of their enrolment this way. However, this year, employers have reserved 20% more spots than there is capacity for, and this includes a 30% expansion in Level 2. Therefore, there may be no "general" enrollment for Level 2. Ian added that perhaps one course could be added to each of the three modules, but the CAA would be challenged to maintain the high standards of service delivery. Essentially, the ITP has reached capacity. The focus is on retaining and training new instructors. If any members are interested in teaching workers of tomorrow, Ian needs you!

The Level 1 course had a wait list of 80 people last year and demand for other programs has also increased. Ian noted that the ITP program is run for the members, so if people have ideas for other courses or see a demand for training that isn't being met, please let him know.

Membership Committee

Membership Committee Chair Ken Bibby reported that 71 member applications had been approved last year and between five to 10 denied. The CAA membership is currently comprised of:

- Professional members ~ 375
- Associate members ~ 102
- Affiliate members ~ 236
- Active members ~ 116

Associate memberships have levelled off over time, but there continues to be steady growth in professional memberships. The affiliate membership is dropping due to the active member category. Ken added that the membership committee will concentrate on increasing the number of associate members.

This year the random selection process of CPD auditing has been formalized so there is now a clear, transparent method to identify members to be audited. Ken will post information on how that works. He added that there will be 10 professional member audits, and five active member audits carried out be-

CAC Operations Manager John Kelly (centre) meets with key members of the youth education team. Clockwise from John's left Julie Timmins, Danyelle Magnan, Verena Blasy and Amber Wood.

Mary Clayton

tween May 1 and September 1, 2008. The CPD form is available for download on the CAA website and contains instruction tabs. All ITP instructors are audited on an annual basis so instructors must submit their CPD reports in order to be involved in the ITP program.

Ken provided some background on requests for CAA membership from international members. We are working towards becoming a world leader and to work internationally with collaboration; this is congruent with the CAA vision. Global perspective would help the CAA, and this would also broaden our knowledge base. There is potential for the CAC AST program to be offered internationally.

Four membership applicants, all of whom would be strong assets to our association, were turned down because they cannot meet the requirement of Canadian work experience. A special membership category in a separate stream is being proposed. Ken reviewed some suggested international membership requirements and next steps. He was questioned on AST course delivery in the US, and whether American avalanche organizations had been contacted about this potential exportation of avalanche training. International non-voting membership and dues were also discussed.

A motion was made to recommend the BOD pursue the creation of an international membership category. The results of this are to be presented for ratification at the special meeting at the ISSW. The motion was carried with all in favour.


Franz Fux, Peter Schearer and Bruce Jamieson share a laugh.

Mary Clayton

Explosives Committee

Explosives Committee Chair Bernie Protsch reported on the committee's review of the blaster's exam. Some changes were made and Bernie asks that if anyone writing the exam notes any mistakes, please contact him. CAA explosives procedures were also reviewed and updates are planned. The creation of a training video is a focus and Bernie is hopeful that this occurs within the next seven months.

New regulations for magazine security surveillance were discussed and Bernie added there is no reliable technology in place to address remote magazine security surveillance. Compliance costs would be high for areas with remote caches and the regulations are onerous. Bernie encouraged stakeholders to contact Ottawa regarding these regulatory changes. (For a full report on these new regulations, see the article on page 27.) The CAA will write a letter to the Chief of the Explosives Branch for Natural Resources Canada, regarding the deficiencies in the new proposed regulations.

Technical Committee

Cam Campbell was recently appointed as chair of the technical committee, and he thanked Rob Whalen for his five years of service as chair. Rob will remain a committee member. The revision of OGRS was a major accomplishment and the committee has received positive feedback. He also discussed the work undertaken to finalize grain classification. The US is now revising their snow avalanche guidelines (SWAG) and we will give OGRS to them so the two documents will look very similar once again.

Education Committee

Chair Marc Deschêne reported that the Education Committee was tasked to draft a reference form for Level 2 applicants and an ITP instructor standards review template. They have completed the reference form but are continuing work on the Level 2 instructor standards form. Other initiatives included the review on new education initiatives, AST instructor manual and revisions review, and Level 1 weather observations, although some work is still required for next year. The Education Committee has also provided feedback to upgrades of the avalanche sledding manual.

There are proposals for teaching DACUMS for basic and advanced weather courses, the applied avalanche forecasting course, mountain operations and SAR, and a review of the "White Risk" DVD from Switzerland. The CAA is planning a beta release this fall for the proposed avalanche forecasting course. They are looking for paid curriculum developers and reviewers, and there is lots of work to do.

Proposed Qualifications for Avalanche Workers:

Steve reviewed the history of this issue and stated that informal CAA qualifications have been developed over time. There are no formalized qualifications for avalanche program planner or forecaster. The CPD program and professional registry was developed in the late 90s to begin to address this but, while the CPD program has been successful, the registry failed due to lack of explicit guidance for the self-assessment process.

In the past few years there were increased concerns about how some people in the industry were operating. No career path following completion of the Level 2 course existed. The BOD was given specific direction from membership at AGM 2007 to pursue qualifications and scope of practice guidelines for avalanche workers, given the proposed WorkSafe BC regulations. This was a converging path for demonstrating professionalism within our industry and WorkSafe BC.

Consultation has occurred with our membership and other stakeholders to fully engage people through the process. Steve reviewed the various consultations that had occurred over the past year, and the modifications to the document that had taken place. Today's meeting, he said, is meant for ratification, not further consultation.

This is the opportunity for avalanche workers to achieve recognition in a regulatory environment. The BOD requests ratification of proposed qualifications for planners, and agreement in principle for other categories. WorkSafe BC is awaiting our vote prior to wording the regulation, and this is our opportunity to have a role in these regulations.

A motion was made to ratify the proposed qualifications for planners. After some questions and comments from the floor, the motion was carried with all in favour. Another motion was made to endorse in principle the minimum qualifications for forecasters, technicians and assistant technicians. The motion was carried with all in favour. Some discussion ensued about the applied avalanche forecasting course and the BOD was encouraged to give Ian as many resources as he needs to build this course.

Elections for the 2008 BOD positions were as follows:

President – Steve Blake (2008-2010) - acclaimed
Sec/Treasurer – John Hetherington (2008-2010) - acclaimed
Director for Professionals – Mike Boissonneault (2008-2010) - acclaimed
Director for Associates – Dan McLellan (2008-2010) - selected in prior meeting

Johann Slam and Mike Rubenstein were up for re-election on the Membership Committee. Both agreed to run again and were acclaimed for another term on the membership committee. Steve noted that the Professionalism and Ethics Committee is comprised of six members and representation from the six sectors is highly desirable. Individuals should contact John Hetherington or Steve Blake if they are interested in serving on the Professionalism and Ethics Committee.

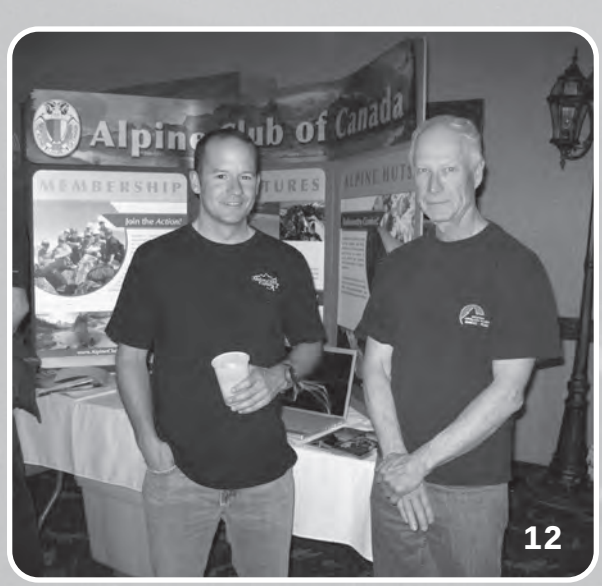
The floor was opened to new business and Bruce Allen made a motion that the CAA investigates the possibility of purchasing a training facility for ITP use. The motion was seconded and carried.

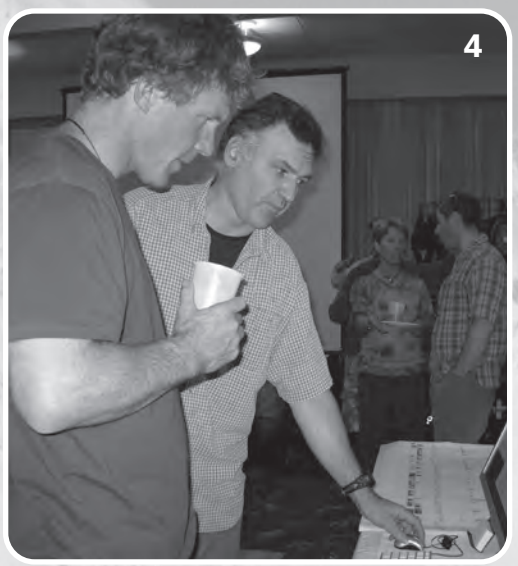
More than 200 caa members gathered in the Penticton Conference Centre for the morning presentations of the Continued Professional Development day.

Mary Clayton

Tradeshow Pro Purchase Seminar

May 6, 2008 Penticton, BC





1. Jim Henderson of Rocky Mountain Extreme had ABS packs on display.
2. Andrew Fodor discusses some of the new products from Arc'teryx with Kirsten Knechtel.
3. Felix Camire is the Western Canada rep for Backcountry Access.
4. Daniel Curry demonstrates the Avert software to Grant Statham
5. Chuck Gorton, Director of Operations for Canadian Powder Adventures, demonstrates the Snow Pulse airbag system to Brad White.
6. Doug Harstrom with Ferno Canada discusses rescue gear with Peter Marshall.
7. Naheed Henderson is on the Product Design and Development team for G3.
8. Othmar Kagi of Swiss North Marketing had all the latest technology from Pieps.
9. Gord Burns and Alison Cardinal of Recco share a laugh with Ilya Storm.
10. David Sly of CIL/Orion smiles for the camera.
11. Karl Ernst brought some new product information from GazEx Systems.
12. Executive Director Lawrence White (left) amd Sid Scull were on hand to represesent the Alpine Club of Canada.

All photos CAA Staff.

Sharing the Wealth

The CAA rules when it comes to avalanche education, says this American writer. Why don't we let more foreigners in the club?

By Marc Chauvin

"Nine months of winter and three months of bad sledding." That's how Canada's seasons were once explained to me and, despite the relative lack of summer, it's clear what the impact of all that snow has been on Canada's avalanche professionals. Canadian Mountain and Ski Guides lead the world in the area of snow science and CAA training is an important foundation for that reputation.

When I was thinking about increasing my knowledge of snow I looked to the CAA and its professional education program. Over a few years I took both the Professional Level 1 Course and the three modules of the Level 2. I received exactly what I expected—a professionally run intensive course on the science, risks and avoidance of the avalanche hazard. I left my last course satisfied with my investment without expectation of membership or credential. I wanted the information and I had received it.

> **"Canadian Mountain and Ski Guides lead the world in the area of snow science and CAA training is an important foundation for that reputation."**

So now a few years have gone by and I yearn for more. Why? I miss the connection with other similarly trained professionals. Although I have connections with avalanche professionals in my home area, I find that my training with the CAA has me looking at things differently and I miss having conversations with like-minded professionals.

I remember being in a Swiss hut during the ski touring season not too long ago and there was an ACMG guide there. We started talking about snow and I got the sense he had been unable to discuss the local conditions with someone similarly trained and had been a bit frustrated by that. For me it was a breath of fresh air and a reminder of how important it is to communicate with someone who has common training and semantics.

For me, nowhere is this need more acute than when I teach snow safety to the increasing numbers of entry-level recreational skiers and climbers in my area. I don't see myself as someone who has so much experience and training that I am capable of passing on information, even to an entry-level user group, without some support from an organization devoted to avalanche training. Keeping abreast of new methodologies of decision making for the entry level skier, along with a lack of support material based on the kind of training I have received, has been my biggest frustration.

I know the politics within institutions and between them are important considerations. As a US citizen I know the importance of good relations between the CAA and organizations like the American Avalanche Association (AAA) and the American Institute for Avalanche Research and Education (AIARE). In truth, I rely on both American organizations for support. In fact it was my involvement in AIARE that inspired me to go through the CAA courses. As an AIARE instructor it was highly recommended that I take CAA courses. Now, having taught AIARE courses and become familiar with the AST program, my personal opinion is that AST fills a need not met by AIARE.

AIARE does not have a two-day entry level curriculum. The AIARE curriculum begins with a three-day course that follows AAA guidelines for the US Level 1. Looking through the AAA educational guidelines however, shows the AAA strongly recommends that the US Level 1 be preceded by an eight to sixteen hour course that uses simple decision making tools, such as Ian McCammon's Obvious Clues Method on the Avaluator. AIARE has nothing that fills that need.

A lot of time and energy has gone into the development of the AST program. The Avaluator and the data behind it is a useful teaching tool regardless of area. Admittedly the terrain rating

system isn't as useful unless someone is traveling in Canada. The question you have to ask is, how many foreigners are ski touring in Canada? Isn't it in your best interest to have the terrain rating system understood by visitors? If you believe in the terrain rating system and feel it is a good way to enhance the recreational skier's understanding of the real risk, wouldn't you want it to spread?

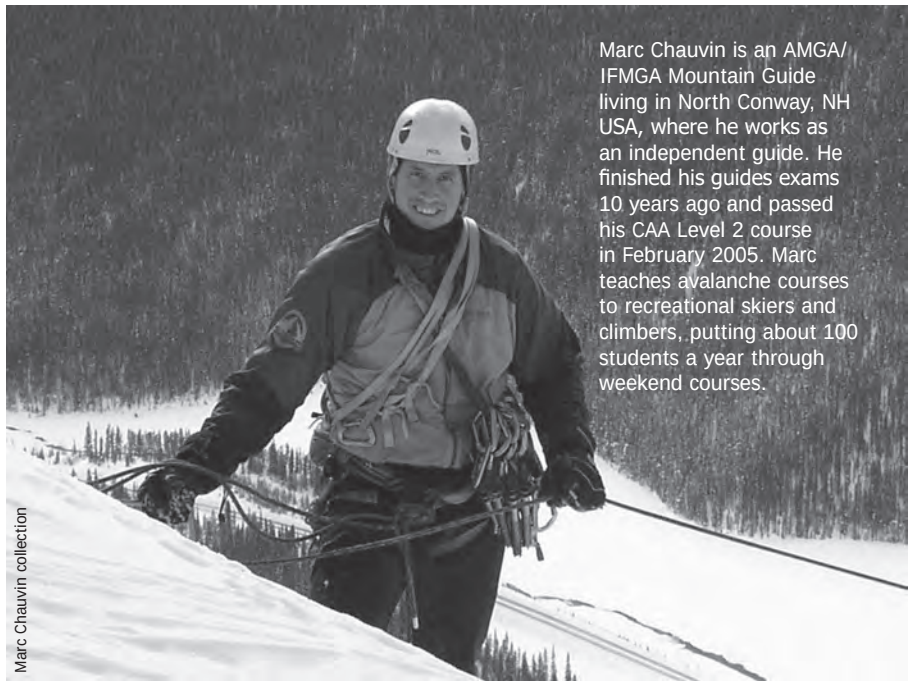
In my opinion one effective strategy to accomplish this would be to have CAA-trained foreigners able to introduce this tool to their countries. Another benefit would be that foreign members could feed more students into Canadian-run AST 2 courses. I believe that an increase in students for AST 2 courses in Canada will increase the number of AST 2 courses being offered and make those courses more convenient and accessible for Canadians.

In Canada, you have one of the most comprehensive avalanche training regimes in the world, spanning the entire range from entry level recreational to professional. It is a shame that such a well thought-out curriculum for recreational skiers is not allowed to spread to areas with fewer resources or allowed to compete in areas with some structure.

The CAA has made a decision to allow foreigners to take their professional level courses. It seems you should continue to support these professionals with educational material, newsletters, and access to CPD training that only some form of membership can allow. Speaking as someone that enjoyed my time in Canada during my courses it would be nice to remain connected to the community I was introduced to through some kind of membership.

From the CAA Constitution:

A person is eligible to be a Practising Professional Member if...during four of the previous six winters, the person was engaged full-time in avalanche related activities, at least two of which were in Canada...
A person is eligible to be an Active Member if...during two of the previous four winters, the person was engaged in avalanche related activities in Canada...



Marc Chauvin collection

Marc Chauvin is an AMGA/IFMGA Mountain Guide living in North Conway, NH USA, where he works as an independent guide. He finished his guides exams 10 years ago and passed his CAA Level 2 course in February 2005. Marc teaches avalanche courses to recreational skiers and climbers, putting about 100 students a year through weekend courses.

CPD Workshop 2008

This spring's Continuing Professional Development meeting focused on the pending WorkSafe BC regulations and their implications for front-line operations. After a morning of thought-provoking presentations, members split into two workshops for the afternoon to share insights and ideas. All sectors of the avalanche safety community were represented within each workshop and CPD organizers Clair Israelson, Ian Tomm and Janice Johnson created a series of questions for the participants to ponder. Here is a summary of the answers.

Professionalism and Implementation Issues

Question #1 – Are Scope of Practice statements helpful or necessary for workers (forecasters, technicians, assistants) and employers in your sector, or are "recommended qualifications" enough? Why or why not?

The vast majority of the participants said SOP statements are necessary in their sector. The most popular reasons given were that such statements can best define areas of expertise, set standards and ease mobility between sectors. Safety for both workers and employers was also mentioned, as well as public accountability and transparency.

None found SOP guidelines unnecessary but one group said they weren't necessary at this point, although they may be in the future. There were some concerns, especially monetary ones regarding their implementation. These included the costs of training existing staff to meet qualifications and how smaller groups, such as volunteers and not-for-profits, would be affected.

Question #2 – Consider mobility between sectors. As an example, a ski patroller going to work as a Park Ranger. What should happen when the best qualified person available to be hired for avalanche work does not fully meet the "CAA recommended qualifications" for a position?

All participants recognized a need for the worker to eventually attain the recommended qualifications for the position, and the discussions focused on the best ways to help the worker achieve that goal. Mentoring, both internally and externally, was by far the most popular solution.

All groups felt the onus is clearly on the employer to ensure the worker's training needs are being met and to ensure safety is not being compromised because of under-qualified personnel. The importance of clear communication was mentioned several times, specifically when clarifying limits on unqualified workers or adjusting the program until qualifications are met. Some concerns were raised about recommended qualifications creating a shortage of trained workers.

Mary Clayton

Mary Clayton

Question #3 – Grandfathering of qualifications. In every instance where new qualifications are invoked, a group of existing practitioners agree that they are suitably qualified and that all new applicants must meet the new qualifications. Please propose principles for how this might be done for avalanche workers in a way that would stand up to scrutiny.

Many groups mentioned areas where better definitions are required to communicate experience. Some suggested that a committee be struck to establish the criteria required, and most suggested that PLAR (Prior Learning Assessment and Recognition) be a core component of the grandfathering process. Another common theme was the importance of public input in this process.

One group said there should be a limited need for grandfathering, and a couple of groups suggested an alternative. A "grace period" approach would require established practitioners to acquire the training and certifications necessary for their position, but they are allowed a certain amount of time to do so.

Question #4 – Should the CAA work towards ensuring "recommended qualifications" and Scope of Practice statements are binding on our members and enforceable under our bylaws and code of ethics.

All groups answered "yes" to this question. The main focus of the discussion was on how this would be achieved and many mentioned a need for that process to be transparent and accountable. Some suggested internal oversight, where senior employees monitor junior employees, and others suggested a CAA committee. A need to separate regulatory from teaching bodies was noted and another group suggested that standards should be established by industry, not the CAA.

Question #5 – The public has expectations for professionalism in avalanche work (public safety). Avalanche workers do not have right to title –right to practice legislation, and we are not a registered professional association. How could the CAA address this issue?

This question generated a wide variety of responses and the group appears to be split on the issue of whether to pursue registered professional status. Some say this is required in order to meet public expectations; others say we are already meeting public expectations so there is no need.

The point raised most often was that there needs to be increased public awareness of our profession, and the CAA should do more to accomplish that. Increasing employer respect was another theme, as was compensation. A number of participants suggested partnering with existing professional organizations to obtain a limited scope of practice for qualified members.

Active Avalanche Safety Plans by Sector

Question #1 – At present the CAA has only published very basic guidelines for assessing the terrain in wilderness operations, so there seems to be an urgent need to create a more appropriate guidance document. Should ATES be proposed as a terrain assessment tool for wilderness operations? If yes, how should it be used? What are its limitations? If no, what are the alternatives?

All the groups answered "yes" to the first question. Some said ATES should be implemented as part of safety plans and used as a go/no go decision tool. Others qualified their support somewhat, calling ATES too simplistic to be used on its own. The need for experienced decision making, applied in conjunction with ATES, was noted by many groups. Also, many groups pointed out the value of ATES as a tool for communication and education.

The limitation identified most was scale. Others mentioned the time and expense of mapping/rating their terrain, and how lack of historical data might affect their ability to do so. The question of liability was raised by a couple of groups, as was the need for flexibility, i.e. ATES as a suggestion, not a mandate.

Question #2 – List all topics that should be addressed in an avalanche safety plan for your sector. If applicable, make separate lists for topics to be addressed by QRP's (qualified registered professionals, and by QAP's (qualified avalanche planners).

QAP

Table of Contents, Program Mandate and Objective
Terrain atlas
Operations
- Observation procedures, InfoEx, daily sharing
- Plot locations
- Stability assessment/ hazard forecast
- a.m./p.m. meetings or Check in
- AC routes/procedures
- Explosives use procedures/shot sheets
- Clearance procedure
- Closure/evacuation plans
- Signage/boundaries
- Staff responsibilities/scope of practice/certification
- Organization's responsibilities to staff
- Group lists
- Run lists
- Guide/personal equipment
- Time profiles
- ATES analysis
- Non-avalanche work protocols
- Night-shift protocols

Staff training
- Control methods
- Rope rescue
- CPD
- Snowmobile/vehicle safety
- Radios

Safety
- Equipment (cache contents and locations)
- Training (requirements for each role)
- Identify access routes
- Guest and staff safety orientation/policies
- House staff guidelines
- Risk identification

Emergency Response Plan
- Chain of command
- Contact info
- Capability of staff and outside resources

Incident Report Forms
Communications/media plan
Waivers
Information available to guests/how shared
Documentation—daily operations, training log
Requirements for periodic review, annual training
Spell out when QRP should be involved
Resources
Appendix
Glossary

Non-mechanized groups:
Guidelines for self-guided groups
- Skill level
- Radio procedures
- Terrain-use tracking

QRP

Hazard assessments/zoning for fixed structures and/or assets
Mapping
Risk modelling
Impact pressure
Determine threshold values

New Courses

The Applied Avalanche Forecasting course got a lot of attention from members this spring at the AGM, and for good reason—it's one of the qualifications identified in the recently ratified Recommended Minimum Qualifications for Avalanche Planners. The interest in the development of some sort of forecasting seminar or course has grown in the last couple of years and this spring the board approved $30,000 in funding to make it a reality. While work has just begun on this new initiative a few things are starting to become clear. We know that it's going to be more than just a forecasting course. It will also involve elements of risk management and, at very basic levels, certain elements of planning.

By the time you are reading this article we'll have a project manager hired and content production well underway. The subject matter experts for this initiative will be the people who attended the Senator's Workshop last October. This is a very different project for us because instead of lengthy and expensive face-to-face meetings to develop goals and objectives, much of this work is being done over the internet by a few select people with input from the SME group.

At this point in time it looks as if the introductory course scheduled for November 10-14, 2008 in Canmore will be by invitation only. This course is new terrain for us, and we're developing it in a different way than we have our core programs. Because of so many unknown factors, the course will be bench tested so that we can continue to offer the high instructional standard our members and students have come to expect—the very best avalanche training for frontline workers internationally.

Stay tuned. It's picking up speed and we're well on our way to developing and delivering the first ever avalanche forecasting/risk management course for frontline avalanche workers internationally. Rather exciting if you ask me.

Some input from Professional Member and IFMGA Guide Karl Klassen regarding the Avalanche Risk Mapping course.

Clearly there are many applications in industry and transportation that we know need mapping knowledge. From my perspective as a guide, I think this is an excellent course for senior lead guides and ski operations managers. I'd strongly recommend this course for decision makers and their supervisors, or anyone who determines where an operation will:

- **have lunch**
- **regroup**
- **establish pickups**
- **build cat roads**
- **transport guests through avalanche terrain in vehicles**

The course met all my expectations and exceeded many. A big thanks to all the instructors and everyone who has played a role in developing this course to date.

Brent Strand

InfoEx Report

By Ian Tomm

This past season marked the 17th year of operation of the CAA's InfoEx information exchange service for frontline avalanche operations in Canada. The program has changed significantly over the past five years. It's hard to believe but as recently as 2004-05 we still had people faxing in their observations and technicians producing summary reports by hand!

The Canadian Avalanche Information System, the electronic brains behind the InfoEx system, has been up and operational now for four full winters and, over the past three seasons we've successfully transitioned all subscribers to an entirely automated data submission process. This has been no small feat. The diversity of our subscriber group (now 100 strong) ranges from some operators not even having a computer (or one that operates on Windows 95!) to very sophisticated and mature IT systems like the BC Ministry of Transportation and Canadian Mountain Holidays.

The data exchanged by subscribers in InfoEx is the blood supply for avalanche safety operations in Canada. This vital information forms the basis for the production of the Canadian Avalanche Centre's public avalanche bulletins, including their special warnings. This exchange enables subscribers to deliver essential public safety services not only to Canadians but to those who travel from around the world to visit our western Canada—from travelers on our roads to tourism at ski areas, and mechanized and non-mechanized backcountry operations. Subscribers should be recognized and thanked for their continued commitment to the exchange of this essential data that enables the highest possible standards for both commercial and public avalanche safety.

InfoEx is seeing a series of upgrades this summer. The InfoEx subscribers group meeting this spring at the AGM was one of the most productive in recent memory. Here is a snapshot of the meeting and the summer development of this collaborative, subscriber-driven data exchange program.

2007-08 in Review

- Subscriber base grew by 5%, including ski touring and industrial-related applications like mining and forestry
- 2007-08 marked the third year of operation of a fully automated, database-driven exchange
- SnoInfo Input tool continues to improve, and was voted by 98% of subscribers in attendance as the preferred method of submission to InfoEx
- The InfoEx Web Portal continues to grow and diversify with roughly 60% of subscribers in attendance reporting daily use of the resources and tools available on the site

Upgrades for 2008-09

- Enhancements to the SnoInfo user interface
- Enhancements to support and troubleshooting documentation
- Enhancements to the web portal including custom report generators
- Development of a new data exchange category specifically for terrain (exchange of run lists, control sheets, discussion of terrain character, etc.)

Subscribers can submit data to InfoEx in a variety of ways including the use of the CAA's own proprietary software called SnoInfo or through patching a third-party system to InfoEx. Web Service API's and InfoEx SDK's are available under license to those organizations wishing to explore these options. The CAA and the InfoEx Subscriber Group welcomes all professionals (organizations and independent consultants, contractors or guides) involved in avalanche safety to participate in the InfoEx program. To be eligible, subscribers must meet minimum standards and include assurances of data quality. Please contact Ian Tomm at itomm@avalanche.ca for more information.

>>Ian Tomm is the Operations Manager for the CAA.

"I feel this spring was just the kind of condition where InfoEx was invaluable. We were kept informed about all the weird and wonderful stuff that was going on, so that the negative-event type of feedback you get with these deep PWL's was kept in context. In other words, InfoEx keeps you HONEST!"

Scott Davis, IFMGA Guide and President of the Association of Canadian Mountain Guides.

New Regulations for Explosives Magazines

Electronic Monitoring Mandated for this Coming Winter

By Bernie Protsch

As part of the ongoing national security program to secure explosives, the Explosives Safety and Security Branch is introducing a new requirement for all explosives storage sites. Starting October 1, 2008, all magazines in southern BC containing explosives must be under surveillance at a regular interval with an electronic record of inspection. The basic premise of the magazine security surveillance program is to ensure the magazine's physical security attributes (e.g. locks) have not been breached and, where possible, assess that its contents have not been disturbed.

This initiative was first announced in the June 2002 document titled "Proposals for Enhanced Explosives Security," following the tragic events of September 11, 2001. This in turn led to the development of an "Explosives Storage Risk Map" for all of Canada. The risk map introduced the concept of high- and low-risk areas. In essence, the southern portions of Canada are defined as high risk, with the exceptions of Prince Edward Island and Newfoundland and Labrador. The northern reaches of Canada are defined as low risk along with the two provinces named above.

Depending on where the magazine is on the risk map, the magazine must be visited either daily or weekly. The visit is recorded with an electronic pen using iButton technology to identify the magazine and record the time and date of the visit. Alternatively, an electronic surveillance can be fitted to the magazine to detect unauthorized entry into the magazine and communicate via satellite with the monitoring company to raise an alarm. The electronic surveillance system must be capable of sending a signal every 24 hours to provide a status of the equipment.

The aim of the directive is to require that users of explosives are diligent in ensuring that their storage magazines are not breached in, and provide an appropriate response when an attempted or actual break-in occurs. These new regulations are part of enhancing security in this province with the lead-up to the Winter Olympics in 2010. It is important to note that the risk map has no correlation to the risk categories developed for the magazine door replacement program introduced with the revision of the storage standards for industrial explosives in May 2002.

In summary, the main requirements to be implemented are that a person must physically visit each magazine and verify electronically that the visit has taken place. A simple log book sign-in entry or honour system are not acceptable. A higher level electronic security system may be used if a person cannot physically visit each magazine. Regardless of the size, quantity of explosives therein, or the type of magazine, each licensee has a responsibility to ensure the explosives in his/her possession and/or licensed by ERD are secure and thus have not found their way into the general public.

All magazines, regardless of type and including those mounted on or in vehicles, licensed for overnight storage will require daily and weekly visits as per the areas outlined on the risk map. For more detailed information about the Explosives Magazine Security Surveillance Program, contact Rod Boulay, Pacific Region Manager and Senior Inspector of Explosives at 604 666 0366. For information regarding the Explosives Regulatory Division and the Canadian Explosives Act and Regulations, go to www.nrcan.gc.ca/mms/explosif.

>> Bernie Protsch is the Chair of the CAA Explosives Committee.

To find out more about iButton technology, enter "guard tour system" in your web browser.

Everett Clausson from CIL/Orion presents the CAA Explosives Committee Chair Bernie Protsch with a support cheque of $7,582.11. The money is to be used for avalanche explosives training and safety throughout the Canadian avalanche community.

Mary Clayton

This man helps you make good decisions.

Dr. Bruce Jamieson leads a world-class avalanche research program, right here in our own backyard. His research helps keep workers and public safe in avalanche terrain. How much is that worth to you?

If you benefit from the expertise developed through avalanche research, you can be an important partner in this research program. This research position is funded in part by the federal government. This must be matched by industry funding by August 31, 2008. To find out how you can help, contact the Development Office at the Schulich School of Engineering—phone 403.220.2626

"Dr. Jamieson leads the largest field program of snow avalanche research in the world. Knowledge transfer is exemplary; research results are shared through spring and fall sessions with practitioners, directly improving our understanding and capacity to predict avalanches. Jamieson and his team produce world-class research that will save lives and position Canada to achieve its potential as the world's premiere winter tourism destination."

Clair Israelson, Executive Director,
Canadian Avalanche Association &
Canadian Avalanche Centre

Currently, the funding shortfall stands at about $50,000 a year over the next five years. The time to act is now.

Whistler ISSW 2008 Update

More news from the "Greatest Snow Show on Earth"

First of all, thanks to all of you who rushed to their computers right after the CAA spring meeting and signed up for the ISSW 2008 in Whistler. Twenty-three Canadians registered between May 9 and May 12 and snuck in just before the extended early bird deadline. As of June 13 we have 444 registrants for the conference—we should easily double that number by the time the next deadline rolls around on September 1. Most participants are from the USA, followed by Canada. We also have registrations from Afghanistan, Austria, China, France, Germany, Iceland, Japan, New Zealand, Norway, Spain, Switzerland and England, and we look forward to even more people from other countries signing up over the next few months.

Steve Conger and Cam Campbell, co-chairs of the papers committee, and Pascal Haegeli, posters chair, announced that there will be 74 oral and well over 130 poster presentations. Oral presentations will take place every day except Wednesday, and can be viewed from the main theatre or simulcast room. In addition, there will be a panel discussion on field-testing for fracture propagation propensity.

All the posters will be displayed throughout the conference centre for the duration of the workshop, with scheduled sessions when the authors will be available for discussions. In total, the papers committee has received over 200 submissions for abstracts from 14 different countries. Well done, avalanche community—and good luck to the papers committee on the work load as they wade through it all and pick the best.

We have managed to secure our guest speaker for the Thursday evening Gala Dinner at the Conference Centre. Sam Kavanagh is an avalanche worker from Montana who lost his leg and one of his best friends in a tragic avalanche accident. His story is an inspiration to us all and we look forward to his video, presentation and Q&A session from the audience. Just a reminder, the gala dinner is included in your regular registration (this is a departure from previous ISSWs).

On Monday night, the men are on their own as the Garibaldi Lift Company hosts the Avalanche Divas women-only celebration of women in the avalanche community. Supposedly at the Telluride conference, the men sent in a spy dressed in women's clothing. However his cover was blown, so the men were not able to observe the event, but heard it was a great success.

On Tuesday night, the Canadian Avalanche Foundation will host a Mountain Top Fundraiser on top of Whistler Mountain. The evening will provide a chance for the local community to brush elbows with us avalanche professionals. The Rocky Mountain Sherpas (a film production company from Calgary) will give us a preview of their upcoming avalanche education video geared toward the younger crowd of backcountry skiers and wannabe extreme skiers. They will also enlighten us on their tragic story which led to the formation of their company and the inspiration behind their filming work. We will also view some of the videos and pictures from the video/photo competition and announce the winners. Prizes have been generously donated from our sponsors and include a Marmot sleeping bag. So come and enjoy the sunset on top of Whistler Mountain and support a great cause.

Wednesday is our activity day with plenty of choices for everyone, including:

- Whistler/Blackcomb Avalanche & CARDA program. This event is almost sold out so sign up quickly if you want to be a part of it!
- Callaghan Valley bike trip to see Whistler Olympic Park, the site of the Nordic ski events during the 2010 Winter Olympics.
- Hockey game— "Canada versus the rest of the world." Thanks to Arc'teryx for supplying uniforms.
- Guided cross-country mountain bike trips for various levels of riders.
- Guided downhill mountain biking in the world famous Whistler Mountain Bike Park.
- Heli-Glacier hiking trip.
- Whistler golf tournament.

These are just some of the organized activities that you can sign-up for at registration. More activities will be available for sign up on arrival and include rock climbing, river rafting, ziptreking, bungee jumping, hiking, and more. After a busy day playing, we will all be thirsty. We have secured Whistler's favourite local band, the Hairfarmers, for an evening BBQ social at the Garibaldi Lift Company.

Most sponsorship spots have been taken. Thanks to all the great industry partners who have supported this conference. Please go to their booth at the trade show with an extra "thank you" for coming through so strong. You will find their logos on the website. Speaking of the trade show, quite a few booths have been booked already, but there is room for more—please tell interested businesses about us!

We have lined up numerous accommodation packages, including the incredible deal of $15 a night thanks to Whistler/Blackcomb. Who says Whistler is expensive? This is the least expensive accommodation that ANY ISSW has been able to provide so far (with the exception of friends opening their living rooms to the myriad of couch surfers). To book accommodations, go to the website and click on "Lodging."

Should you be among the minority of people who have not been to our amazing website, then we suggest you go and check it out at: www.issw2008.com. The website will probably

answer 99% of all questions you might have, but if there are some left, please don't hesitate to contact us at: issw2008@avalanche.ca. Please note, online registration is the much preferred method of registration. It's much more environmentally friendly AND costs less time and money for you.

Last but not least, we are always looking for volunteers to join our team! If you are keen to be involved, have some great ideas or special skills, we would love to hear from you. Feel free to contact us—the least you will get is a load of fun, a special T-shirt and our wrap-up Volunteer Party on Friday! We hope to see you in Whistler in September!

Your ISSW 2008 Team: issw2008@avalanche.ca.

ISSW 2008 Schedule

Time	Event	Location
Sunday, September 21, 2008		
0900-1700	Exhibitor Set-up	Telus Whistler Conference Centre
1200-1700	Monday-Tuesday Poster Set-up	TWCC
0800-1700	Possible Meetings	
0900-1900	Registration	TWCC
1300-1700	CAA Bulletin writers work shop	TWCC
1800-2100	CAA Board of Directors Meeting	TWCC
1700-1900	Happy Hour Reception Presented by Marmot	TWCC
Monday, September 22, 2008		
0600-1700	Registration	TWCC
0630-0745	Speaker's Breakfast	TWCC
0800-1200	Morning Presentations	TWCC
1150-1320	Lunch Meetings	
1320-1610	Afternoon Presentations	TWCC
1615-1745	Poster Session & Social Presented by Pieps	TWCC
1800-2000	Avalanche Diva's Social	Garibaldi Lift Company
1800-2100	CAA Special General Meeting	TWCC
Tuesday, September 23, 2008		
0630-0745	Speaker's Breakfast	TWCC
0800-1150	Morning Presentations	TWCCe
1150-1320	Lunch	
1150-1320	ISSW Steering Committee Meeting	TWCC
1320-1610	Afternoon Presentations	TWCC
1615-1745	Poster Session & Social Presented by Arc'Teryx	TWCC
1930-2200	Whistler Mountain Social and Movie Night Presented by Whistler/Blackcomb	Roundhouse Lodge Top of Whistler Mtn
Wednesday, September 24, 2008		
0800-0900	Field Trip Orientations	TWCC
0800-1830	Detailed description of Field Trips & Activities	Whistler & Area
1200-1700	Thursday & Friday Poster Set-up	TWCC
1800	BBQ, Social & 'THE HAIRFARMERS'	Garibaldi Lift Company
1900-2100	The American Avalanche Association. General Membership Meeting	TWCC
Thursday, September 25, 2008		
0630-0745	Speaker's Breakfast	TWCC
0800-1150	Morning Presentations	TWCC
1150-1320	Lunch	
1320-1610	Afternoon Presentations	TWCC
1610-1745	Poster Session & Social Presented by CIL Orion	TWCC
1900-2200	Banquet with key note speaker Sam Kavanagh	TWCC
Friday, September 26, 2008		
0630-0745	Speaker's Breakfast	TWCC
0800-1150	Morning Presentations	TWCC
1150-1320	Lunch	
1320-1410	Afternoon Presentations	TWCC
1410-1630	Poster Session & Social Presented by:	TWCC
1700	Volunteer Party	TWCC
Saturday, September 27, 2008		
	Social Options	Whistler Area

international snow science workshop

WHISTLER 2008

"a merging of theory and practice"

www.issw2008.com - PO Box 7, Whistler, BC, V0N 2L0 - issw2008@avalanche.ca

September 21 to 27, 2008

Presented by Marmot

Calling All Winter Shutterbugs and Videographers

Now is the chance to show off your artistic talents and interesting footage. Send us your avalanche and snow science related photographs and/or video clips. Selected photos will be featured at various times during the Whistler ISSW 2008 conference. Selected video clips will be shown at the Canadian Avalanche Foundation's fund-raiser movie night

We are looking for photos with the following themes:

* avalanche photos
* snow scientists and technicians collecting data
* guides and other snow professionals working in their snow environment
* humourous snow related photos

Prizes from our sponsors including a Marmot sleeping bag and an Arc'Teryx back pack

Thanks to all our sponsors for their generous donations.

Send photos by email to
ISSW Photo Contest
photos@issw2008.com

WHISTLER BLACKCOMB ARC'TERYX C·I·L PIEPS T·A·S SPORTS INSURANCE.COM

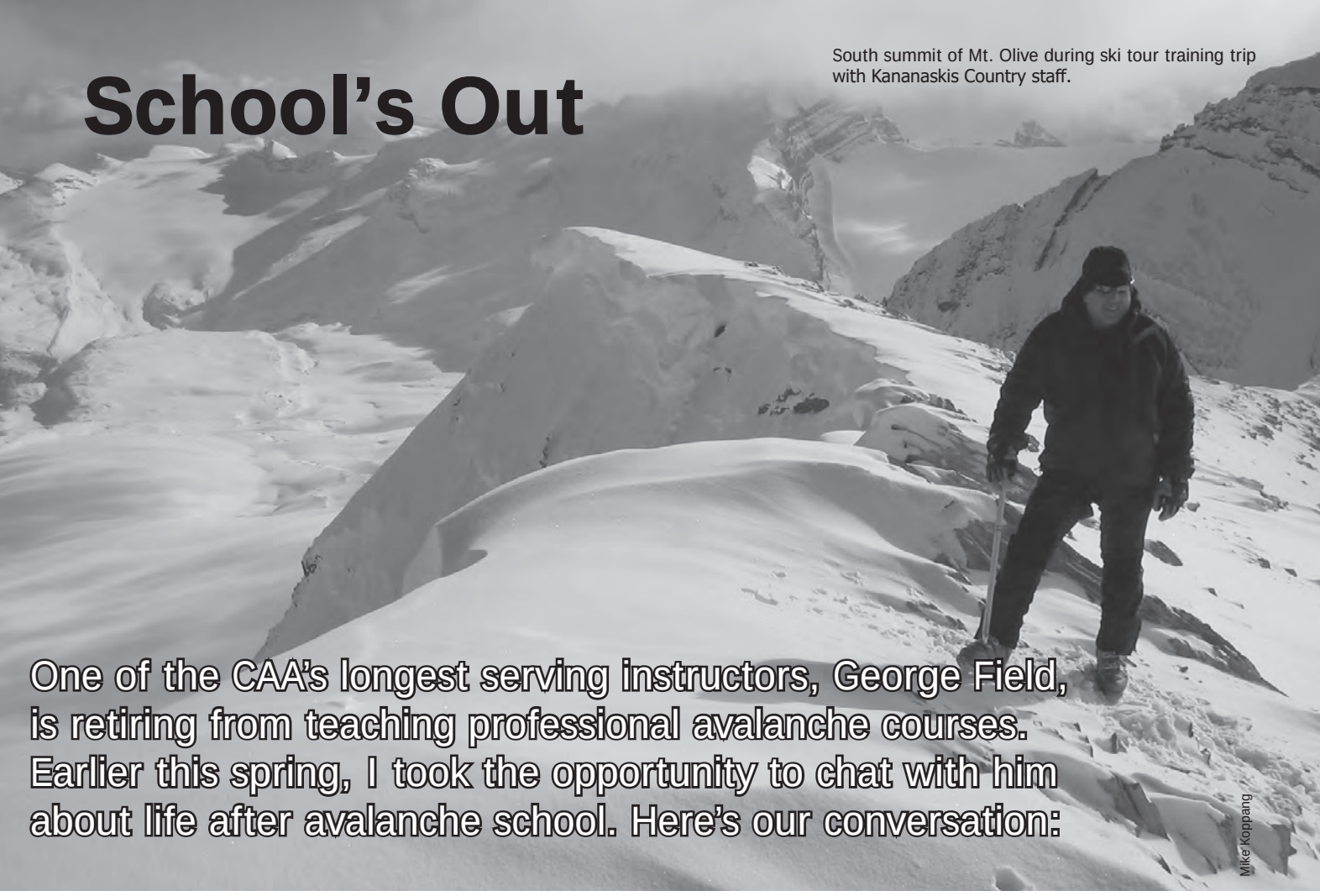
Online Registration

Four winters ago the CAA's Industry Training Program developed an online registration system and, since its inception, this system has been the primary enrollment mechanism for the program. This spring we embarked on an upgrade of the system to modify it in ways so it will work for the ever increasing diversity and range of programs that we offer. The system has now been deployed for Level 2 registration and is working just as hoped.

Not all the educational and training programs of the CAA will be managed through the online registration system. All programs are open for general enrollment on September 2, 2008. Interest is high this year for all programs from the new weather seminars to the Level 1 and beyond.

Stay tuned for the fall CPD seminar series.
We're working on some great programs for you!

School's Out



South summit of Mt. Olive during ski tour training trip with Kananaskis Country staff.

Mike Koppang

One of the CAA's longest serving instructors, George Field, is retiring from teaching professional avalanche courses. Earlier this spring, I took the opportunity to chat with him about life after avalanche school. Here's our conversation:

Mary Clayton:
George, in addition to retiring as an ITP instructor, you also recently turned 60. What goes through your mind as you look back on your years in the avalanche patch?

George Field:
I'm very impressed with the CAA and how it's advanced and continuing to advance. I'm also very impressed with the annual general meetings in Penticton. I think those meetings are one of the biggest learning experiences for a Level 1 or Level 2 graduate to go through.

I've been very happy to be part of this organization. I've always appreciated the opportunity to teach courses; they felt like I was giving back to the community. Of course I'm sad to leave, but it's similar to the issues I felt as an examiner for the ACMG. I told myself that 50 would be the end of that work, that examining guides is a young man's work. I felt I went one year too long, felt I wasn't on top of my game 100%, not the best I could be. So, I thought for the ITP program, let's call it a good run and leave it at that.

MC:
How long have you been an ITP instructor?

GF:
It's been somewhere around 18-20 years. I started a long time ago when Kiwi (Lloyd Gallagher) was doing local CAA courses through Kananaskis Country. We used to fly into Turbine Canyon with a cook, a slide show, a generator, the whole thing. Chris (Stethem) and Clair (Israelson) were part of the instructor team back then and that's where I got my foot in the door.

MC:
What are some of the major changes you've seen over your years?

GF:
There have been some big changes since I started being an instructor. When I first started Phil Hein was running the program, and Peter Schaerer was playing a big role. They were both very good to work with. Phil, like a big brother, scheduled me into the instructor pool. I especially remember Peter giving me some very good advice for teaching that has always stuck with me. He spoke about the importance of linking your lesson with the instructor before and leaving something for the next instructor to link to. That was good advice, given in a very heartfelt manner, and I've always remembered it.

Ian (Tomm) has done an incredible job in terms of moving things forward, keeping up with the latest science and integrating Jan Johnson's work in adult education. The way he's been coordinating with national and international agencies, those are big workloads.

And of course I can't forget to mention Bruce Jamieson. He's given the CAA an incredible amount of knowledge; it's really added to the professional momentum to keep these courses going. I can't mention everyone because there are so many individuals who play a part in the program's success. It wouldn't work if the instructors weren't a team, able to bounce things off each other, learn from each other and yet still have the ability to keep your own style. Great camaraderie was a big part of being on the CAA instructor team.

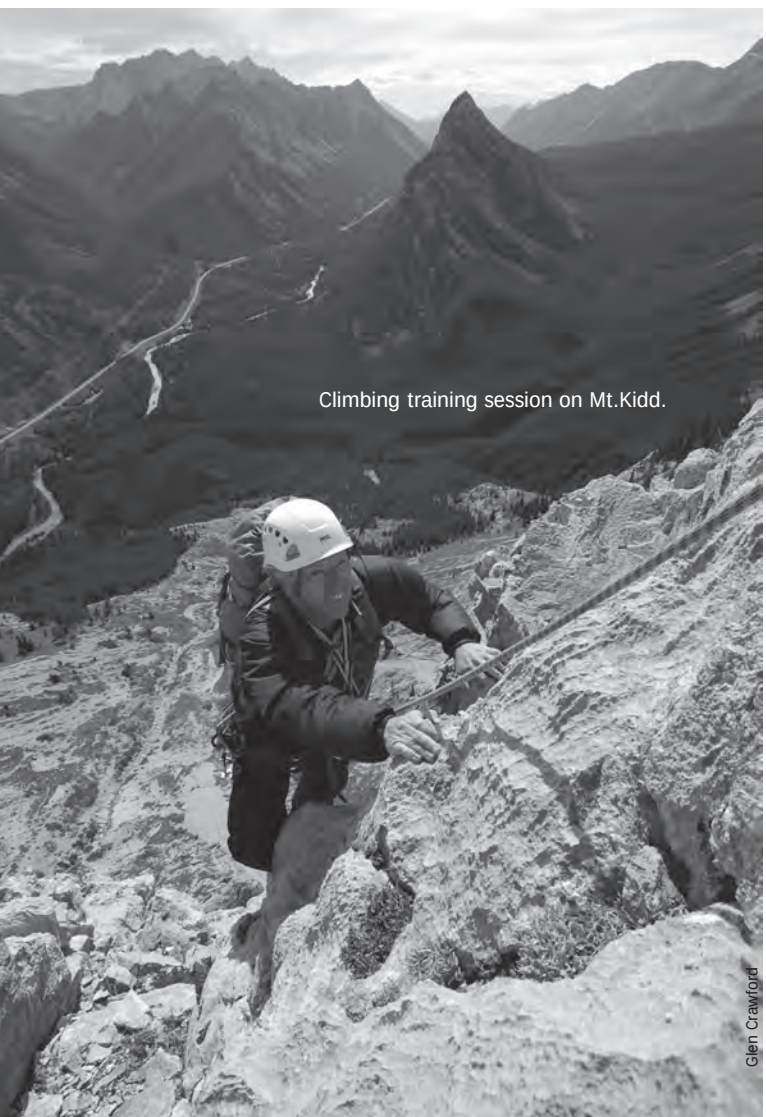
MC:
You've been the head of public safety for Kananaskis Country since 1983, when you took over from Kiwi Gallagher, who started the program there. What are some of the highlights of that work?

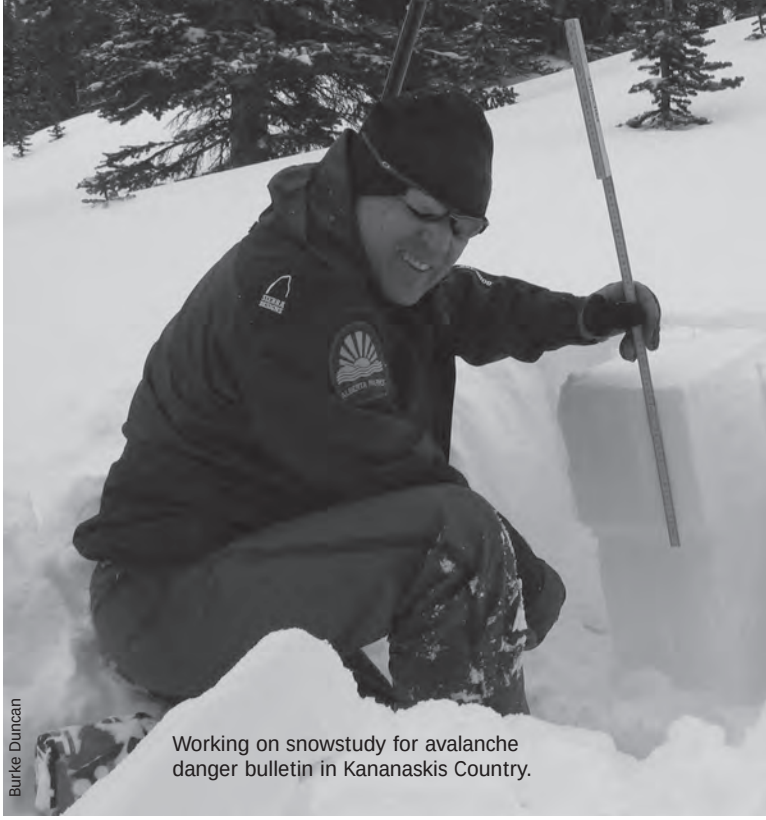
GF:
I started working here the summer of 1982, and Kiwi handed responsibility to me within the year. We're a pretty generalist program, we don't do anything extraordinary—a little avalanche control for the highway, avalanche bulletins in the beginning were three times a week, annual training of staff for backcountry ski travel, avalanche awareness, and avalanche search, rescue and recovery.

We finally got a daily bulletin schedule three years ago and I feel we put out a good product on a daily basis. That was a real breakthrough and everyone who works on public safety here was pretty excited. Even though around here we can go day after day with no snow, our guys go out every day. The team really works hard at writing a good bulletin every day, coming up with new words, not just cutting and pasting. I feel really proud of them.

Of course the dark side of public safety is avalanche accidents, and that's part of the job. The team does a good job there, doing the investigation and getting the paperwork to the CAA. In the aftermath, dealing with the family members is part of my responsibility.

MC:
What are you going to miss about teaching avalanche courses?


Climbing training session on Mt.Kidd.
Glen Crawford


Burke Duncan
Working on snowstudy for avalanche danger bulletin in Kananaskis Country.

GF:
A number of things. Going out with students, having fun and seeing them learn, that's always been a great uplifting observation for me. To see them struggle a bit at the beginning, and then by the end of the week accomplish things and be looking forward in the future with some knowledge, excited to learn more. That was the best part. Also the team attitude of the instructors was always great.

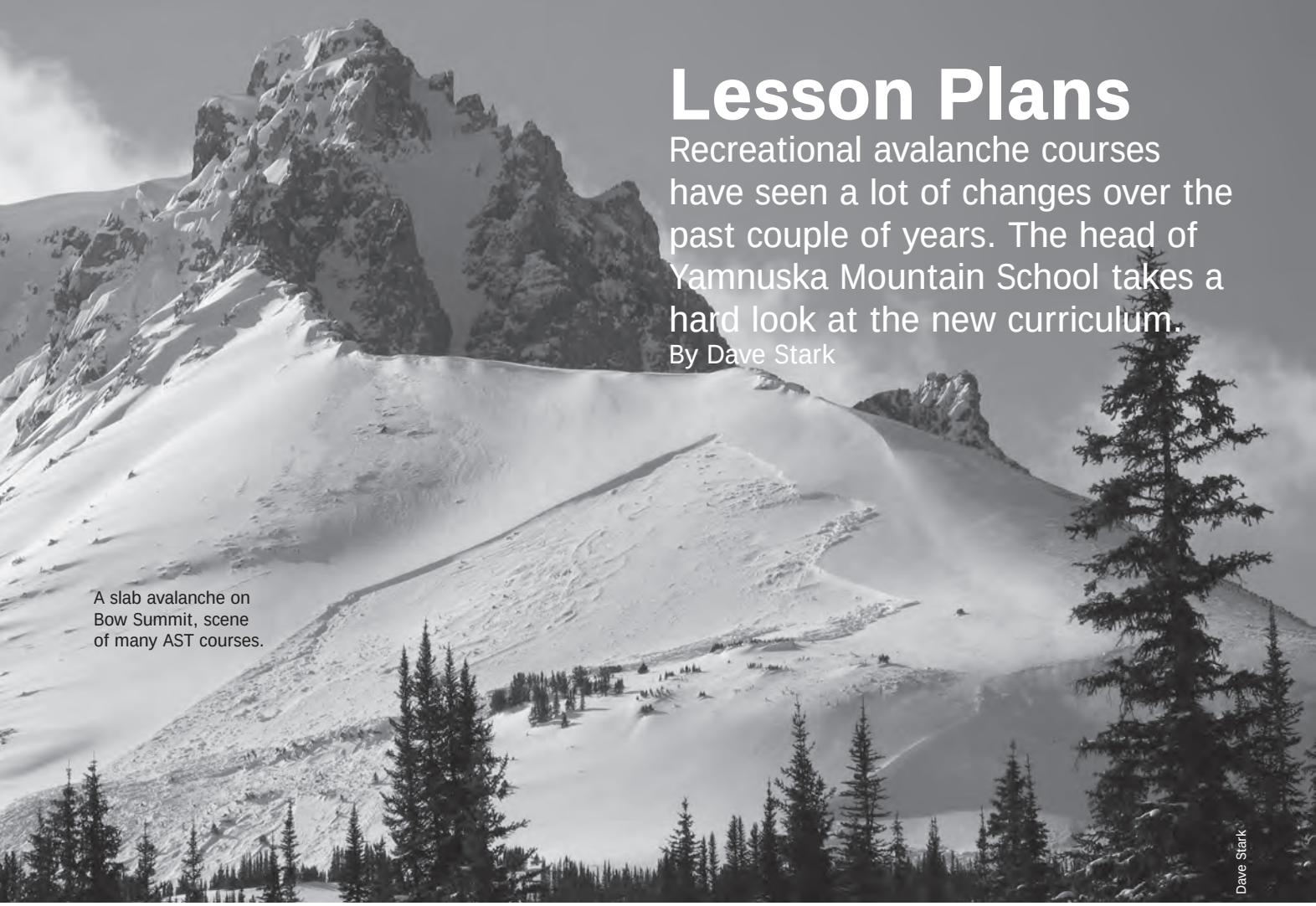
The most memorable course was my last one. It was in Fernie, and run by John Buffery. I respect Buff and like his philosophy. I felt it was a great course to end on, I felt really up. I would hate to have stuck around and have people tell me it was time to go. The other instructor on that course, Rick Schroeder, has been a long-time friend and it was great to have been working with him over the years. Garth Lemke and Peter Marshall were being mentored as upcoming instructors. They're the type of individuals for the future of the program and I feel comfortable leaving it to them. It's in good hands.

MC:
What are your plans?

GF:
Well, I got up at 4 o'clock this morning to do a rescue, and I had another rescue at 7:30 a.m. two days ago. Things haven't slowed down here a bit. That's the pace of things for public safety. But by July 2010, that will likely be the end of Kananaskis Country work for me.
I would like to say thanks to all the people I have worked with over the years. Many thanks for your comments, criticisms, support and patience. I have learned many different and wonderful ways of dealing with life and work from the collective group of CAA members and I feel very privileged to have been part of the instructor pool. I will still be supporting the CAA, CAC, and CAF in my capacity as Public Safety Specialist in Kananaskis Country and I still look forward to the next couple of annual spring meetings.

MC: Thanks, George, that's great.

GF:
Thanks Mary. I'm sure we will be talking again when winter arrives and the snow slides.



Lesson Plans

Recreational avalanche courses have seen a lot of changes over the past couple of years. The head of Yamnuska Mountain School takes a hard look at the new curriculum.

By Dave Stark

A slab avalanche on Bow Summit, scene of many AST courses.

Dave Stark

Recently I received a call from Matt Gunn on behalf of Pascal Haegeli and the ADFAR 2 project. Matt was conducting telephone surveys with Avalanche Skills Training (AST) course instructors to find out how well the Avaluator is working and what can be improved. Matt's telephone call allowed me a bit of reflection time to consider just where we are with AST courses, and the effectiveness of an avalanche awareness course. Are we headed in the right direction? Do we provide better products and make people safer travellers in avalanche terrain? As AST instructors, these are the questions we have to be constantly asking. The answers will enable us to save lives.

Last summer, Karl Klassen was hired to rewrite the AST manuals with assistance, advice and review from a committee comprised of 15 AST providers. In the early stages of rewriting the manual, the providers and instructors had slightly varying opinions on how presentations should be laid out as well as what weight to put on different subject matter. Developing a manual that fits everyone's idea of how to do a lesson plan is extremely difficult. Karl did an admirable job of herding all the AST cats, soliciting feedback, writing the darned things and actually having the AST manuals completed in time for the 2007/08 instructional season.

So now with two seasons of teaching the Avaluator and a season with the new AST manuals under our belts, we have an idea of what is working and what we need to look at differently to become more effective in presenting awareness skills. Over the winter of 2007/08, Yamnuska Mountain Adventures ran about 24 AST 1 courses with over 400 students. We had a variety of instructors running these programs and received mixed feedback on how the new curriculum and instructor manuals worked for our instructors.

The opinions I heard on the new manuals from Yamnuska instructors was across the spectrum. I heard comments ranging from "Overall, quite disappointing" to "A wonderful resource." I noticed the new manual didn't seem to be as useful for those who have been teaching avalanche awareness for many years and are ingrained in their lessons plans. For the newer instructors, however, the manual was a very useful and worthy resource, used extensively in lesson planning.

At Yamnuska Mountain Adventures our program has been developed through the years with feedback from our guides and instructors on what they feel is effective in getting the message across to the students of AST 1 courses. Our development of lesson plans and presentations aligns with the AST 1 curriculum and most of the instructors used the new manual as a reference and cross check to ensure they were on the right track this past season. Our classroom lessons consist of a PowerPoint presentation or Keynote presentation platform. We develop a base presentation which our instructors can

then customize with their own images and anecdotes. All the key points and outlines follow the AST curriculum but we are careful not to have a canned show.

The biggest challenge for us during the past two seasons has been incorporating the Avaluator into the presentations and putting it to use on the field day. This was initially met with varying success in 2006/07, our first season of presenting the Avaluator. This past season we were far better at getting across the message and teaching the concept of ALPTRUTH and using the Trip Planner. I think that instructors understood the system better this season, and thus, were far more effective at presenting the Avaluator to their students.

Students like having a tool for decision making in avalanche terrain that makes sense to them. Working with the Avaluator, a rule-based tool, helps them to become knowledge-based decision makers, hopefully with a greater margin of safety. One of the drawbacks or points to improve is the concept of "Normal Caution" and "Extra Caution." Defining these terms to students is not as simple as first thought. Having talked with other providers, this seems to be a common challenge.

The introduction of the Avalanche Terrain Exposure Scale is a giant leap forward in describing and defining terrain. People get it, they understand it, and it became very helpful in talking about risk reduction through terrain selection. Over the years more weight has rightly been given to terrain on awareness courses. Having a model and language to describe terrain in easy terms has been a big improvement to the AST curriculum.

Companion rescue sessions have been improved in the new curriculum and now include more efficient shovelling techniques. Greater emphasis on probing and shovelling techniques and practice has been met with good success. Instructors are teaching beacon searching with deeper burials (50cms+) and using targets for teaching efficient probing methods.

There are areas for improvement, particularly in regards to photo sets. The photo sets provided by the CAC in support of the AST courses are lacking. Most instructors have had to supplement the CAC photo sets with their own photos or borrowed from others. This is a concern for those who do not have access to good terrain and avalanche photos. Karl Klassen made repeated calls for photos to support the new manual but did not get a good enough response to include photo sets that met everyone's needs. Despite the challenges of the new editions of the manuals, they are filled with a wealth of information and provide an excellent platform on which to plan, build and conduct an AST course.

So, back to my original questions. Are we headed in the right direction and do we provide a better product and make people safer travelers in avalanche terrain? In both cases, I believe the answer is yes. Overall, I do think we are getting better at filtering out irrelevant information or misinformation and presenting pertinent and useful avalanche safety messaging that fosters skill development which students can build upon, and I think we are providing greater safety to the new and inexperienced users of the backcountry. Students are finishing courses with greater respect for avalanche terrain, yet are armed to make good basic decisions in regards to their own safety as well as the safety of their companions. They have an idea of their limitations and know how to gain further experience without killing themselves in the process. We certainly cannot control people's behaviour in the mountains, yet through the AST program we have great influence and a wonderful opportunity to empower people with safer practice through education.

A Brief History of Avalanche Awareness Education

By Dave Stark

Avalanche awareness courses have been taught by a multitude of individuals over the past 40 years or so. The Canadian Ski Patrol System (CSPS), through Peter Spear and Brad Giesler, taught members of the volunteer patrol about avalanche awareness back in the 60s. Many schools such as Outward Bound Mountain School, Yamnuska Mountain School, Canada West Mountain School and the University of Calgary Outdoor Pursuits program all developed and taught a variety of avalanche awareness courses.

From the mid-70s to the mid-90s, most avalanche awareness courses resembled a watered down version of the professional's Level 1 course administered initially through the British Columbia Institute of Technology then the CAA. Basic awareness courses were typically two-day programs aimed at the recreational user and taught by graduates of the Level 1 or Level 2 program. Advanced awareness courses were extended versions of the basic course, usually incorporating decision making skills and more amateur snow science.

In 1997 the CAA standardized the curriculum and the program became known as the Introductory Recreational Avalanche Course, or IRAC. An advanced course curriculum was also developed and became known as the ARAC. The development of these courses and curriculum was funded by the National Search and Rescue Secretariat, after a grant proposal was submitted by the CAA with support from CSPS and Parks Canada.

The majority of course providers signed user agreements from the CAA, and purchased instructor manuals and supporting materials such as slide sets, student manuals and overheads. Over the subsequent years there were many minor changes to the curriculum, several instructor manual revisions and one major change in regards to the field trip policy, which currently restricts CAA Active members from conducting field trips in challenging or complex terrain. This added level of risk management created much debate initially but was soon understood and accepted by the providers.

During this time it was coming to light that the instructor manuals and curriculum were not working for all. Many of the providers were developing their own curriculum loosely based on the IRAC and ARAC curriculum. As well, things were changing with the development of the Avalanche Terrain Exposure Scale developed by Grant Statham and Bruce McMahon through Parks Canada and also Pascal Haegeli's work on the Avalanche Decision Framework for Avalanche Recreationists (ADFAR) project that resulted in the creation of the Avaluator in 2006.

The advent of the Avaluator signaled a big change in avalanche awareness instruction. In the summer of 2006, the RAC program evolved into the Avalanche Skills Training (AST) courses and the Avaluator became a core component of that curriculum. Now, each AST 1 student receives one and is taught how to use it for both trip planning and while travelling in the backcountry.

Dave Stark is an IFMGA mountain guide and Director of Operations with Yamnuska Mountain Adventures. He has been teaching avalanche awareness courses for the past 25 years.

The Goals of the Avalanche Skills Training Program are to:

- **Improve avalanche safety in Canada**
- **Maintain a national standard for entry- and intermediate-level avalanche training.**
- **Provide support materials for instructors and organizations delivering entry- and intermediate-level avalanche training.**
- **Form the basis of an avalanche education continuum that includes entry level and intermediate-level training: advanced training and apprenticeship; expert- and master-level training, certification and professional status; and ongoing continuing professional development.**

From the Avalanche Skills Training Level 1 Manual

Avalanche Awareness Days in Nunavut

By Andrew Maher

Brian Koonoo

The First Annual Nunavut Avalanche Awareness Days on March 17 to 20, 2008 were a huge success. Many of us knew that there was interest in Nunavut communities to discuss avalanche safety, but we certainly did not expect the response we received. In the crazy week leading up to the events, CAC and Parks Canada staff worked hard to ensure that we had locally relevant safety messages and that materials were translated into Inuktitut. Planning events and organizing activities also took great effort by local park staff.

The week itself saw many exciting events and activities. Monday, March 17 was kicked off with a Nunavut-wide advertisement and radio interviews on CBC North. In Pond Inlet, we also had presentations to all of the high school students at Nassivik High School. Tuesday saw middle and high school presentations in both Pangnirtung and Iqaluit, and public information booths in Pond Inlet and Iqaluit.

An evening radio show in Pond Inlet was a great success, with elders calling in to recount some of their own avalanche experiences. Wednesday had public presentations in both Pond Inlet and Iqaluit, with a long-time Iqaluit resident recounting a story of an avalanche he experienced in his youth and another avalanche he experienced as an adult. Thursday wrapped up the week up with a training session with local search and rescue volunteers in Pond Inlet. Many of these events saw great prizes donated from G3 and the CAC.

The goal of these events was to raise awareness of avalanches and avalanche safety in Nunavut and to get people talking. One unexpected result was the realization of just how frequently avalanches occur in Nunavut communities. Over the week we heard many stories of avalanche incidents spanning the last 80 years across the territory.

Over the next year, we will be drawing on some of the contacts made this year and trying to gather more local and traditional knowledge about avalanches throughout Nunavut. We will also be looking at ways to partner with other organizations so that more communities can hold events and raise awareness about avalanches across Nunavut.

I would like to thank all of the staff at the CAC and Parks Canada who supported these events with their time and effort. I am very excited about next year and look forward to building on this year's success.

>> Andrew Maher is the Public Safety Coordinator for the Nunavut Field Unit of Parks Canada.

Signs of the Times

Would an avalanche safety sign help your organization? The CAC may have just what you're looking for.

By Jennifer George

At the CAC, we have been working on developing templates for trail signs to be used in popular winter backcountry recreational areas to inform public users of avalanche threats. These signs are designed for strategic backcountry locations such as trail heads, cabins, common access points to out-of-bound areas and forestry service roads. All the templates will work in conjunction with the CAC's current system of public avalanche safety tools including the public avalanche bulletins, the Avaluator and the Avalanche Terrain Exposure Scale (ATES).

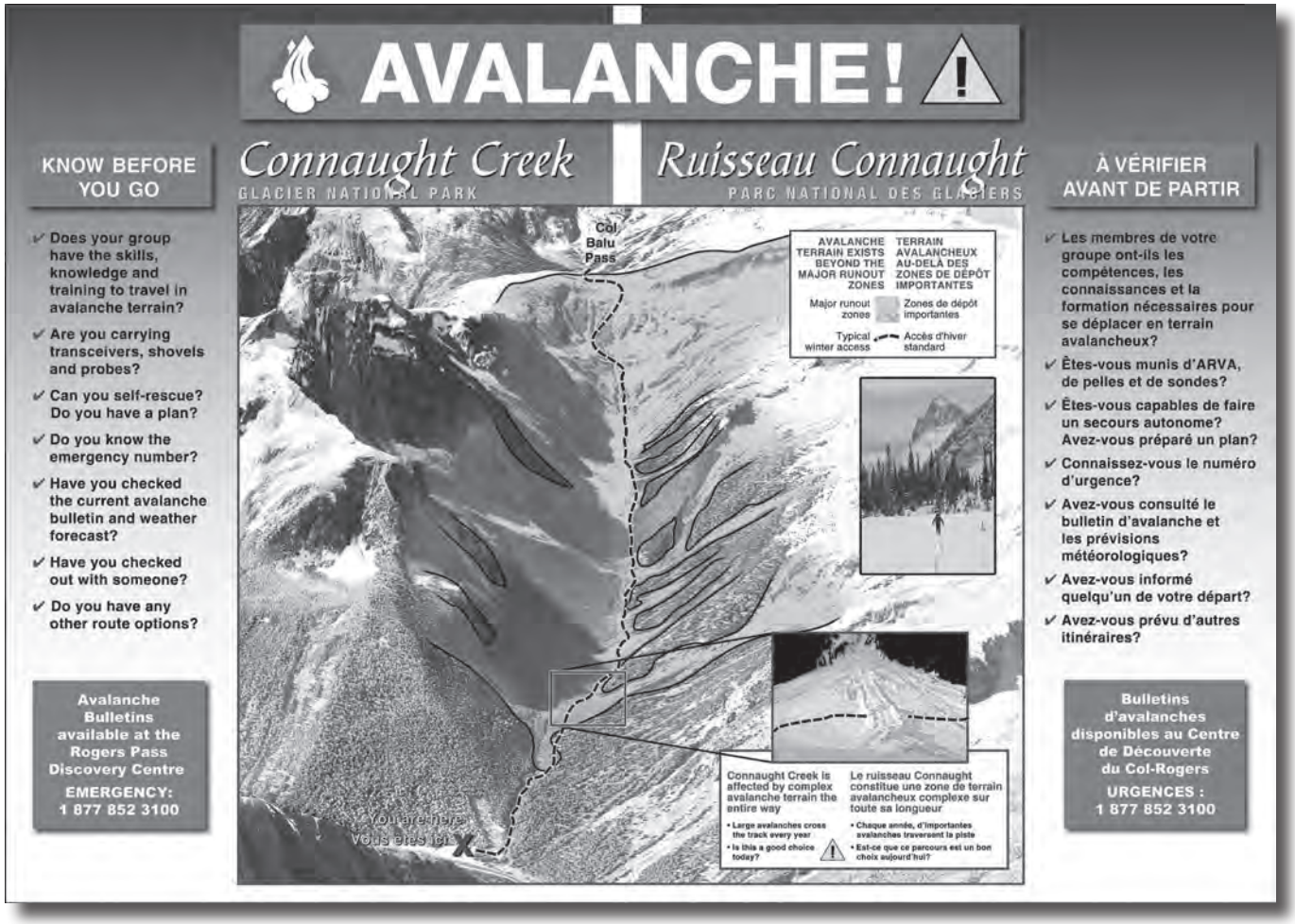
As usual, this is a collaborative effort and we have been working with Parks Canada, BC's Ministry of Tourism, Sports and the Arts, BC snowmobile organizations and Avisualanche Consulting. Between us, we came to the conclusion that three types of signs are needed. Parks Canada has the most experience in this field and we used their framework for sign development. This includes creating a mission document for all three signs outlining three objectives:

Learning—what do we want the user to learn from the sign;

Behavioral—what do we want the resulting actions taken by the user; and

Emotional—how do we want the user to feel.

These mission documents resulted in standardized design points and recommended usage for each type of sign. With the completed mission documents and input from our collaborations, we began to create sign templates for each of the following three types of signs.



Identification of Avalanche Terrain

We concluded that Parks Canada has come up with the best standard for this type of sign. This template incorporates a large photo or rendition of the area with a colour overlay and/or cross-hatched to highlight the avalanche terrain. This sign will be used in areas that are not currently rated under the Avalanche Terrain Exposure Scale (ATES). This sign also can be used to visually explain or provide background reasoning for closure areas according to local land-use policy.

Trip Planning

So far, this sign has taken the most amount of design time. The CAA's graphics wizard, Brent Strand, has been driving the mouse, gathering input, and creating many digitally composed drafts which were then been circulated via e-mail to all the stakeholders. The final draft template was designed to assist backcountry users in planning their trip according to the public avalanche bulletin and the terrain in the area. The objective of this sign is to help the user make an informed decision on their risk for the day—essentially an on-site mini trip planner.

What has been created is a standard sign format with customizable points for different locations. Design points that can be customized include the illustration of the terrain and the avalanche forecast region. We envision each area inserting their own photo (or series of photos) with colour overlay to depict the different terrain ratings. Likewise, each sign will include its applicable forecast region and the phone number to get the danger rating for the day.

Decision Support

The objective for this sign is to help the user select terrain according to current observations. The design template is still in development but we envision that it will incorporate Ian McCammon's Obvious Clues Method as used on the Avaluator. The sign will advise the backcountry to watch for specific warning signs and will offer decision guidance based on the clues. Watch for this final draft coming by fall 2008.

Any organization that manages land in or that has access to winter backcountry recreation sites can use these templates to build their own system of avalanche safety signs specific for their area. We encourage land managers to take the design elements incorporated into each template and customize them to fit their area uses and needs. Guidelines to help organizations choose the appropriate signs for their area will be available on the CAC website this fall.

If you can wait for the information to be available on the web, the CAC can help you choose the appropriate signage for your area and use. The CAC will not produce or create the physical signs but we are available to assist you in creating a backcountry sign plan for your organization. We can also direct you to appropriate resources to rate terrain under the ATES program in your area.

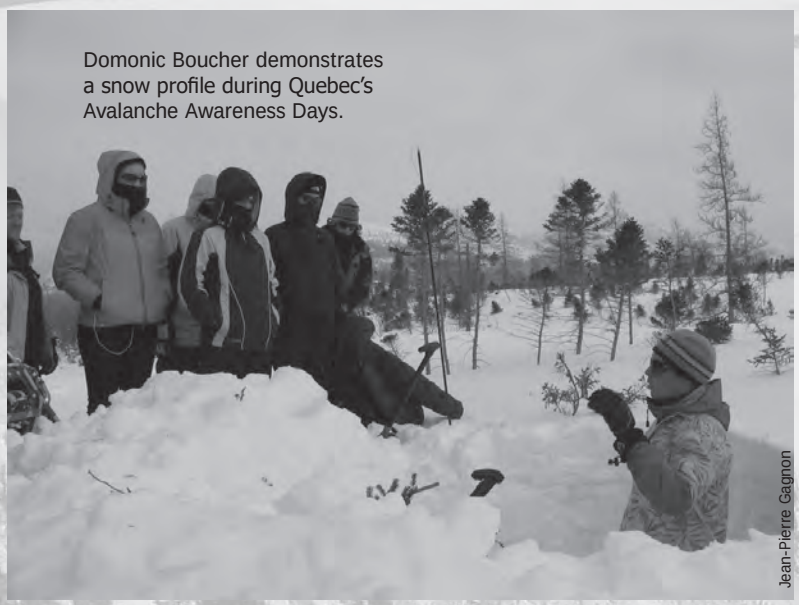
>>Jennifer George is in charge of Marketing and Special Events for the CAC.

Journées de sensibilisation aux avalanches dans les Chic-Chocs

21-23 mars 2008

Par Jean-Pierre Gagnon

Malgré la tempête majeure de la fin de semaine de Pâques qui a paralysée plusieurs skieurs, planchistes et randonneurs en route vers les Chic-Chocs, les activités de sensibilisation aux avalanches organisées par le CENTRE D'AVALANCHE DE LA HAUTE-GASPÉSIE (CAHG) ont été un franc succès. Les conditions hivernales et la neige abondante ont été appréciées par les amateurs de sports de glisse qui ont pris d'assaut les pentes poudreuses du mont Hog's Back et des Champs de Mars dans la Réserve faunique des Chic-Chocs. On pouvait y essayer des équipements de télémark disponibles au kiosque de la boutique Le Yéti, installé pour l'occasion dans les stationnements. D'autres randonneurs ont entrepris l'habituel pèlerinage au mont Albert où des prévisionnistes du CAHG étaient en poste à l'abri de la Serpentine pour les rencontrer et discuter de sécurité en terrain avalancheux.



Domonic Boucher demonstrates a snow profile during Quebec's Avalanche Awareness Days.

Jean-Pierre Gagnon

Un nouveau dépliant-carte pour la Réserve faunique des Chic-Chocs a aussi été distribué aux participants pour les aider dans le choix d'itinéraires en fonction des caractéristiques du terrain avalancheux. Cet outil fait partie des actions entreprises conjointement avec le Centre Canadien des avalanches dans la prévention des avalanches au Québec.

Tout ce monde s'est retrouvé en fin de journée samedi pour l'après-ski au Bistro du Piedmont du Parc national de la Gaspésie où les attendaient un BBQ ainsi qu'un encan silencieux de matériel et de vêtements de plein air au profit de la Fondation Canadienne des avalanches. Ces activités de financement ont permis d'amasser près de 2000$, une première dans l'Est canadien. Rappelons que les Journées de sensibilisation aux avalanches sont organisées à chaque hiver dans 30 communautés de montagne au Canada.

Ironie du sort, durant le long congé Pascal, une avalanche causa la mort d'un adolescent à Thetford Mines. Vendredi le 21 mars, juste après le passage de la tempête qui a touché tout le Québec, le jeune homme glissait en traîneau sur une pente abrupte de la mine Bell et a déclenché involontairement cette avalanche. C'était le septième accident mortel du genre à survenir dans cette région depuis 1969. Ce sombre évènement rappelle qu'il reste beaucoup de travail à faire au niveau de la sensibilisation du public face aux risques d'avalanche présents en de nombreux endroits au Québec, pas seulement dans les monts Chic-Chocs. Une récente enquête historique a recensé depuis 1825 un total de 39 avalanches mortelles au Québec, causant 69 décès. Beaucoup de ceux-ci se sont produits dans la région de Québec où l'on retrouve une concentration importante de population et des pentes de neige raides propices à ce risque naturel.

La saison des avalanches au Québec tire à sa fin et le CAHG à recensé durant l'hiver 2007-2008 deux autres incidents qui auraient pu tourner au drame : un aux Mines Madeleine dans la Réserve faunique des Chic-Chocs où un planchiste à été presque complètement enseveli sous la neige et un second dans la Réserve faunique des Laurentides où un autre planchiste fut emporté par-dessus une petite cascade de glace. Dans les deux cas, les avalanches ont été déclenchées par la surcharge occasionnée lors du passage des victimes elles-mêmes sur un manteau neigeux déjà instable.

CAHG Archives

Chic-Chocs Avalanche Awareness Days

March 21-23, 2008

By Jean-Pierre Gagnon


Apres ski activities, Quebec style.

Jean-Pierre Gagnon

Despite the storm during the Easter weekend that shut down travel on the road to the Chic-Chocs Mountains (paralyzing several skiers, snowboarders and snowshoers) avalanche awareness activities organized by the Haute-Gaspésie Avalanche Centre (CAHG) were a great success. The wintry conditions and heavy snowfalls were appreciated by backcountry enthusiasts who raided the powdery slopes of Mount Hog's Back and the Champs de Mars in the Chic-Chocs Wildlife Preserve.

Telemark equipment demos were available at the Yeti store booth in the parking lots. Other hikers began the usual pilgrimage to Mount Albert where CAHG forecasters were stationed at the Serpentine shelter, available to discuss safety in avalanche terrain. A new pamphlet for the Chic-Chocs Wildlife Reserve was also distributed to participants to help their trip planning, with popular trails in the reserve have been rated according to the Avalanche Terrain Exposure Scale. This brochure was created with the help of the CAC for the purpose of avalanche accident prevention in Quebec.

By the end of the day on Saturday, everyone met at the Piedmont Bistro of Gaspé National Park for an après-ski to attend a BBQ and a silent auction with outdoor clothing and equipment for the benefit of the Canadian Avalanche Foundation. These funding activities raised nearly two thousand dollars, a first in Eastern Canada.

Ironically, during the Easter long holiday, an avalanche caused the death of a teenager in Thetford Mines. Friday, March 21, just after the passage of the storm that affected most of Quebec, the young man was sled gliding on a steep slope of the Bell Mine and unwittingly triggered the avalanche. It was the seventh fatal accident of its kind to occur in this region since 1969. This dark event underlines the fact that much work remains to be done to build public awareness of avalanche risk, and the fact that it is present in many places in Quebec, not only in the Chic-Chocs Mountains. A recent research paper identified a total of 39 fatal avalanches in Quebec since 1825, causing 69 deaths. Many of them had occurred in the area of Quebec City, where there is a significant population concentration and steep snow slopes favourable for this natural hazard.

The avalanche season in Quebec is drawing to its end and the CAHG identified two other incidents during the winter of 2007-08 that might have turned to tragedy. One occurred at the Madeleine Mine in the Chic-Chocs Wildlife Reserve where a snowboarder was almost completely buried under the snow. The second was in the Laurentians Wildlife Reserve, where another snowboarder was swept away over a small ice cascade. In both cases, the avalanche was triggered by the passage of the victims themselves on an already unstable snowpack.

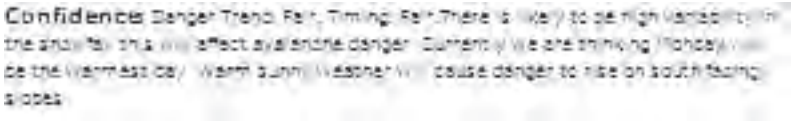

Jean-Pierre Gagnon collection

Jean-Pierre Gagnon is a Professional Member of the CAA. He has worked as an avalanche forecaster for the Centre d'avalanche de la Haute Gaspesie since January 2005.

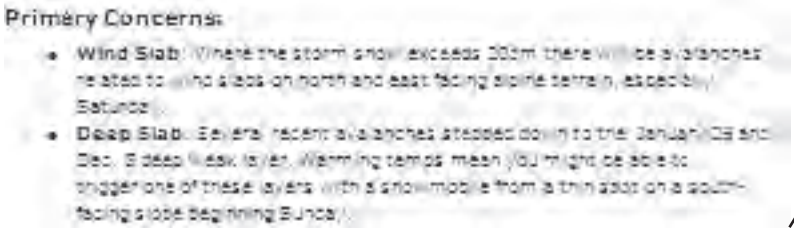
Value Added

This past winter, the forecasters at the CAC began integrating these new features into the public avalanche bulletins.

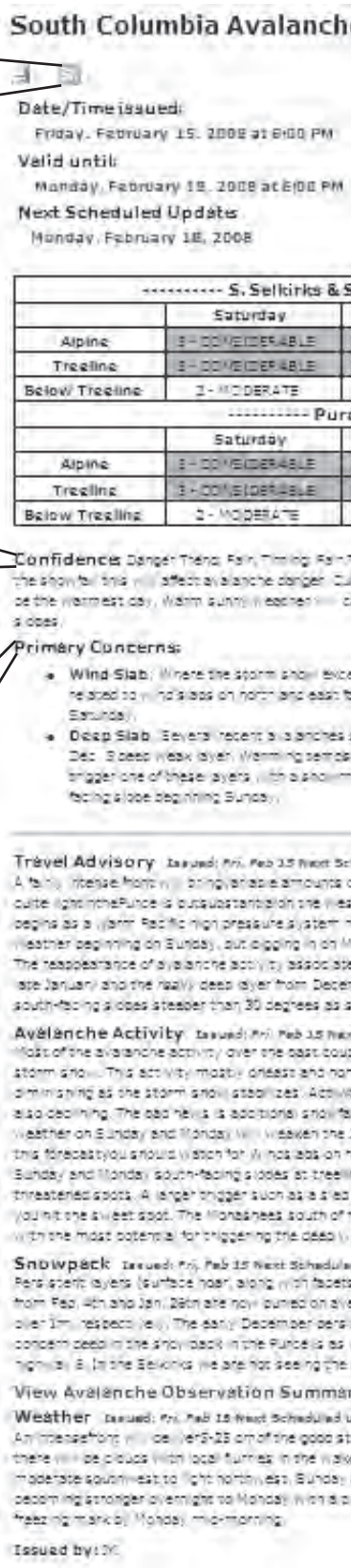
NEW RSS Feed!
A Really Simple Syndication (RSS) link that enables automatic notification whenever a bulletin is updated.

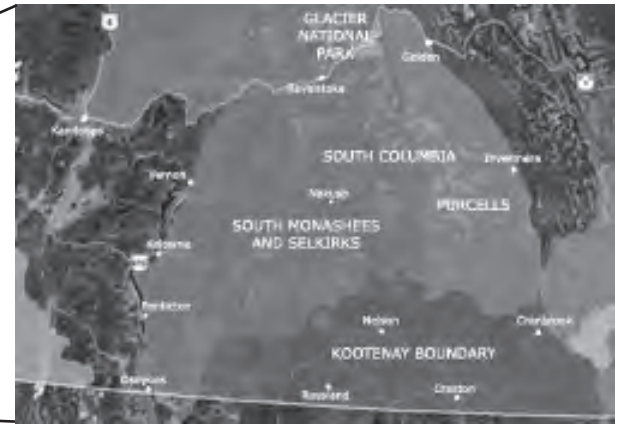


NEW Statement of Confidence!
Qualifies the forecasters confidence in the bulletin based on factors such as the weather forecasts and the amount and quality of relevant data.



NEW List of Primary Concerns!
Specific areas where caution is advised and conditions that are concerning.





NEW Regional Maps!
Google Earth derived maps showing regional boundaries and major towns and highways.

e Forecast

. Monashees ----------

Sunday	Monday
3 - CONSIDERABLE	3 - CONSIDERABLE
3 - CONSIDERABLE	3 - CONSIDERABLE
2 - MODERATE	3 - CONSIDERABLE

cells ----------

Sunday	Monday
3 - CONSIDERABLE	3 - CONSIDERABLE
3 - CONSIDERABLE	3 - CONSIDERABLE
2 - MODERATE	3 - CONSIDERABLE

here is likely to be high variability in
rrently we are thinking Monday
ause danger to rise on south facing

eeds 20cm there will be avalanches
ing alpine terrain, especially

stepped down to the January 26 and
mean you might be able to
ible from a thin spot on a south

heduled Update: Mon, Feb 18
of snow to the region. Enjoy, could be
t side of the Selkirks. The real fun
olves over the region. Sunny, warm
Monday will loosen up the snow back
ed with the deeply buried layers from
ber means that you should avoid a
oon as the sunny, warmer trips

t Scheduled Update: Mon, Feb 18
e of days has been within the recent
thinking alpine loads a relatively
; on the January surface hoar layer is
, followed by significant warm
January layer. Over the course of
orth and east aspects on Saturday,
he and below will be the most
could trigger a very big avalanche if
ghtweight is probably the location
eak layer from December.

d Update: Mon, Feb 18
and sun crust in some locations)
rage a little under 1m and a little
atent weak layers are an ongoing
ver as in the Monashees south of
same problems with this layer

y (NEW)

pdate: Mon, Feb 18
uffs, Saturday morning. Saturday
e of the front. Winds will drop from
e warm high begins to build in.
he temperatures approaching the

---------- 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

NEW Sub regional Danger Ratings!
Five of the six bulletin regions have been subdivided to provide higher resolution danger ratings.

South Columbia — Percent Reporting: 29% (10 of 34)

Avalanche Observations

Aspect	Number	Percent	Size Range	Typical Value
Unknown	7	12%	2 - 3	2.5
W	3	5%	1 - 3	2.5 - 3.5
NW	3	5%	1.5	1.5
N	9	15%	1 - 3	2
NE	5	8%	2.5 - 3.5	3
E	15	25%	1 - 3	2
SE	6	10%	2.5 - 3	2 - 3
S	4	10%	2.5 - 3	2 - 2.5
SW	3	5%	2.5 - 3	1 - 1.5

Avalanche Characteristics

	Range	Typical Value
Incline (deg)	30 - 50	40
Elevation (m)	1500 - 2800	2000 - 2350
Slab Depth (cm)	30 - 200	80 - 90
Slab Width (m)	5 - 800	80 - 90
Distance Travelled (m)	5 - 1500	90 - 250

Field Observations

Snow Accumulation	Range	Typical Value
New (cm)	10 - 25	25
2 Day (cm)	14 - 45	28
3 Day (cm)	32 - 65	45
7 Day (cm)	85 - 195	145
Storm (cm)	10 - 100	35
Elev (m)	850 - 2850	1943 - 2450

Forecaster Comments

NEW InfoEx Observation Summary!
A data table that summarizes InfoEx reported avalanche sizes by aspect, as well as information on start zone characteristics, avalanche dimensions and recent snowfall.

Sledder Ed

Avalanche accidents involving snowmobiles are on the rise, but so is snowmobiler-focused avalanche education. One of Canada's leading educators, Lori Zacaruk shares her thoughts on the state of avalanche awareness among the mechanized set.

Size 3 avalanche, three persons involved, deceased buried 26 feet down. Avalanche hazard rated High. Do you often shake your head when you think about the snowmobile community? Why risk so many lives in such a trap during obviously risky avalanche conditions? Why does there seem to be so little motivation for avalanche safety training? How can we reach this user group?

Zac's Tracs has been reaching out to sledders in Western Canada and the northern US for the past nine years. Mountain snowmobilers ourselves, my husband Randy and I have poured a lot of passion into this commitment and our persistence has finally turned our expensive hobby into a profitable business. Our growth is due to a combination of factors, including persistence, compassion, a commitment to quality, flexibility in programming and scheduling, and partnerships with clubs, dealers, events, and associations. What worked? What didn't? What's next? See if our experiences apply to your backyard.

Put yourself in the shoes of an experienced mountain rider with no avalanche training and read this definition from the online encyclopedia, Wikipedia. *"This activity (highmarking) is extremely dangerous because optimum highmark terrain is typically in areas where avalanche danger is extremely high. Snowmobilers are the recreation group most likely to be killed in an avalanche, largely due to the activity of highmarking."*

Many snowmobilers have looked at similar media quotes and resigned themselves to the belief that avalanches are simply to be accepted as a risk of their sport. My own comments from my first avalanche education course in 1998 reflect that attitude: *"I'm just taking the class for the safety ticket. I doubt I'll learn anything. I'm sure they're just gonna tell me that it is steep and I shouldn't be there."*

Why did I think this way? Because if the only factor discussed is terrain then it appears that the only option to maintain one's safety is complete avoidance. As sledders we had experienced too many awesome adventures in big terrain without incident to give up the sport totally. Once avalanche training opened my eyes, the mission became to communicate to snowmobilers that our passion for climbing hills is not irrational. The slopes that challenge sledders are favoured by skiers and boarders as well. However, our behavior is irrational if we fail to pick and choose.

Our snowmobiles give us access to a serious amount of terrain in a day. When we get educated, gather observations prior to and during our riding day, and learn to use our snowmobile as a tool instead of a weapon, suddenly our choices of routes and slopes are based on probabilities and consequences. Therefore, for very little cost in our day (get on the throttle and choose a different route or play area) we can learn to manage our risk quite efficiently. I truly believe that most snowmobile avalanche victims weren't making bad decisions; they simply weren't making any decisions at all.

Serious mountain riding is a combination of technical riding skills and mechanical know-how, like science fair projects for adults. The ability to fine tune a snowmobile is an art. As instructors this has always been one of the strengths of Zac's Tracs. Whether for boondocking (aka powder riding) or hill climbing we have always been surrounded by modified and high horsepower sleds. We have been successful in creating a safe environment for snowmobilers to have frank discussions about experiences and beliefs. As a group of peers, without fear of judgement, students are free to analyze their activities and accept new habits of riding and group management. These informal discussions are important to anchor the learning.

Graham Helfrick

Over the seasons we have invested a significant amount of time with the various makes and models of safety gear commonly available in North America. We have taken the theory to the field with over 1200 participants. In our AST 1 field sessions, beacon technologies and skills have become so strong that our accident scenarios need to include four to six buried targets just to give the students a challenge. This season we have even had requests to run beacon workshops for CAA professional members.

For true value and information retention, courses must be educational and fun. Through the years we have constantly improved our resources of field props and tools, images, video clips, case histories, personal stories as well as interactive lesson plans and workbooks geared specifically for snowmobilers. These steady improvements to course delivery have been very successful. *"Lori's enthusiasm and energy were obvious and it was fun to get to know her and learn from her. We all benefited from her dedication to the cause of promoting safe and fun snowmobiling." Nelson Lanaway, Regina, SK.*

The word of mouth generated by our past students has been our biggest draw to the courses. The most powerful recommendations do not come from an authority figures but from peers. Over the years we have maintained a database of past students and have kept them up to date with regular newsletters. Last season we added colour, photos, teaching content and personal experiences to our communication. The feedback was awesome and our subscriber list is growing steadily through referrals. *"Lori, I love getting your newsletter and updates. If I get you some of our corporate e-mail addresses can you send to them as well? I like to keep them aware of the work that happens in the west to keep all customers safe and happy." Randy Swenson, District Sales Manager, Yamaha Canada.*

In general the snowmobile industry is warming to our message. I believe that part of this is due to our stability in the industry. Manufacturers and dealers are continually approached for support. Through tradeshows, dealer visits, direct marketing, online forums and media coverage their confidence in our value as a training company is high. Industry is interested in investing in companies with a proven track record.

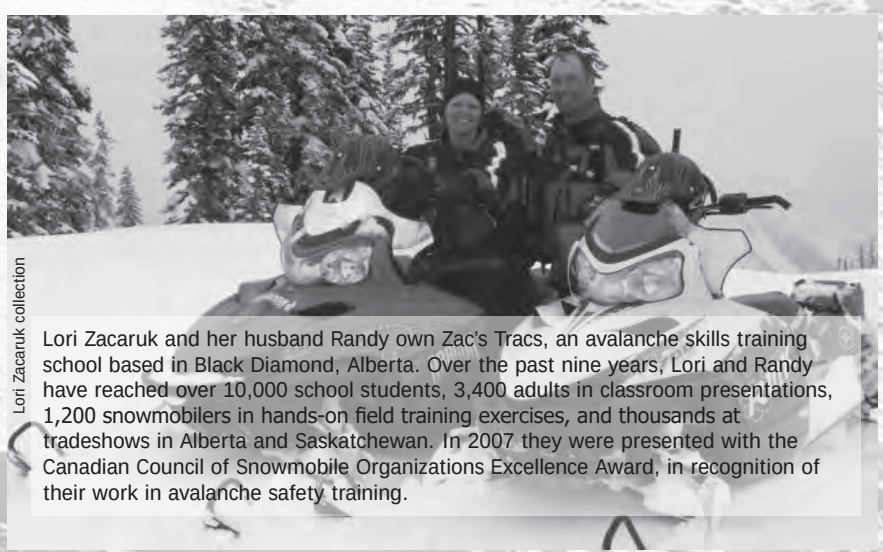
Most sledders can only commit to a few riding weekends each season due to financial, family and work-related pressures. To hook snowmobilers when interest levels are high and to overcome the common complaint of "wasting a good riding day in the classroom" we reworked our AST 1 programs to schedule classroom work in the fall in their hometown communities. Later in the winter these riders then meet us in mountain locations to complete their field training. This format has been a great in terms of increasing participation. However, it is an economic and scheduling challenge for us to ensure there are enough students in a geographic area to justify our travel expenses.

Our successful partnerships with the Alberta Snowmobile Association (ASA), and more recently with the Canadian Avalanche Centre, have allowed us to share some of these expenses and risks in order to service smaller communities that otherwise would not have access to training. This season our connections to the Saskatchewan Snowmobile Association (SSA) and the British Columbia Snowmobile Federation (BCSF) have grown stronger and we are exploring cooperative ventures to develop better access for snowmobile specific training for their members as well.

We are truly looking forward to the upcoming season. New resources, including colour workbooks, will be woven into more active lesson plans. Avalanche safety is about well functioning teams equipped with knowledge and skills. We have always offered the knowledge and skills, so this season our focus will be on bringing the team-building experiences into the classroom through actively working the course curriculum.

In order to support these initiatives, Zac's Tracs plans to grow the partnerships already started with other avalanche educators. To create profitable snowmobile-focused training programs, we recognize that partners are needed to develop the training resources, marketing and logistical foundation. Together, we can create the best product and make economic sense for everyone.

The years to get to this point have been quite a series of learning opportunities but I am glad we have stuck it out this long. The current buzz in our teaching zone is this—"We want our whole riding group to get trained on how not to get caught." Wow, what a huge step forward for risk management for backcountry snowmobile groups! We are pleased to have had a role in creating this shift in our community.



Lori Zacaruk collection

Lori Zacaruk and her husband Randy own Zac's Tracs, an avalanche skills training school based in Black Diamond, Alberta. Over the past nine years, Lori and Randy have reached over 10,000 school students, 3,400 adults in classroom presentations, 1,200 snowmobilers in hands-on field training exercises, and thousands at tradeshows in Alberta and Saskatchewan. In 2007 they were presented with the Canadian Council of Snowmobile Organizations Excellence Award, in recognition of their work in avalanche safety training.

Avalanche Awareness in Newfoundland

By Keith Nicol

In the late 1990's a new National Search and Rescue Secretariat project was launched to promote avalanche awareness in Eastern Canada. The purpose of the Eastern Canada Avalanche Project (ECAP) was to reduce the risk of avalanche accidents in Eastern Canada by assessing risk values, increasing avalanche knowledge, and developing techniques and materials for avalanche education.

Research by the Newfoundland Geological Survey has determined that over 60 people have been killed by avalanches in this province. Unlike the case in Western Canada where most people killed are recreationists, in Newfoundland most people have been killed by avalanches that have struck their homes. However, as more people head to the backcountry in Western Newfoundland there is a concern that more snowmobilers and skiers will be travelling in avalanche terrain

Since ECAP initiated avalanche training in Newfoundland, many basic AST courses have been run through Sir Wilfred Grenfell College-Memorial University for students in the Environmental Studies Program, where I teach. Adventure Tourism students at the College of the North Atlantic were also taught AST. Both of these post-secondary institutions are in Corner Brook, located in the heart of the Long Range Mountains of Western Newfoundland.

In addition to those curriculum-based courses, Gros Morne National Park has requested several AST courses over the past few years for their staff. Over that time I also began to map avalanche activity occurring in the Long Range Mountains near Corner Brook by talking to snowmobilers, snowmobile guides and other backcountry users. In these discussions it became apparent that every year there were close calls involving snowmobiles or skiers, and this occurred more often than most people realized.

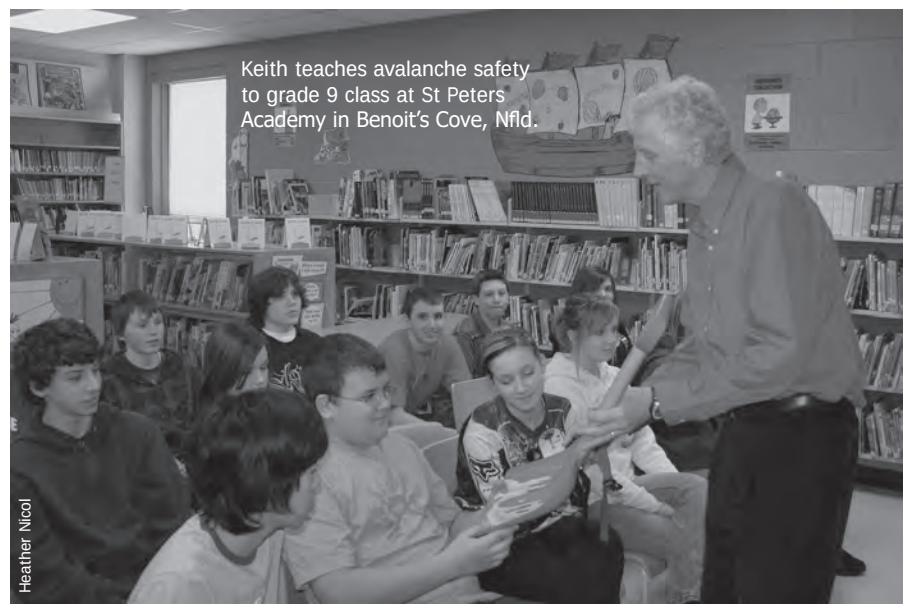
I began to video tape some of these discussions and in 2006, received funding from the Canadian Avalanche Foundation (CAF) to produce a DVD of these interviews as well as showing good avalanche awareness precautions. Ironically, shortly after the DVD was launched in mid-February 2007, there was a serious avalanche on the Northern Peninsula. Several people were partially buried and one snowmobiler was killed.

Various TV news stations used clips from the DVD to raise awareness of avalanches in the province. As well, since 2006 I have been requesting that people send me avalanche information (photo, location, when it occurred, etc.) and I have created an "Avalanche News Update" website where these comments are posted. I have also appeared on a local cable TV station and CBC Radio on several occasions, and written numerous magazine and newspaper articles on avalanche awareness over the past few years. The avalanche DVD has been distributed to many school and public libraries throughout Western Newfoundland and a shortened version has been posted to YouTube where it has received over 1500 hits.

In the winter of 2008 we developed a very extensive public avalanche awareness program through the assistance of the CAF that provided funding to visit schools and present public avalanche sessions. In total, 13 locations in Western Newfoundland were visited through February and early March 2008. We visited 10 schools and ran 11 sessions (generally one-hour sessions for Grade 6 to Grade 12.) Class sizes ranged from 10 to over 120 people in a gym and we estimate that close to 500 students attended these sessions.

We also ran a three-hour evening session for adults in Corner Brook and two sessions at cross-country ski venues in Corner Brook and Pasadena. These were received by about 150 people in total. All of these sessions were free, as were all the school visits.

As well, two Level 1 AST courses were run (for a total of 16 participants) marking the first time people other than students or National Park employees took AST courses. Most were local skiers and snowboarders, as well as three ski patrollers from Marble Mountain. This extra interest is likely due to the fatality last year and the overall greater awareness that is being created. Plans for 2009 include a continuation of the school visit and public awareness campaign and the CAF has been approached for a grant to run this program.



Keith teaches avalanche safety to grade 9 class at St Peters Academy in Benoit's Cove, Nfld.

Heather Nicol

AST students from Corner Brook in one of their first snow pits.

Keith Nicol

Heather Nicol

Keith Nicol teaches Environmental Studies at Sir Wilfred Grenfell College in Corner Brook, Nfld. and is an avid cross-country and telemark skier. He has been involved with the Canadian Association of Nordic Ski Instructors CANSI) for over 20 years running ski instructor courses, and he also is heavily involved in avalanche education and awareness in Newfoundland. He can be reached at knicol@swgc.mun.ca.

“...it became apparent that every year there were close calls involving snowmobiles or skiers and this occurred more often than most people realized.”

AST Providers Meeting Report

By Mitchell Sulkers

Approximately 25-30 AST providers and CAC staff met in Penticton on the evening of May 8, 2008 to discuss issues related to the new AST 1 and AST 2 curricula. After John Kelly gave a review of the new AST program, a number of topics were discussed.

A number of providers voiced concerns about promoting avalanche training to youth, which is seen as a high-risk propensity group. The question of whether AST providers saw themselves enabling or promoting avalanche travel to this group was raised. Other providers suggested that many youth are already accessing out-of-bounds areas or backcountry, especially in some resort towns, and that the AST program is the best course that we have to help them with decision making tools. A number of providers felt there is an opportunity to give youth some very good decision making tools in the backcountry. It was decided that additional information regarding the extra preparation, precautions and prerogatives required to deliver AST to minors would be valuable for AST providers delivering courses to youth. This information may be appended to AST manuals for this fall.

A general discussion on AST curriculum materials followed, with a number of providers praising the curriculum, but suggesting that the video and image support materials needed work. A poll of providers showed that a number of them access short avalanche video clips through YouTube or use more traditional formats like "A Dozen More Turns" and "Take Charge." It was mentioned that the CAC might have some funds that would make it possible to explore further options for making image and video resources available to providers, including the possibility of an exchange forum for AST providers on the CAC website. Karl Klassen pointed out that the expertise for developing support materials was actually "in the room" and that initial calls to AST providers for appropriate materials resulted in few actual submissions.

In a related discussion, Lori Zacaruk asked about the possible use of coroners' photos and materials for case studies. While there are limitations on what materials can be shared, there is the possibility that some of these resources could be made available to providers at some point in the future. As a result of these two discussions, the AST Working Committee will meet to draw up a prioritized list of recommended materials development based on the recommendations made by AST providers at this meeting.

Some providers raised concerns about the removal of most of the snowpack lecture and discussion from the AST 1 curriculum when CAC bulletins still use a considerable amount of snowpack language. Karl Klassen clarified this issue by noting that the first four layers of the bulletin are geared towards the AST student and mention of particular grain layers, like facets or surface hoar, should be found in the snowpack section of the bulletin. It was also pointed out that there are links for most snowpack-related terms in online avalanche dictionaries for those who are viewing bulletins online. Overall, most providers voiced approval for having simplified this part of the curriculum.

It was noted that many instructors have introduced a very limited snowpack lecture to their AST 1 offering and that the CAC appears to be going in one direction with its bulletins while other agencies, including National Parks, appear to be going in a more technical direction. Most instructors felt that some snowpack information is necessary. In the end, the AST working committee was asked for appropriate guidelines for a snowpack lecture in an AST 1 program.

A discussion about the new shovelling techniques introduced in the AST curriculum ensued. It appears that strategic shovelling techniques were a key factor in saving two lives this year. Most providers felt that a new demo video would be useful, as the current video has production value problems as well as some rescue detail errors. Efforts will be made to produce an improved demonstration video for shovelling techniques for next season.

From here, the meeting centred on some of the limitations of the Avaluator, including its use in compacted areas, its usefulness for ice climbers, and the difficulties in getting across the information about Normal and Extra Caution to students. After some key avalanche events in compacted terrain this past season, concerns were expressed for helping AST 1 students understand possible limits to the Avaluator's use in compacted areas. The compaction issue appeared to be resolved when Karl Klassen noted that this past season exhibited a very unusual snowpack character, especially in compacted areas, and that the take-home message should still be for recreationists to seek out local knowledge for local snowpack problems. The other two concerns will be addressed during June meetings in Canmore.

As talk moved towards next season, a number of suggestions for early season training for providers (CPD) were made, including instructional techniques to support the curriculum, suggestions on how to make some of the lessons "interesting," models to help providers understand how people learn, getting notice for CPD out as early as possible, sessions on new avalanche rescue technologies—including sessions on beacons, and an update on the ADFAR 2 project. A preliminary plan is being drawn up for AST workshops as this article goes to press.

Finally, the implications of the new WorkSafe BC guidelines for providers were discussed. This will be clarified before next season. A special thanks to all the attendees, who provided lively discourse and many ideas during this two hour and forty minute meeting.

>>Mitchell Sulkers is the Chair of the AST Committee.

Tyler Carson

Youth and AST

Important feedback from a year of teaching avalanche skills to youth

By John Kelly

The May annual meetings provided AST course providers two separate opportunities to frankly discuss the challenges and opportunities of delivering AST courses to minors. Discussion about the merits and pitfalls of providing courses that enable youth to make decisions that might take them into avalanche terrain was lively and resulted in the conclusion that some young students may use the course to ramp up risk-taking behaviour. Instructors should be very careful to ensure that they understand the motivations of their young students in taking an AST course. They should be even more careful to have good contact with parents to provide them with feedback on the young student's preparedness.

Teaching avalanche skills to young students who are probably going to go into the backcountry anyway may seem like an obvious way to provide help to a group at risk. When they go into the backcountry at least they will be armed with knowledge and some decision support tools.

As educators we might be convinced that transferring knowledge to students will result in better decision making and safer activities in the backcountry; however, this may not be the case. Lively discussion at the youth avalanche education meeting revolved around the possibility that young students with a certain profile may be using an AST course as a lever to maximize risk taking.

So instead of arming students with skills information that will help them make good decisions we are providing some of them with a certificate that gives them credibility with peers and parents alike. "It's ok mom, I took my AST, I know what I'm doing out there." An AST course may be a platform for those who are already pushing the boundaries of safe behaviour to continue pushing boundaries even harder.

Nobody knows how often this is the case, but the concept had enough resonance around the table of instructors at the spring meetings to result in the consensus that we should be careful to be aware of this possibility and do our best to counter it. Here are some suggestions on how this might be done:

1. Carefully determine the motives for youth who are taking the AST course. Discuss your concerns about appropriate risk taking behaviour with both the student and parents.
2. Be completely transparent with parents about the purpose of AST training and the need for them to monitor the activities of their children after the course ends. Give extra feedback to parents about the level of mastery that will be attained at the end of an AST course.
3. Strongly encourage young people to seek out mentors to travel with.
4. Discourage young people from taking on the responsibility of leading groups of their peers into the backcountry.

>>John Kelly is the Operations Manager of the CAC.

Huck it and Get 'er Done!

Teaching Avalanche Safety to Teens

Story and Photos By Cliff Umpleby

This winter I found myself working with a fair amount of teenage students on our AST courses. We found a large percentage of the students coming both from the public and private school streams where the courses were organized through the school districts. A slightly smaller but steady percentage of 16-19-year olds came to us outside of their school environments, mostly from local ski area and ski shop exposure or word of mouth.

A typical high energy rescue scenario with teenage students.

Predominantly most of the students in this age range were taking an AST 1 course or some kind of modified basic avalanche awareness rolled into an overnight winter experience. Many of our students from the school streams were travelling on snowshoes, while teenagers coming from outside the school environment were predominantly on split boards or skis. It was interesting to note that the school districts were generally on snowshoes due to funding restrictions, even though some of their students would have preferred to be on their skis or snowboards. The kids we did have on skis and boards were generally skilled on their mode of transport.

Working with this age group has been a bit of a learning curve. Occasionally you can find yourself with one or two teenagers, in a course but consistently having a whole group of teens took a bit of adjustment in course delivery, and a lot more thought in how to transfer the balance of risk to them. Being teens, they had little concern for their own safety, convinced their bubble of invincibility would protect them from most mishaps. The learning went both ways though, keeping us hip in speech and dress….

The terrain for these courses was chosen for easy access from local ski areas. Some of this included literally three minutes of side stepping to access mid-30 degree 200- to 300-metre lee bowls with no boundary rope or active avalanche control. Other areas required a bit more work to get to. Our terrain choices skirted and avoided all avalanche-prone areas and generally followed safe alternatives for high hazard conditions. Terrain was chosen to reflect existing lines skied by students, or potential terrain they had been looking at or planned to ride.

After skiing with these students throughout the winter, I came to the conclusion that most teens who are quite skilled on boards or skis, are hitting committing lines on a regular basis, mostly with no safety equipment and completely oblivious to avalanche hazard. I definitely noticed that they look at terrain in a much different manner than, say, a group of 40-something backcountry enthusiasts (not to stereotype, of course).

Forty-five degree chutes with terrain traps such as ditches or small cliff bands are considered fair game. And if you only hit it once on a given day then you're lame, man. Telling a 17-year-old talented skier or boarder that this terrain is possibly inappropriate will often get you the glassy-eyed look.

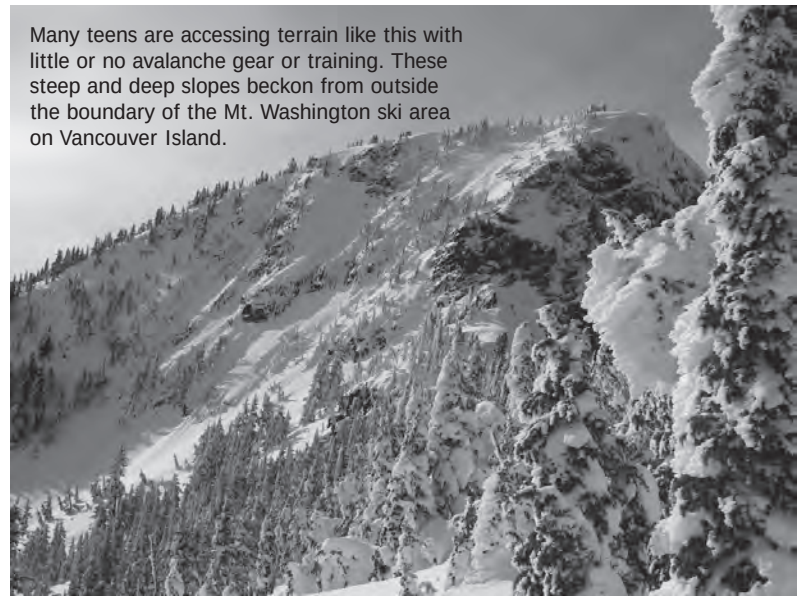
Now, they are not all ripping up the big lines, but to get a sense of what they are hitting check out the lines going off in any of the major ski areas or just outside of the boundaries. Remember that this is the same group riding gaps and wall ramps at mach speed on a nine inch downhill mountain bike or launching cliffs backwards. As one student told me, "Snow is soft, what can go wrong?"

What I came to terms with is, no matter what, a percentage of the students will be back up at the top of the bowl or chute tomorrow morning to ski or ride the steep terrain. My goal was to not dissuade them from riding this kind of terrain

or to convince them that they should be notching it down a bit. I knew I would just lose them. They came to the course to increase their safety margins when they ride those bigger lines and, to be honest, they are going to ride it anyway no matter what you say.

The path I took was to acknowledge the terrain being accessed and focus on getting the message across that there are days when it's appropriate to access terrain such as this, and there are days when it is not. Recognizing the bad days and allowing a healthy margin for error is the key to staying out of trouble.

The concepts I used for this focused on recognizing obvious clues through the use of the Avaluator, reading local and regional forecasts, discussing recent storm events, and accessing appropriate agencies and resources for information such as ski patrol, local forecasters, etc. Hazard evaluation through the use of profiles or stability tests was not covered.



Many teens are accessing terrain like this with little or no avalanche gear or training. These steep and deep slopes beckon from outside the boundary of the Mt. Washington ski area on Vancouver Island.

I found that accepting and agreeing with their terrain choices as "fun" where appropriate (pointing out terrain traps, terrain shape and objective hazards such as cornices, etc.)and by focusing on the recognition side of the equation,

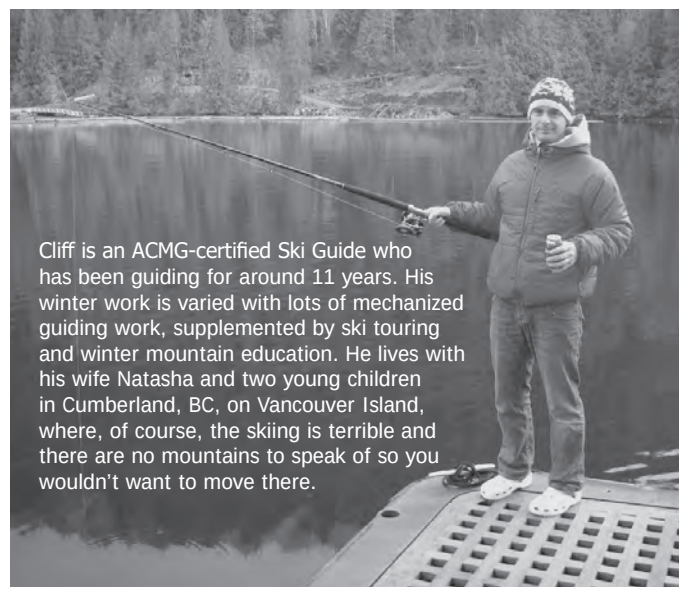
> **"Telling a 17-year-old talented skier or boarder that a 45° chute with terrain traps is possibly inappropriate will often get you the glassy-eyed look."**

I had good retention and comprehension with most of the groups. As someone who loves to ski, I used the terrain as common ground, helping me to connect with the students and keeping their interest and enthusiasm. Acknowledging that 45 degree slopes are fair game, rather than terrain that should be avoided, was a key factor in keeping the students "with me." While that is a shift in thinking and not applicable to all groups, it is a reality of the terrain being accessed.

With this age group, visual aids are great for the classroom. The more skier-triggered and big avalanches you can show on video the better. They are used to being taught. They pick up on concepts quickly and have good retention of the course material. In the field they will go a fair distance and seem never to tire, until you stop. Then they all flop down for a rest and another eating session!

I used digital beacons exclusively for beacon training. No beacons with flagging options were used and no switch to analog was used if the beacon had that option. I quickly realized that the iPod generation gets all things digital! The speed at which most students could uncover a buried beacon was dramatically quicker than, say, a 40-something group. I could move from uncovering a shallow beacon to probe striking a 50-100 cm burial quickly and effectively with these groups. I would find myself demonstrating and running a simple two-beacon search often as the single beacon searches were generally done fast and effectively.

All in all, the courses aimed at this age group are a ton of fun to teach. They are eager to learn and love to ski or board. Their enthusiasm is infectious and I encourage teaching them. It will keep you young and keep you up on all the cool lingo. Peace out, homies.



Cliff is an ACMG-certified Ski Guide who has been guiding for around 11 years. His winter work is varied with lots of mechanized guiding work, supplemented by ski touring and winter mountain education. He lives with his wife Natasha and two young children in Cumberland, BC, on Vancouver Island, where, of course, the skiing is terrible and there are no mountains to speak of so you wouldn't want to move there.

Youth Avalanche Education Program

Final Report - 2008

By Verena Blasy

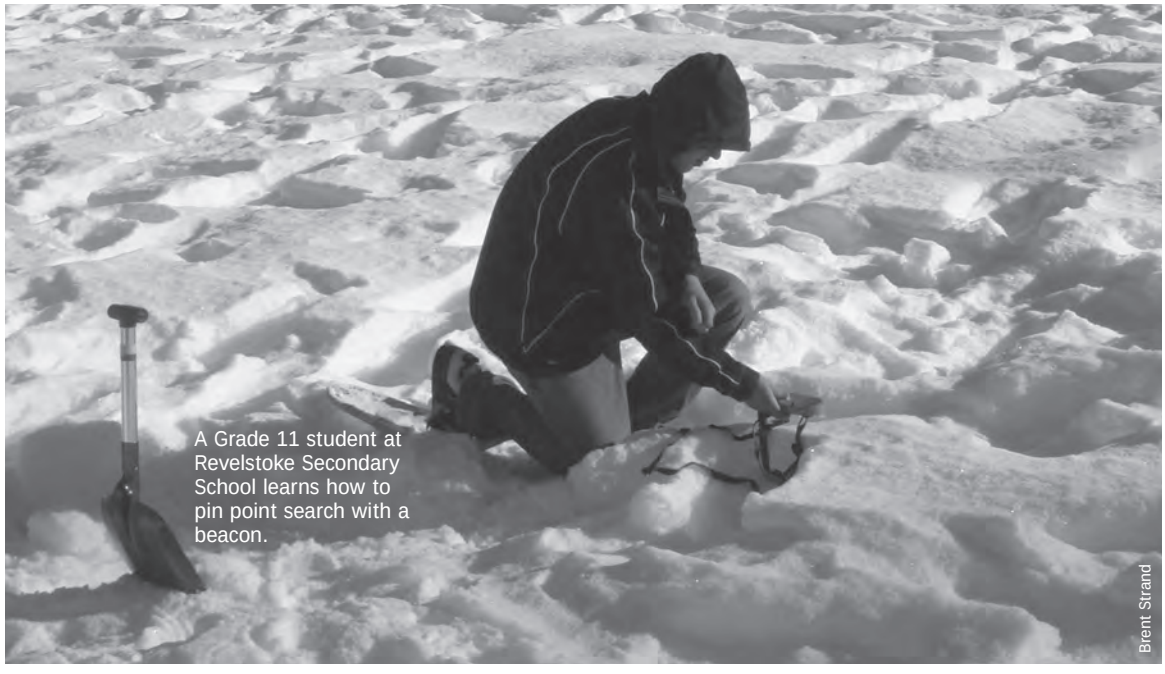
The CAC's Avalanche Education Program was a success in its second year. Once again, Verena Blasy was program coordinator and educator. Joining her in some of the presentations were Ken Gibson, a volunteer ski patroller, and National Park Wardens Danyelle Magnan and Anna Brown.

Last year Grade 6 and 10 students in Revelstoke received an in-class program. This year, Grade 6, 7, 8 and 10 students in Revelstoke and Golden received presentations. The Grade 11/12 Physical Education classes in Revelstoke did outdoor beacon searches as well. In addition the program was presented to three outdoor education classes (55 students) in Calgary. A total of 668 students were reached between December 2007 and February 2008. Please see the tables below for a breakdown of students by grade and location. Overall feedback from teachers was very positive. All teachers who filled out an evaluation form "strongly agreed" that the program was worthwhile.

Revelstoke		Golden	
Grade	No. of Students	Grade	No. of Students
5-7	140	5-7	90
8	50	8	104
9	13		
10	70	10	107
11/12	24	11/12	15
Total	297	Total	316

Student Survey

Julie Timmins and Pascal Haegeli worked together to create a winter-recreation survey for high school students. I altered this survey slightly to include more questions for snowmobilers. One hundred and twenty students from Revelstoke Secondary School and 52 students from Calgary completed this survey. In Golden, where class-times were shorter, I did a quick verbal survey at the beginning of each program (asking students to put up there hand if they ski, board, snowmobile, etc). I did this verbal survey with 147 Golden Secondary School students as well as with 107 Revelstoke and Golden elementary students. Pascal Haegeli has received all of this data and will be working with it sometime in the spring of 2008. A preliminary look at the data is displayed in the following graphs.



A Grade 11 student at Revelstoke Secondary School learns how to pin point search with a beacon.

Brent Strand

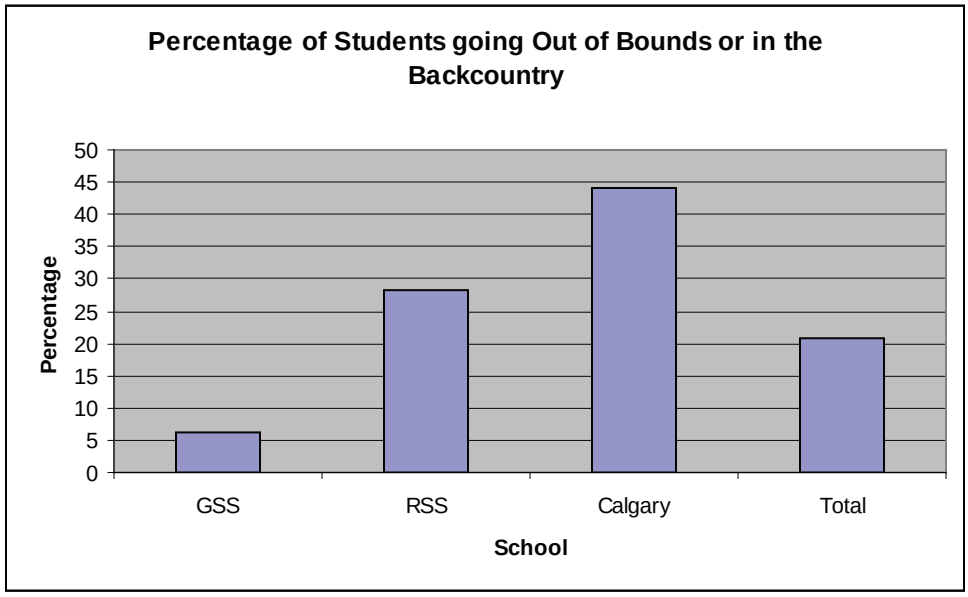


Figure 1: Percentage of students who were surveyed who said they skied/snowboarded out-of-bounds or in the backcountry. GSS: 147 Grade 8-12 Golden Secondary School students, RSS: 120 Grade 9-12 Revelstoke Secondary School students, Calgary: 52 Grade 9 Outdoor Education Students. Please note that the students at GSS were verbally surveyed while the students at RSS and in Calgary filled out an anonymous written survey.

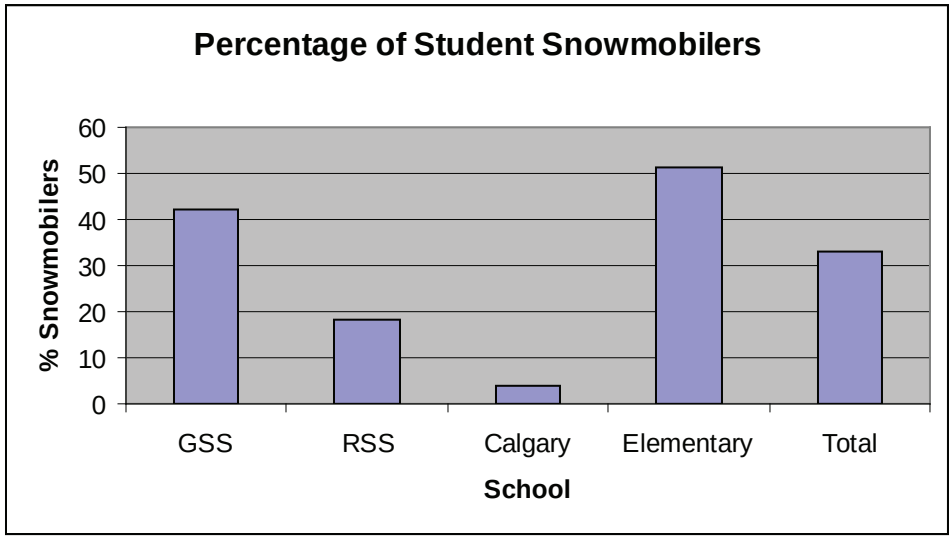


Figure 2: Percentage of students who said they snowmobiled or said their primary winter activity was snowmobiling. GSS, RSS and Calgary refer to same data as in Figure 1. Elementary refers to Grade 5-7 students in Revelstoke (17 students) and Golden (90 students). Please note that students in Golden and at the Elementary level were verbally surveyed and could raise their hand if they snowmobiled at all, while students in Calgary and Revelstoke filled in a survey which asked them to choose only their primary winter activity.

Revelstoke Mountain Resort Presentation

A new ski hill opened in Revelstoke on December 22, 2007. A ski hill existed on Mount Mackenzie before but this year it grew a lot—from 300 vertical metres (1,000 ft) to 1,445 vertical metres (4,735 ft), from 68 ha (170 acres) to 607 ha (1,500 acres), and from no alpine terrain to over 10 runs in the alpine. This extra terrain meant there would also be more hazards to skiers and boarders including more tree-skiing, in-bounds avalanche terrain, avalanche control and easy access to out-of-bounds terrain. Because of this concern and because the hill was opening on the first day of the school Christmas holidays, there was a need to do some education in Revelstoke's schools before opening day.

High School Program

Sylvain Herbert, head of mountain patrol at Revelstoke Mountain Resort (RMR), approached volunteer ski patroller Ken Gibson

to do a presentation at Revelstoke Secondary School (RSS). I teamed up with Ken to create a high-impact presentation that could be presented to a large group. RMR and the CAC provided us with prizes for the students. Ken and I presented a slideshow to approximately 200 students in the RSS gym on December 5, 2007. The presentation was optional for students and occurred over the lunch-hour. Ken and I succeeded in making the presentation as interactive as possible by offering prizes to students who answered or asked questions.

The main points we tried to get across in this presentation were:

- Ski with a buddy (especially when tree skiing)
- Never go into a closed area
- Out-of-bounds = avalanche terrain

Grade 6/7 RMR Program

The RMR high school presentation was then adapted for Grade 6/7 students as we felt that these student would be old enough to be skiing without adult supervision. The presentation was offered to all Grade 6 and 7 classes in Revelstoke. It was presented to seven classes (123 students) at three out of four of the elementary schools before opening day at the ski hill. The fourth school received the regular Grade 6 program (see below) at a later date.

Grade 6 Program

The Grade 6 program was presented to the Grade 6 class at Mount Begbie Elementary School in Revelstoke and to all four Grade 6 classes at Golden's two elementary schools (Lady Grey Elementary and Nicholson Elementary). A total of 107 students saw this program. Six other Grade 5, 6 and 7 classes in Revelstoke received the RMR presentation described above.

The program is divided into two lessons, each just over an hour in length. The first lesson is focused on ski-hill safety (the Alpine Responsibility Code, helmets, tree skiing, tree wells, etc.). The second program is focused on being out-of-bounds and in the backcountry. It covers how avalanches work, the hazards of the backcountry, what to bring in your pack, and how a transceiver works.

Both of these programs have a mixture of videos, student activities, photographs and a lot of interaction in order to keep students engaged. The second presentation also has a slideshow which goes along with it. Although the core of the Grade 6 program did not change from last year, several improvements were made. They are as follows:

- Several video clips of avalanches and people getting caught in avalanches have been added to the slideshow.
- I have a student do a beacon search in the classroom, rather than demonstrating it myself (more interaction for students).
- We had a prop built out of wood that allows us to demonstrate how an avalanche works using flour and Lego skiers and snowboarders.
- New photographs of Revelstoke Mountain Resort (in-bounds and out-of-bound areas) have been added to the Revelstoke slideshow.
- New photographs of the Golden area (including Kicking Horse Mountain Resort) have been added to the Golden slideshow.
- We acquired our own materials and display for the in-bounds presentation.
- I have collected stories (my own and others) to share with students during presentations.

Grade 8 Program

The Grade 8 program was presented to all Grade 8 PE classes in Revelstoke and Golden to a total of 154 students. Last year's Grade 10 program was adapted to suit Grade 8 students and it proved to work much better at this grade level. The program focuses only on out-of-bounds and backcountry travel and goes over many of the key points mentioned above for the Grade 6 program. As with the Grade 6 program, the core of the program did not change too much, however some improvements were made. Improvements were similar to the improvements made to the Grade 6 program, listed above.

Grade 10 Program

This program was presented to all Grade 10 students in Revelstoke and Golden as well as one class of Grade 11/12 students in each town. A total of 216 students saw this program. Students in Revelstoke had this program as part of their Planning 10 course, while Golden students had it through their PE classes.

The Grade 10 program is focused around the movie "A Dozen More Turns," the true story of five guys who go into the backcountry on a three-day trip and trigger an avalanche. One person dies and his friend breaks and eventually loses his leg. Overall I found Grade 10 students to be very receptive to this movie.

Before showing the movie I review backcountry and out-of-bound areas that students may be familiar with, as well as reviewing the basic gear needed to travel safely in the backcountry. During the movie, students are given a worksheet to fill out. The students are asked to look for the things the group does right (Are they carrying the right equipment? Do they know how to use it? Have they taken a course? Did they check the forecast?). I also have them pinpoint the group's mistakes and suggest what they could have done differently. After the movie is over, I go over the above questions with the students and share stories when appropriate. If there is enough time I also introduce the Avaluator to them.

Grade 11/12 Program

The Grade 11/12 program consisted of avalanche transceiver searches done outside during PE classes. This was a trial program done at the request of several teachers at Revelstoke Secondary School (RSS) as well as from comments on evaluation forms. This program was done with both Grade 11/12 PE classes at RSS to a total of approximately 30 students participated in this program.

Terry Beitel, a PE teacher at the RSS, already does beacon searches with his Grade 11/12 class. RSS owns 10 analogue transceivers (Ortovox F1s). Park Warden Danyelle Magnan and I joined Terry for this lesson. Anna Brown, also a Park Warden, and I then taught the second 11/12 PE classes this lesson. Each student had an opportunity to find one buried transceiver during the class period.

Verena Blasy introduces these teenagers to avalanche transceiver technology.

Brent Strand

Overall, Anna Brown and I felt that this lesson would work much better with more volunteers experienced in avalanche transceiver use. Groups of 4-5 students per adult would be ideal. Using a beacon basin, such as the one located at RMR or at Rogers Pass Visitor's centre would be very beneficial as well.

Other Events and Programs

In addition to the above programs, we also ran three other one-time programs: a poster contest for Avalanche Awareness Days at Revelstoke Mountain Resort; a Grade 9 presentation for 55 students in an outdoor education class in Calgary; and a field trip and presentation for the Adult Literacy Program at Okanagan College in Revelstoke.

Poster Contest

Grade 5-7 students who had seen the RMR presentation in December were invited to enter a poster contest for Avalanche Awareness Days, which occurred on January 12, 2008. A total of 75 students entered the contest and all posters were put up on display at the day lodge at RMR on Saturday, January 12. At the end of the day the posters were judged by a panel of four experts and a winner was chosen from each of the three grades. These three students appeared in Revelstoke's local paper with their

posters the week following Avalanche Awareness Days. A selection of approximately 20 posters were laminated and given to the ski hill to be put on display while others were posted in the front windows of the Canadian Avalanche Centre in Revelstoke.

Calgary Presentation

A presentation was requested for the Outdoor Education classes at Bishop Pinkham Middle School in Calgary Alberta. Because of timing issues, the program was presented to all three classes (55 students) at once in the school library. The presentation was a combination of the Grade 8 and 10 programs. It was challenging to present to so many students at once and more prizes would have been desirable (as at the RMR high school presentation).

Okanagan College Presentation

The Adult Literacy Program at Okanagan Regional College in Revelstoke requested a field trip and presentation on avalanches. We started by taking the gondola up to the beacon basin and every student had the opportunity to search for a beacon. After this, we re-grouped at the college for a slideshow. Because many of these students do not participate in winter recreation, I changed parts of the presentation to include information on avalanches on highways as well as in the backcountry. The students were very receptive and interested in both the presentation and the opportunity to get up onto the ski hill.

Evaluation of the Programs

Evaluation forms were e-mailed or personally given or e-mailed to most of the teachers whose class the program was presented to. Nine teachers have responded. The following table and paragraphs summarise the feedback received.

Numbered Ratings: 1 - strongly agree, 2 - agree, 3 - somewhat agree, 4 - disagree, 5 - strongly disagree.

Question	Average Rating
1. The presentation was an appropriate length of time.	1.2
2. The videos shown were appropriate for the students' level.	1.0
3. The content of the presentation was clear and appropriate for the students' level.	1.1
4. The students' questions were acknowledged and answered well.	1.0
5. The students were challenged to answer questions during the presentation.	1.1
6. There was a good balance of student participation to student "sitting and listening."	1.3
7. The presenter was good at classroom management.	1.1
8. The students were engaged throughout the program.	1.3
9. This was a worthwhile program.	1.0

Overall feedback was very positive and all teachers "strongly agreed" that this was a worthwhile program. Lori Milmine, a planning 10 teacher at RSS who is also a backcountry skier commented:

"This was an excellent presentation. The students were engaged and interested; the topic relevant and important. Students really need to know this information and this gave them the basics. Thank you so much!"

Areas for Improvement

Based on teacher evaluations, ongoing student feedback during presentations, conversations with other educators and co-presenters and the preliminary results of the surveys, the following improvements are suggested.

- Avoid mixing age groups up whenever possible. The presentations in Golden were done in the school gym and during one presentation there were Grade 8 and Grade 11/12 students mixed together. The Grade 8 program seems to be much more effective with the younger age group and the content of the Grade 10 program (specifically the movie, "A Dozen More Turns") would not be appropriate to show to Grade 8 students. In addition, if younger students (eg: Grade 5) see a Grade 6 program this year, then it will possibly be repeated to them the following year.
- Do presentations in a classroom rather than a gym or library. This year the Revelstoke Grade 10 program was offered to Planning 10 classes rather than PE 10 classes. This worked well as it did not take physical activity time away from the students, a classroom was already available and the content of the program fit into the Planning 10 Risk unit well. The Golden Secondary School programs all occurred in the school gym and this was not as effective as using a classroom. Students don't have access to a desk to write at or a writing utensil to fill out surveys and worksheets; the smaller space of a classroom seems to be more conducive to

interacting with students; and students don't have the expectation of doing usual physical gym activities when in a classroom. At RSS PE classes have booked a classroom for presentations and this would be ideal for all presentations.

- Develop a collection of interactive activities for students to do when they are getting restless. For example, Monica Nissen has suggested covering one (non-claustrophobic) student with a white sheet and have other students stand around the edge of the sheet to simulate what it feels like to be trapped in an avalanche.
- Work with Julie Timmins to create a Grade 9 Jeopardy game. Julie had success with this program this year. This would be a great way to review material in a very interactive manner.
- Target snowmobilers better. The preliminary look at the survey numbers showed that 42% of Golden students said they snowmobile and 18% of Revelstoke students listed it as their top winter activity. The program has strived to include photographs and video clips of sledders and to mention sledders whenever possible. However, because the program has been taught by backcountry skiers, it would be beneficial to have it viewed by someone who is both a snowmobiler and an educator for suggestions.
- Have more experienced volunteers to teach Grade 11/12 classes how to use an avalanche transceiver. This is a difficult thing to teach in large groups. Groups of 4-5 students per teacher would be ideal. It would also be helpful to use a beacon basin such as the one at RMR or Rogers Pass for this activity.
- Improve the wording of the student survey and the manner in which it is delivered. The student survey has the ability to give us an excellent idea of who our audience is. However the survey questions and manner in which it is delivered need to be adapted. Students rarely read questions carefully and many surveys ended up with conflicting data. It would be beneficial to read each question to students as they do the survey. The survey also takes 5-10 minutes of class time, which can be challenging especially at schools with shorter blocks.

Future Plans for the Programs

- Continue to use new and up-to-date materials (such as photographs and videos) in the program. Rocky Mountain Sherpas (www.rockymountainsherpas.com) are expected to begin releasing avalanche education movies for youth in the fall of 2008. Although the trailer to this movie looks fantastic, it should be noted that it contains very little snowmobiling content.
- Continue to work with Julie Timmins and others who are teaching avalanche education to exchange ideas, experiences and teaching materials. Work with stakeholders to develop a best practice template for age appropriate avalanche education.
- Create a Grade 9 program.
- Work on improving the Grade 11/12 avalanche transceiver program (see suggestions above). Contact manufacturers to obtain beacons for demonstrations.
- Introduce a career planning component for Grade 12.
- Create programs or work with other existing programs to reach Grades 1-5. For example work with Wildsight (Monica Nissen and Debbie Robinson in Revelstoke) to add a small amount of information on avalanches into their primary winter-wonder program.
- Add new content into the Grade 8 program. Students who saw the Grade 6 program in Revelstoke last year will be in Grade 8 next year. Currently the Grade 6 and 8 programs are quite similar and it would be beneficial to alter the Grade 8 program again so that it is not too repetitive.
- Initiate a scoping project to determine where existing programs are underway in other mountain towns, develop network and provide active support for existing programs.
- Expand to other mountain towns that do not have avalanche education.
- Work with local ski hills to set up AST courses that youth can participate in (in-bounds). Let high school students know where and when they can take these courses.
- Parks Canada would like to expand their avalanche education program from the Bow Valley to Revelstoke and Golden. Danyelle Magnan, a park warden in Glacier National Park, has witnessed and helped teach the Grade 6, 8 and 10 programs. The CAC needs to work with Parks to establish the best way to combine their resources.
- Start going into schools in November, before winter season has started.
- This program could do with a catchier name. It might be possible to have a name-our-program competition among students.

Conclusion

Overall this program was a success in its second year. Six hundred and seventy students were reached between December 2007 and March 2008 and all of the teachers surveyed "strongly agreed" that the program was worthwhile. Many of these students are already spending time out-of-bounds or snowmobiling in the backcountry. In addition, the larger ski hill in Revelstoke has suddenly dramatically increased student's access to avalanche terrain in this town. Many of these students may not have any awareness or understanding of the risks inherent with being in avalanche terrain without education programs such as this one.

Canadian Avalanche Roundtable Report

By Mary Clayton

The fourth annual Canadian Avalanche Roundtable (CAR) met in Penticton on May 5, 2008. The roundtable is a yearly process, where partner organizations are given the opportunity to monitor and assess the services offered by the CAC. It is also an important venue for those organizations to give guidance and direction for members of the CAC management team as they select priorities for the coming season.

CAC Executive Director Clair Israelson discussed the funding agreements currently in place with federal and provincial governments. Parks Canada has renewed their contribution of $100,000 annually for the next three years. The Meteorological Service of Canada has also pledged $75,000 per year over the next three years with $50,000 designated for programs in Western Canada, $10,000 for programs in Nunavut, Newfoundland and Labrador and $15,000 for the Gaspésie Avalanche Forecasting Centre (CAHG). The BC government will continue to provide $125,000 annually and additional funding to support special bulletins. The Alberta government will provide $100,000 annually. Clair thanked all the representatives from the various organizations for their ongoing financial support and efforts to obtain this funding

Public demand for CAC products and programs continues to grow and external relationships with stakeholders are excellent. There is growing dialogue with land managers regarding avalanche safety policy issues and the CAC is gaining an international reputation for innovative, effective programming. As well, the CAC has achieved credibility with the media.

This is the fourth year of CAC operations and programs are maturing and evolving appropriately. Staff is comprised of highly dedicated and capable individuals, but there is a need to manage over tasking. The ADFAR 2 project is in its final year and is continuing to develop concepts to align amateur and professional avalanche decision making. Other major projects included a report regarding avalanche threat mitigations in Canada and avalanche skills training course curriculum development.

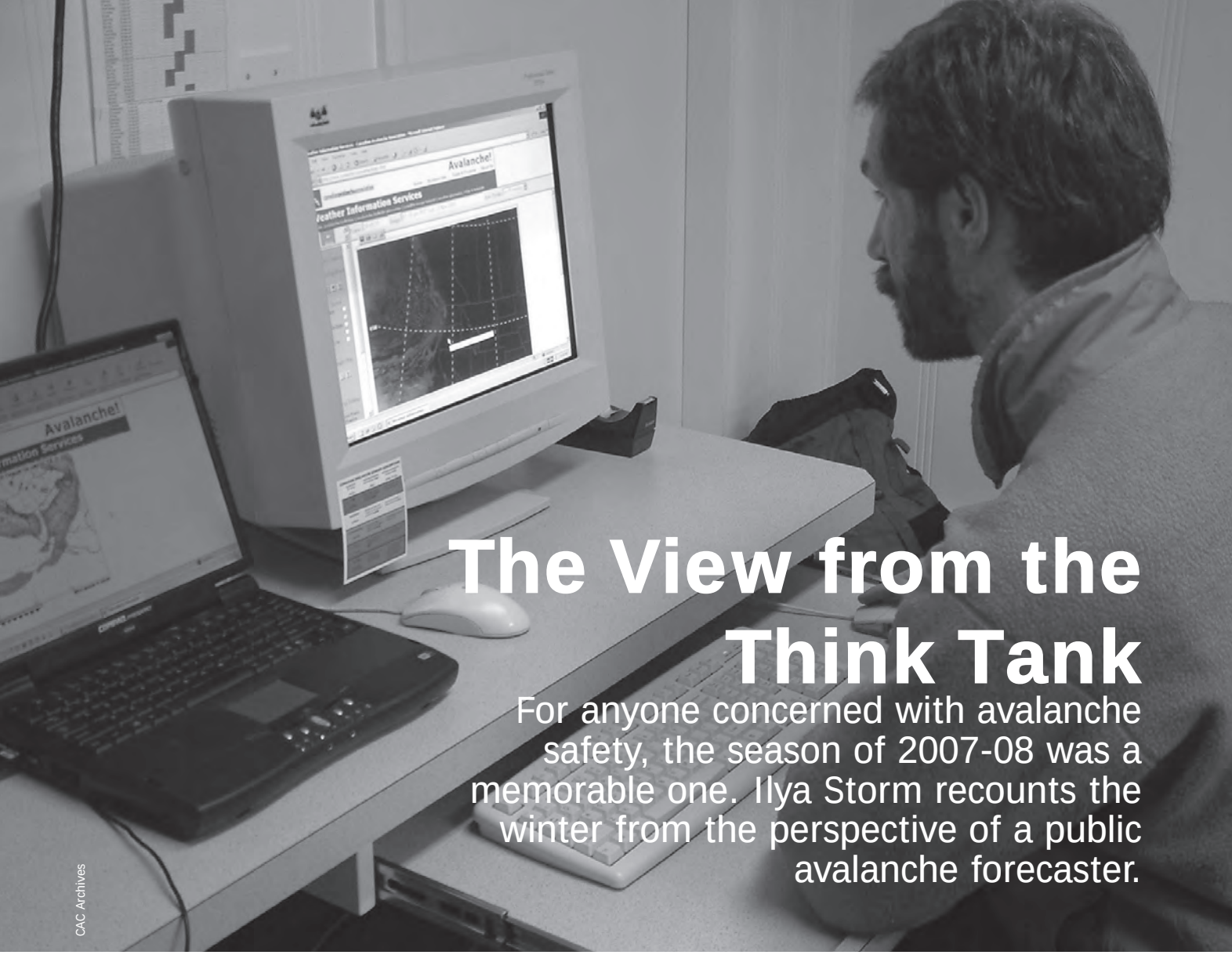
Operational challenges include finding seasonal staff and housing, providing coordination and advisory services for government agencies, and developing partnerships and safety programs for Newfoundland, Labrador and Nunavut. External challenges include the pending WorkSafe BC avalanche regulations and possible implications and the CAC's role regarding the 2010 Winter Olympics.

CAC Operations Manager John Kelly (JK) provided an overview of operational activities in 2007/08, describing the intense avalanche periods in short timeframes with two major and two medium persistent weak layers. Seven special avalanche warnings were issued, double the average. JK showed a breakdown by activity of this season's 16 fatalities. This year, more snowmobilers were killed by avalanches (seven) than any other user group.

The CAC produced some new products this year including avalanche and field weather observation summaries transmitted to the public on a daily basis, RSS feeds, and a test version for public avalanche bulletins on a mobile device. The forecast area has been divided down into five more sub-regions, and the public can now submit information on notable avalanches and avalanche incidents online. This latter product has proved extremely popular this year, as the forecasters received 119 incident reports. Each of those reports received, on average, 1,300 requested views by our web users, for a total of 150,000 requested views.

The CAC website continues to be a valuable tool and users give good feedback. Web traffic has reached over two million views, with over 800,000 bulletin views. Overall it gets information out but JK noted that the CAC must stay current with new technologies. Media presence and outreach is a major focus, and on one day this season, 28 media interviews were given out.

Other coordination highlights include Nunavut programs, and work with partners in CAHG and Newfoundland. The CAC undertakes a number of education initiatives, including the annual Avalanche Awareness Days and Backcountry Avalanche Workshops, Avalanche Skills Training (AST) courses, the online avalanche course and snowmobile workshops. New AST curriculum and supporting materials were developed in summer 2007 and implemented this season. Over 5,000 AST courses were delivered last year, representing a 13% increase in AST 1 and 27% increase in AST 2 over the previous season. As well, 2007/08 was a record year for snowmobile AST courses. Youth snow safety education, and snowmobile outreach and education continue to be a major focus for the CAC.



CAC Archives

The View from the Think Tank

For anyone concerned with avalanche safety, the season of 2007-08 was a memorable one. Ilya Storm recounts the winter from the perspective of a public avalanche forecaster.

Sometime in early April, I started to hear sighs—long sighs, loud sighs. They increased in number and volume, like the water in the rivers as spring took hold and, as winter drew to a close, there seemed to be a collective sigh of relief from the avalanche patch. At the CAC's public avalanche forecasting office, the forecasters were unanimous—everyone was happy to sign-off on their last bulletin of a very challenging season.

Our first day in the office coincided with the first fatality of the season. Talk about starting with a bang! Unfortunately, this accident was eerily similar to one the previous November, and that got us thinking. One of the benefits of the CAC's investment in improved record keeping and databases is that we were able to identify some interesting patterns in early-season fatal accidents. What we found is that 50% of early-season avalanche accidents (October to mid-December) involve ice climbers and backcountry skiers in the Rockies. This analysis allowed us to quickly initiate some coordinated media outreach with partners in Kananaskis Country and Banff National Park.

As an added benefit, now that we aren't in the thick of winter, we're anticipating next year and figuring out what sort of early season initiatives can be launched to help prevent the first accident, rather than reacting to it. We've done some interesting analysis regarding preparation and route choice, so watch for some targeted messages coming out of our office, Banff and K Country this coming season.

In some ways things began going from bad to worse once we started systematically collecting information on conditions to date. It didn't take long to realize that problems with early season crusts were brewing, at least in the Rockies. That region had a good head start, with October and November crusts in addition to the more notorious (if only because it was widespread across much BC) December crust. The take-home message for us was that this was the first year in five where we were likely going to be dealing with a deep weak layer all winter.

I think that being a forecaster at the CAC is about as close as I'll ever get to membership in a think tank. We keep in close contact with all the other avalanche forecasters in Western Canada but our big advantage is that we're not operational. There are no external pressures on us to open a road or a run—we have the luxury of being able to think only about the snow and how to most effectively communicate our forecasts to the public.

As near misses started flooding in so too did comparisons to 2003 and we directed significant resources and attention towards figuring things out. Where exactly are the problems found, how does the snowpack vary within and between regions, how do we anticipate what's going to happen next (forecasting deep instabilities isn't a trivial task), what ideas will best serve public recreationists during tricky times and how do we communicate this information.

One aspect we struggled with, as all public forecasters have for many years, was deciding on accurate danger ratings. It's the challenge of combining an infrequent but high consequence avalanche problem with a danger scale built around frequency and silent on consequence. There were days where the literal definition of the danger categories suggest a Moderate (or possibly even Low) rating, but the forecaster's feeling was that users aren't well-served by a "green light" signal.

As a public forecaster, knowing that hundreds of sleds were travelling thousands of kilometres and intensively working scores of slopes, I worried that someone would trip a landmine and it wouldn't be pretty. My intention with that example isn't to pick on a single user group. Rather, my point is more easily conveyed in that scenario because sleds can cover so much terrain in a day that statistically, everything else being equal, the odds are that it'll be a sledder who is going to find that isolated trigger point.

Yup, when I check in with the office during days off, dreading an accident report, I look forward to an improved communication tool that will allow us to better convey our understanding of the hazard. My hope is that the ADFAR 2 project, which is currently pursuing a danger scale revision, will provide us with just the tool we're looking for. Look for a new improved hazard scale next year!

This avalanche at Monitor Creek South Selkirks was the scene of a close call this winter.

Rob Whelan

Picture the scenario of forecasting for a long-weekend with a blue sky forecast, great travel conditions (good traction for sleds or easy trail-breaking for skis) and great powder. Now throw in a deeply buried weak layer that isn't going to easily whumpf, doesn't sound hollow, won't present shooting cracks with slope cuts, no cornice falls or sluffs to test slopes—basically no warning signs and you can't get a sense of the dragon through your feet. Yeah, pulling out the shovel might help, but stability tests varied between moderate and hard, although the block reliably "pops." Sure pros have tricks and advanced skills, and possibly more discipline, but what about everyone else that's heading out?

What the heck is a PWL?

Although you don't sign a pledge to use plain English when joining the forecasting team, avoiding jargon is one of our goals. So what's up when one of our major accomplishments for the winter was popularizing an acronym in the recreational community? I guess it comes down to how often we had to write about persistent weak layers (PWL for short). We were repeating ourselves a lot this winter, looking for different ways to describe the same PWL that just wouldn't go away, trying to use our limited space for more timely issues even though a PWL was almost always lingering deep in the snowpack.

It was the first winter since 2003 that PWLs characterized the snowpack throughout much of BC and Alberta, and many comparisons were made between the two winters. Thankfully, in many areas one of the significant differences between this year's snowpack and that of 2003 was a relative absence of step-down potential.

In general terms, in our forecast regions there were three major PWLs this year: the early season crusts, the January 26 surface hoar, and the February 26 surface hoar. It seemed these three layers were separated widely enough in space and time that connecting the dots wasn't easy. In other words, tripping the layer closest to the surface didn't necessarily mean deeper layers also failed. In 2003 numerous weak layers above the November crust tended to connect the crust with the surface, increasing the snowpack structure's nastiness.

One of the major ways we dealt with the PWL problem was through Karl Klassen's discussion papers. By dealing with this lingering and at times secondary problem outside of the forecasts themselves, we were able to provide consistent and credible advice about how to think about and manage the challenges surrounding deeply buried weak layers, and deal with more current issues in the forecasts. The feedback was unanimous and positive. People found the information contained in these papers relevant, and they seemed to help people better understand how to manage the challenging problems.

It's immediately apparent that many of the tricks to managing deep instability risk boils down to managing terrain. Therefore, next on the "to do list" is development of Terrain Tutorials. The goals for these tutorials include:

- Helping people understand the type of terrain where people are finding trouble
- Showing what we mean by "a better choice given current conditions is terrain that's…."
- Helping people better relate to what we mean by cross loaded, thinly covered areas with rocky outcrops, pillows of wind slabs, immediately lee of ridges, and similar standard terrain description.

How to characterize the winter

Winters come and go, with many details fading from one's memory. Of the many ways we could characterize a winter it seems our default measure is the number of fatalities, and the stories behind the accidents. With 16 recreational fatalities this winter, it wasn't a great one for public avalanche safety programs like ours and, in fact, the increased number of fatalities is a bit of a letdown. We take pride, and occasionally some of the credit, when accident trends are on the way down. So we have to question what we can do, or what went wrong, when the trends and statistics go against us.

One of the problems with measuring the winter through fatality statistics is that the world we work in is always just one accident away from being one of the worst years in memory. That's the risk inherent with helicopters moving around the mountains with groups of 12 skiers, or with scores of sledders habitually congregating at the bottom of alpine bowls.

There are probably better measures out there to analyze, including the number of days at various danger ratings, or looking at close calls rather than just fatal accidents. In our office, it's interesting to look at our Special Public Avalanche Warnings. We issue special warnings for the times and places where we feel the risks of recreational accidents are elevated. Generally this means times when we think external factors (like blue skies or fresh snow) may affect the recreational users' perception of the stability. Additionally, our special warnings always include simple measures people can take to better manage their avalanche risk.

Issuing a Special Public Avalanche Warning is pulling out our big guns and we're judicious about keeping them infrequent. For four of the last five winters we issued three or four each season. This winter we issued eight. Even more interesting, the last one was put out in mid-May after operations had wound down. Ahhh, those pesky November and December PWLs and a spring that never seemed to arrive!

A new shovelling technique was introduced in Canada this winter (see Manuel Genswein's article "V-Shaped Conveyor Belt Approach to Snow Transport" in Volume 84, Spring 2008) which was widely disseminated amongst the public through various avenues, including the CAC's Backcountry Avalanche Workshops and AST courses. We heard stories from at least two close calls where a deeply buried person was successfully dug out in an unbelievably short time by companions recently trained in this new technique.

We pursued a variety of different media outreach programs throughout the province as the winter evolved, targeting those regions where the risks seemed greatest. With these initiatives we try to succinctly describe the problem and provide two or three measures people can use to better manage their risk. Feedback from the public at large and avalanche professionals told us our efforts were making a difference. People adjusted their goals, changed their approached to an area or slope, or adopted a more disciplined approach to traveling in avalanche terrain. We can never really know or directly measure the number of fatalities prevented but the combined feedback suggests we accomplished some good things this winter.

An unexpected feature of the winter, possibly a direct result of it being so challenging, was a welcome increase in the number of avalanche workers who called or sent e-mails. You gave us a heads up about avalanche activity, or feedback on a forecast—when you thought it was spot on, or when you thought we missed something important. People called to chew over ideas and explore theories about what's going on and ponder what's likely to happen next. It was great to feel that there was increased support and interest in the public bulletin program by the professional community. Thanks for taking the time!

In the end the winter was extremely busy and full of challenges. For our office it wasn't without successes and I think that's what keeps us motivated to write forecasts and work in public avalanche safety.

>>Ilya Storm is the Lead Forecaster for the CAC.


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

CAF Report Card

The Canadian Avalanche Foundation has been focusing a lot of energy and resources on avalanche education, especially for younger people. At the annual general meeting in Penticton this past May, Vice-President Jack Bennetto reported the following funding highlights:

- $127,720 was provided to public education (video and website for youth, Newfoundland video, CARDA and Gaspe Avalanche Centre)
- $50,000 was provided to the Canadian Avalanche Centre (public avalanche bulletins, south Rockies forecaster)
- $10,600 provided to the Canadian Avalanche Association (University of Calgary Research Chair, Craig Kelly Scholarship)
- Over $250,000 was raised a the Whistler and Calgary fundraising dinners
- $8,500 was received from the Hincks memorial golf tournament

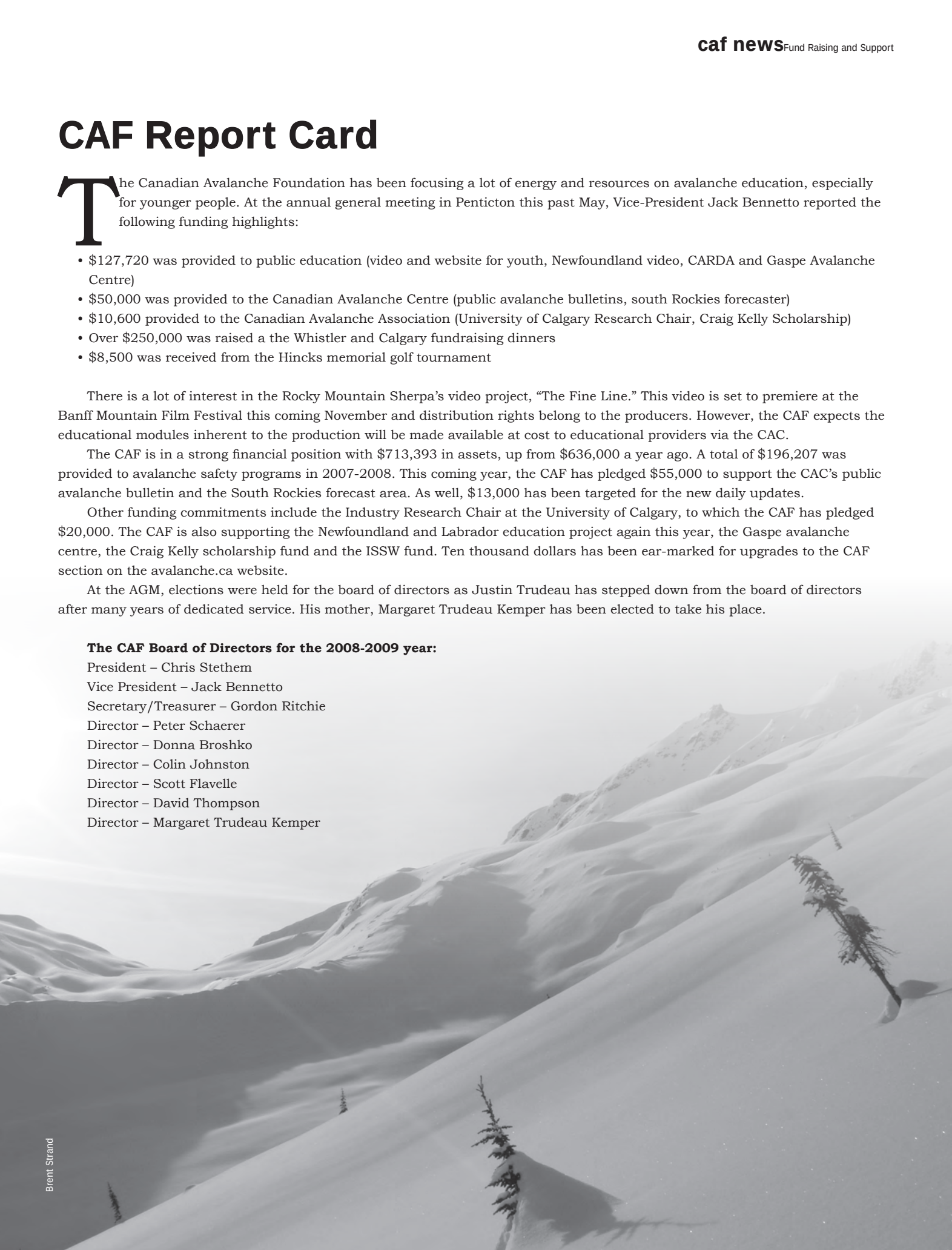
There is a lot of interest in the Rocky Mountain Sherpa's video project, "The Fine Line." This video is set to premiere at the Banff Mountain Film Festival this coming November and distribution rights belong to the producers. However, the CAF expects the educational modules inherent to the production will be made available at cost to educational providers via the CAC.

The CAF is in a strong financial position with $713,393 in assets, up from $636,000 a year ago. A total of $196,207 was provided to avalanche safety programs in 2007-2008. This coming year, the CAF has pledged $55,000 to support the CAC's public avalanche bulletin and the South Rockies forecast area. As well, $13,000 has been targeted for the new daily updates.

Other funding commitments include the Industry Research Chair at the University of Calgary, to which the CAF has pledged $20,000. The CAF is also supporting the Newfoundland and Labrador education project again this year, the Gaspe avalanche centre, the Craig Kelly scholarship fund and the ISSW fund. Ten thousand dollars has been ear-marked for upgrades to the CAF section on the avalanche.ca website.

At the AGM, elections were held for the board of directors as Justin Trudeau has stepped down from the board of directors after many years of dedicated service. His mother, Margaret Trudeau Kemper has been elected to take his place.

The CAF Board of Directors for the 2008-2009 year:
President – Chris Stethem
Vice President – Jack Bennetto
Secretary/Treasurer – Gordon Ritchie
Director – Peter Schaerer
Director – Donna Broshko
Director – Colin Johnston
Director – Scott Flavelle
Director – David Thompson
Director – Margaret Trudeau Kemper



Brent Strand

Schedule of Coming Events

Sept 19 – 21, 2008
HeliCat Canada Fall General Meeting
Where: Hilton Whistler Resort, Whistler, BC
Info: Call (250) 542-9021 or e-mail info@helicatcanada.com

Sept 21 – 27, 2008
International Snow Science Workshop
Once again, this six-day conference and workshop on all things avalanche is back in Canada. Don't miss this premiere event in the snow world. More information can be found on page 30.
Where: Telus Whistler Conference Centre, Whistler, BC
Info: www.issw2008.com

October 1 – 3, 2008
Wilderness Risk Manager's Conference
Pre-conference workshops will be held September 29-30, 2008. This is the 15th annual conference focusing on risk management and practical skills for the wilderness adventure and education industry.
Where: Jackson, Wyoming
Info: www.nols.edu/srmc

October 15 – 18, 2008
SARSCENE 2008
Now in its 17th year, SARScene has grown from a small workshop into a national conference gaining international appeal. It is the largest national Search and Rescue (SAR) conference and expo where Canadian and international SAR professionals (Air, Ground, Marine) gather to learn about new equipment and emerging technologies, share best practices, exchange ideas and tackle issues facing SAR.
Where: St. John's, Newfoundland and Labrador
Info: www.nss.gc.ca or call 1-800-727-9414

November 2, 16 & 23, 2008
Fall CPD Seminars for AST Providers
These seminars will run in four locations over three weekends this fall, coinciding with Backcountry Avalanche Workshops in each area. Registration is required and will open September 1.
Where: November 2 – Whitehorse
November 2 – Vancouver
November 16 – Golden
November 23 – Banff

November 1, 9, 15 & 22, 2008
Backcountry Avalanche Workshop Series Presented by Columbia Brewery
The BAW series has expanded to six communities this fall, giving you six excellent opportunities to meet potential students and advertise your courses. AST instructors are welcome to volunteer their time at any of the workshops
Where: November 1 – Whitehorse
November 1 – Vancouver
November 9 – Nelson
November 15 – Golden
November 22 – Jasper
November 22 – Banff
Info: Call CAC Program Services (250) 837-2141 (233) or e-mail kdube@avalanche.ca

Lori Zacaruk

Avalanche Hazard Monitoring and Forecasting in Romania

Narcisa MILIAN[1], Adrian DAVID[2], Mihaela STĂNCESCU[1]

[1] Sibiu Regional Forecasting Center. Romanian National Administration of Meteorology,
[2] Sibiu Mountain Rescue Team

The Carpathian Mountains are part the Alps-Himalaya System and form a 1,500 km arc across Central and Eastern Europe, from the Czech Republic in the northwest to Ukraine and Romania in the east, and to the Iron Gate on the Danube River between Romania and Serbia in the south. The Romanian Carpathians represent the eastern part of this Carpathic chain. With a length of about 910 km, they cover 27.8% of Romania's surface and are situated in the center of the country, around the Transylvanian Depression. There are three Romanian Carpathians Subdivisions: eastern, western and southern. With a length of 70 km, the Făgăraş Mountains, part of the southern subdivision, are the highest: 50 km continuously over 2,000 m. The highest peaks in Romania are also in the Făgăraş Mountains: Moldoveanu Peak (2,544 m) and Negoiu Peak (2,535 m).

A road called the Transfăgărăşan is constructed across the mountains, but it is closed during winter because of the large amonut of snow and high avalanche risk. Winter tourism has highly increased in the last years. Some of the most popular hiking, trekking and skiing destination in Romania are the Făgăraş, Bucegi, Parâng (all three in the southern subdivision) and Rodnei Mountains (on the eastern subdivision).

Romania has big mountain areas where avalanche risk is present during the whole winter season. Besides important forest damage, people are often caught in avalanches and some of them die. The greatest avalanche risk and most of the fatalities happen in the southern Carpathians, an area with very steep slopes and deep glacier valleys. Among them, the Făgăraş Mountains have the highest fatalities risk.

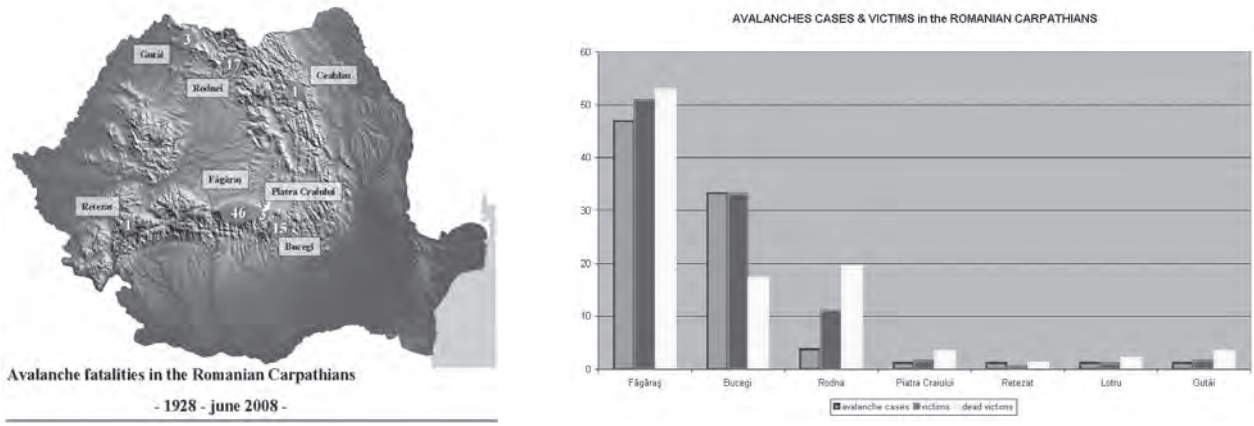


Fig. 1 - known number of avalanches fatalities, from 1928; percentage for each mountain massif: cases, victims and fatalities (Sibiu Mountain Rescue Team; until 2000 - mr Gutt Reinhold)

Between 2000 and 2004, several attempts were made to begin snow observations concerning avalanche risk, in collaboration with Centre d'Études de la Neige (CEN) Meteo France. Also, there were some attempts to meet with Mountain Rescue Teams in order to establish a communication and collaboration regarding avalanche prevention.

On January 20, 2004, five skiers were caught in an avalanche in the Bucegi Mountains. This tragic event renewed awareness of the necessity of specific snow observations in order to prevent avalanches in the future. With the help of CEN, the Romanian National Meteorological Administration began, in February 2004, the first snow observations concerning avalanche risk in Romania. The first person responsible for this activity was Maria Dana Moţoiu. Five meteorological stations from the southern Carpathians started the specific observations: Vârful Omu - 2,505 m, Sinaia – 1,500 m and Predeal – 1,100 m (Bucegi Mt.) Postăvaru – 1,780 m (Postăvaru Mt.) and Bâlea-Lac - 2,050 m (Făgăraş Mt.).

After one month training at CEN, and under their coordination, the first Romanian "snow specialists" issued the first avalanche risk bulletin in January, 2005. Since then, the bulletins have been delivered to the local authorities— Mountain Rescue Teams, district councils, tourist resorts, town halls and to several web-resources and the media during periods of high avalanche risk. This activity remained experimental until April 14, 2007. The forecasting team started with two workgroups—one from the central laboratory in Bucharest and the other from Sibiu Regional Forecasting Center. Since January, 2007, the daily avalanche risk estimation was entirely taken over at Sibiu.

Daily observations are made twice: at 06 and 12 UTC, incuding meteorological and specific snow parameters. Once a week snow pits are made nearby the clasical meteorolgical platform, in a place relevant for the snow cover characteristics in the area. The observational datas are introduced into GELINIV, a programme developed by CEN Meteo France, and transmitted afterwards through e-mail to the forecasting team. The observed parameters can be visualized in different time scales and graphs:

The avalanche bulletin includes an estimation of the avalanche risk for the next 24 hours, as well as a tendency for the next two days, description of present snow characteristics and 24 hours weather forecast, estimated altitude of the 00 and -100 isotherms, speed and wind direction at 2,500 m. The European Avalanche Risk Scale is used for the risk estimation. Simulation and forecasting the evolution of the snow cover and avalanche risk is made using the CROCUS MEPRA PC Version Roumanie 2004 programme, a part of the computer forecasting package known as the French "chain" - SCM.

Snow bulletin visualisation statistics on the internet shows a continuous interest increase, especially before week-ends and during hollidays. In the first three seasons since the beginning of the snow observations program, there were three avalanche accidents, each with a dead victim—two in Făgăraş Mt. andone1 in Bucegi Mt. Nobody has died in avalanches in the past two winters but there have been several avalanche accidents where victims have survived.

The greatest and most tragic avalanche accident in Romania happened on April 17, 1977 at Bâlea-Lac in the Făgăraş Mountains. Seven adults and 16 children from Sibiu were killed. The accident scene was recreated using observations from existing meteorological stations at that time and eyewitness testimonials. A great amount of snow had fallen 36 hours previously, during not

Fig. 2 - moments of the victims searching (photos by mr Ivan M, former forensic expert)

very low temperatures but high wind conditions. The snow fell on a frozen surface and the wind led to weak bonding.

The avalanche happened around midday, on a northern slope steeper than 45°. There was no snowfall but still high winds. A slab avalanche was triggered by the skiers which ran into the lake but did not break the ice. The victims were buried up to five metres deep and were only found after two days of searching by a military team. After that tragedy, the meteorological station Bâlea-Lac (2050 m) was set up but no avalanche studies were started until 2004. Several avalanche accidents happened since then in the Bâlea Valley, some fatal.

Another huge avalanche happened in the Bâlea Glacier Valley just the night before observations formally began—March 2, 2004. Once again a slab avalanche hit the Bâlea Glacier Lake, this time breaking the ice that was about two metres thick. The resulting wave of water and ice triggered another avalanche in the oposite corner of the lake. That one ran to the valley, damaging the Transfăgărăşan road and two bridges.

On January 29, 2006, in the Cerbului Valley of the Bucegi Mountains, a hard slab avalanche triggered by a group of three skiers caused an accident where one skier died. The avalanche started at 2,500 m, 200 m from the Omu Peak meteorological platform, on the lee slope (fig. 3). The first sliding layer was 80-90 cm above the ground. After 30-50 m, the avalanche reached a convex zone and involved almost the entire snowpack, sliding on an ice crust near the ground. In the starting zone the fracture extended and many other snow blocks moved small distances. The starting zone is highly influenced by the wind; the dominant winds at the Omu Peak meteorological station are north-west oriented and usually wind slab are formed on the south-eastern slopes.

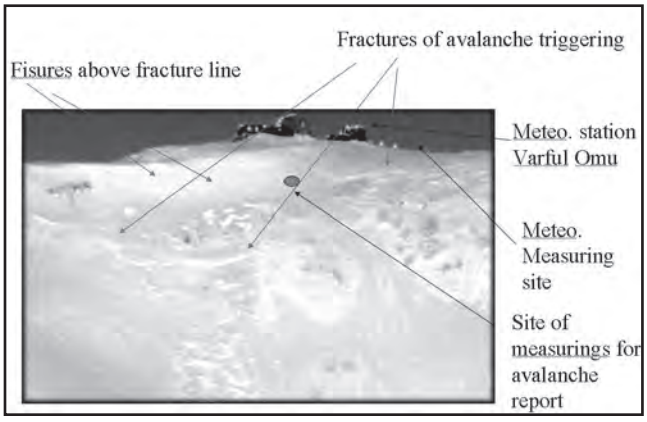


Fig. 3. Avalanche starting zone in Cerbului Valley, Bucegi Mountains (photo Maria Moţoiu)

On March 7, 2007, a group of ten climbers triggered an avalanche in the Făgăraş Mountains, while trying to reach a ridge near Negoiu Peak (2,524 m), in a place called The Devils Canion. A large amount of snow had fallen in the days prior to the accident, and several slab avalanches on different aspects were triggered

Fig. 7 - the first avalanche rupture the damaged cornice the victims
(photos taken by the victims and downloaded after they have been rescued to Bâlea-Lac meteorological station)

from the Făgăraş ridge. The estimated avalanche risk was high (4) on the avalanche danger scale, due to the upper weakly bonded snowpack.

The first two climbers cut the cornice and reached the ridge. Walking further, they starting a huge slab avalanche on the opposite slope, more than 1 m in depth and more than 200 m wide. This caused the damaged cornice to break and start another slab avalanche above the rest of the group, who were still climbing through the canyon to the ridge. Four of them were hurt and three needed medical assistance, but all of them survived.

On March 8, 2008, a skier was buried by an avalanche in Bâlea Valley under about 1 m of snow and found alive after more than two hours! The estimated avalanche risk was considerable (3 on the European avalanche danger scale) because of the weakly bonded snowpack on most steep slopes and possible triggering, even with low additional loads. The victim called the emergency number 112 using his mobile cell. High winds covering all the tracks made the rescue effort very difficult.

It is well known that meteorological and avalanche forecasts in mountainous areas are difficult exercises from which there is always a lot to learn. Our attempt, though still based on too limited series of observations, is to provide suitable answers to the questions of local mountainous forecasting which is confronted with small scale phenomena. In the future a greater number of observation points will begin their measurements, both on the actual monitorized area and on the other massifs with avalanche danger and increasing winter tourism - like Parâng, Retezat, Vâlcan, Bihor, Rodnei, Călimani and Maramureşului Mountains.

World Backcountry Freeride Jam

By Anna Brown

Competitors in the Canadian National Ski Mountaineering Championship complete a 26 km round trip at Whistler.

Ian Mackie / www.mackieimages.com

In late April I finally made it out of the forecasting office for a spring trip back to the coast. Whistler, in its well-practiced fashion, was shaking off the winter and celebrating spring with the Telus World Snowboard and Ski Festival. Thousands of skiers and riders, artists, musicians and other entertainers were in town and up on the slopes bringing in the spring.

Hopping the gondola to the Roundhouse I looked forward to setting up my table and banners in the kindly shared space of the Whistler Backcountry Freeride Jam. April in Whistler can bring hot sunny days, T-shirt weather, and I was relishing the thought of wearing my shades, a sunhat and soaking up the first heat of the season. Hah! Not to be! Winter was not releasing its grip so soon, and my shades turned into a down jacket and long underwear. Yet the bright flags, music and great ski conditions kept everyone happy as they set up for the events of the weekend.

There was a series of randonnée races, free avalanche clinics, guided ski tours and backcountry equipment demos held throughout the weekend. On Saturday there was a 10 km recreational race and the big 26 km grand championship race from Whistler to Fissile Peak and back. On Sunday morning a short whip up from the valley to the Roundhouse finally finished the racers' legs off for the season.

It was also great to see so many people checking out ski and snowboard touring for the first time. They were attending the half-day guided tours, which provided many beginners with a good experience while making that tentative step outside the area boundary into the backcountry wilderness. I was also happy to have the opportunity to see multiple demonstrations of the newest avalanche balloon provided by SnowPulse.

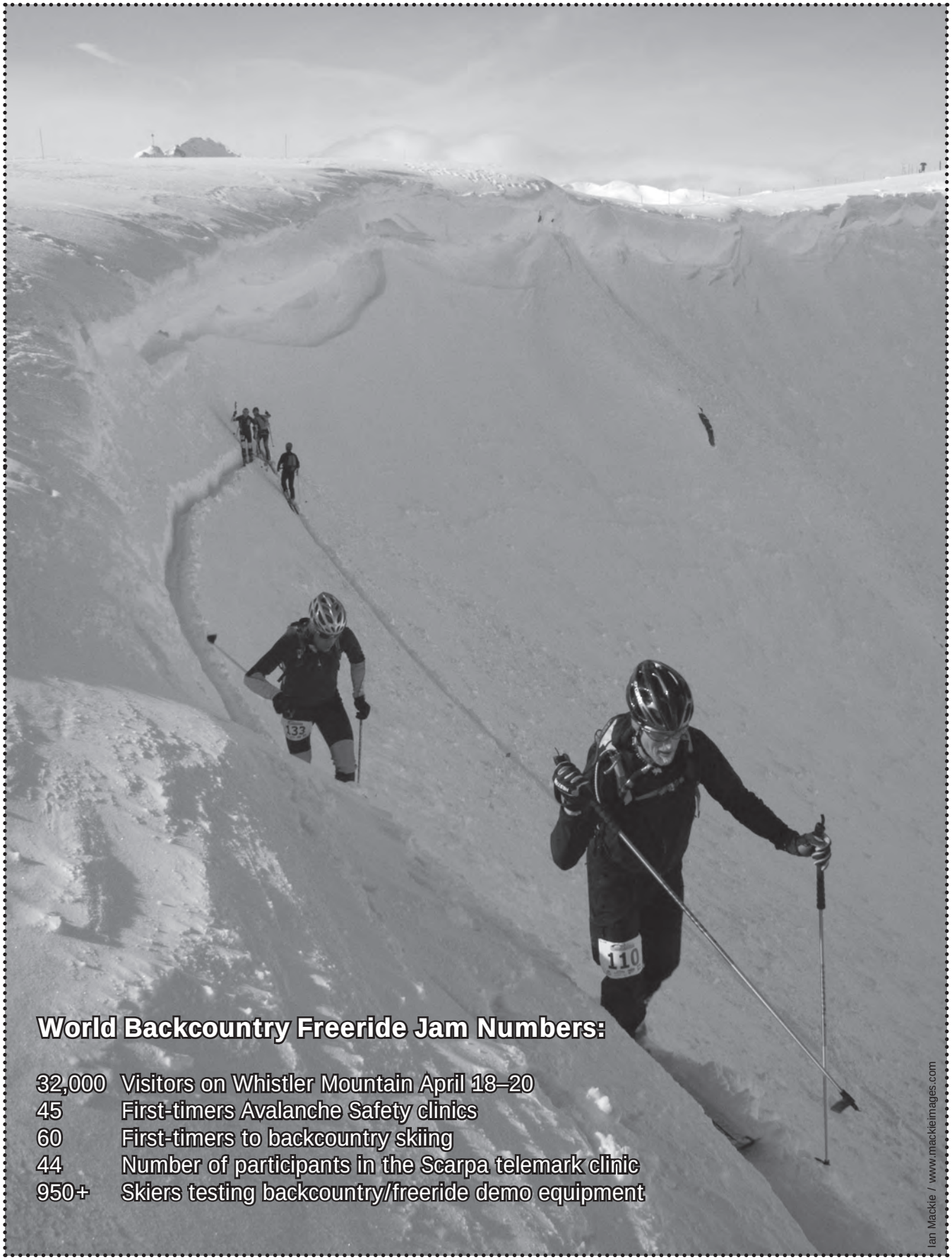
Friday through Sunday many people attended the avalanche skills clinics offered three times daily over the weekend by the Whistler Alpine Guides Bureau. At each avalanche clinics I made a short presentation on the Canadian Avalanche Centre and the public avalanche forecasting products we provide for backcountry users. As an avalanche forecaster this was an excellent opportunity to meet my audience who use the forecasts we produce to plan their trips. I enjoyed getting to know more about their backgrounds and listen to how they used the forecasts, what they liked or did not like about our products and answer all the good questions they had.

About half of the students were used to reading the CAC forecasts and had lots of questions about how we develop our forecasts and the sources we use. The others were interested in hearing about our products, listening keenly to my descriptions of avalanche hazards and explanation of the avalanche danger scale. There was quite a bit of interest in the newer online products such as the online avalanche training courses and Avaluator trip planning tools.

Avalanche Skills Trainers provided snow profile demonstrations, terrain and hazard discussions and beacon training. Those students who made the best times or best improvement in time with their beacons were awarded with a copy of Bruce Jamieson's book, *Backcountry Avalanche Awareness* and an Avaluator. Everyone who attended was entered in the draw for a probe and shovel, donated by G3.

The whole weekend was an excellent time to connect with friends, colleagues and our audience. I really appreciated getting to know more about the wide variety of people who read our forecasts and having the chance to introduce our products to those who had not heard of them yet.

>>Anna Brown is a Public Avalanche Forecaster at the CAC.



World Backcountry Freeride Jam Numbers:

32,000	Visitors on Whistler Mountain April 18–20
45	First-timers Avalanche Safety clinics
60	First-timers to backcountry skiing
44	Number of participants in the Scarpa telemark clinic
950+	Skiers testing backcountry/freeride demo equipment

Ian Mackie / www.mackieimages.com

Forecasting Snowpack Troublemakers

By Matt MacDonald & Mindy Brugman
Operational Meteorologists at the Pacific Storm Prediction Center, Environment Canada

The 2007-2008 winter season posed a great challenge to the entire Canadian avalanche industry. A large part of this challenge was attributable to persistent weak layers (PWLs). The three major PWLs were the December 3 facets-on-crust layer and the two surface hoar-on-crust layers from January 26 and February 25. The latter two layers were essentially the product of prolonged ridges of high pressure. From a meteorological perspective, the December 3rd layer was the result of a much more interesting sequence of storms. In Forecasting Snowpack Troublemakers, we take a look at the ingredients of this Pineapple Express-like event, the performances of short and long range numerical weather models as well as recent tools used by the Pacific Storm Prediction Centre (PSPC) for forecasting these types of events.

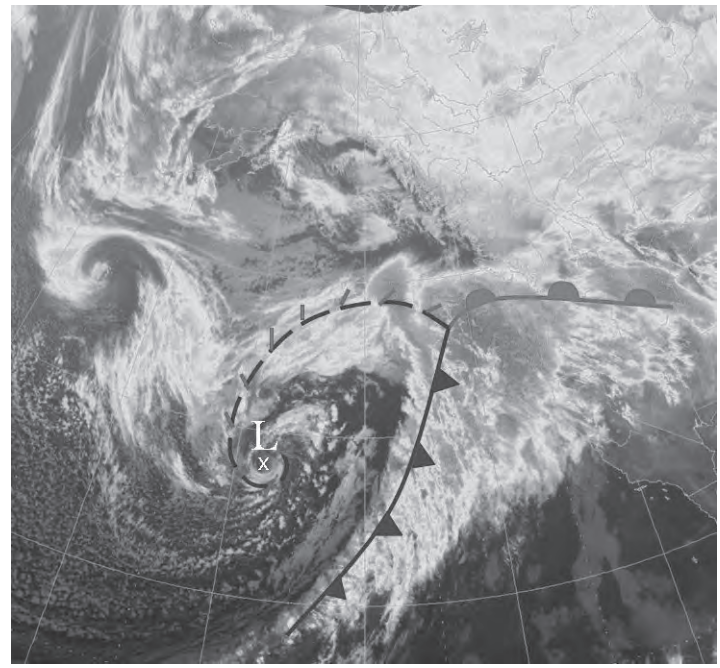


Figure 1: Infra Red satellite image with superimposed fronts of the storm reaching the coast of BC on December 3rd, 2007 at 03:30UTC.

Let us first define Snowpack Troublemakers. A Snowpack Troublemaker is any disturbance that creates a significant discontinuity in the weather pattern and consequently the snowpack as well, by bringing heavy snow and/or rain, strong winds, rapid changes in temperatures/freezing levels or prolonged solar radiation/clear nights. It is important to note that it is the speed and intensity at which these elements change that will determine how much trouble the disturbance brings to the snowpack. The December 3 storm was deemed a Snowpack Troublemaker because it met all of these criteria: heavy snow and rain (70cm of snow followed by 25mm of rain in Revelstoke); sustained winds of 100km/h with gusts up to 150 at many mountain tops; rises of 15°C in 24 hours across much of BC followed by falling temperatures; prolonged sun and clear nights. This sequence of events resulted in a weak layer that persisted throughout the entire season and was linked to many fatalities and several close calls.

Before the influx of moist and mild air typical of a Pineapple Express reached the coast of BC on December 3, an arctic ridge of high pressure centred over the Yukon was in place. This ridge established an arctic flow of cold air across the province and caused the first segment of precipitation to fall as snow. As the upper atmospheric flow switched from northeast to southwest, the overriding warm air sent freezing levels up to 3,000 metres and transformed the falling snow into rain. As the low pressure system stemming from the tropics approached the coast and deepened, winds strengthened from moderate to extreme. When the low hit the coast, heavy snow gave way to torrential rains (Figure 1). Once the low finally moved inland and weakened on December 5, another arctic ridge set up causing the saturated surface to freeze and facets to form subsequently.

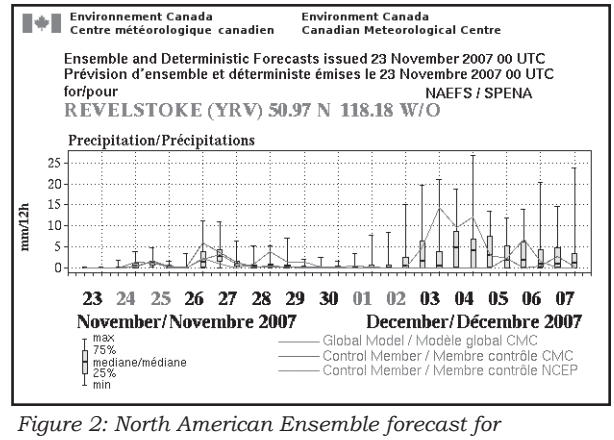


Figure 2: North American Ensemble forecast for Revelstoke issued on November 23rd, 2007, 11 days before the event. Notice the forecasted amounts of 15 to 20 mm per 12 hour period on the day the storm hit.

Overall, the evolution of the December 3 storm was well handled by numerical weather models. Both the Canadian GEM and American GFS models hinted at the Pineapple Express event four to five days out. This convergence of guidance provided forecasters with a high level of confidence which in turn allowed us to convey the importance of the high impact weather event on the horizon. In recent years, Ensemble Forecasting Systems have become a mainstay tool for the operational meteorologist. These systems are comprised of multiple numerical models and are left to run out into the 10 to 14 day period. The mean of the ensemble members has proven to deliver a more accurate long range forecast than individual model runs. Both the Canadian and the North American Ensemble Forecasting systems did a great job at signaling the characteristics of a Pineapple Express event as early as 12

days prior to the storm striking (Figure 2). Ensembles are hence of great utility for long range outlooks and are being increasingly incorporated into the forecast process.

Another variable that forecasters at the PSPC have been incorporating into their analysis and prognosis is the Madden Julian Oscillation. The MJO is a tropical disturbance that propagates eastward along the equator in a wave like fashion. Its signal is monitored by surveying the outgoing longwave radiation along the equatorial Indian and Pacific oceans. Essentially, this means keeping an eye on convective activity as well as tropical cyclones. The second essential element to be surveyed is wind anomalies at 200hpa as they are responsible for the development of these storms and potentially delivering the surplus of heat and moisture to mid-latitudes. A significant correlation between the activity of the MJO and the storminess in the Pacific Northwest has been observed throughout the past decade. Thus, there has been increased research and development in forecasting the MJO. The Australian Bureau of Meteorology has created a “spider plot” to conceptualize the position and strength of the MJO. The spider plot has proven to be an excellent tool in monitoring and forecasting the potential of Pineapple Express events such as the December 3 storm.

The short term forecast period remains the primary focus of the Pacific Storm Prediction Centre’s alpine forecast. However, as time permits, long range forecasting tools such as Ensembles and the MJO spider plot will be incorporated to provide avalanche industry professionals with more accurate long range forecasts. As more tools get developed and are verified on an operational basis, forecast lead times for significant weather events such as Snowpack Troublemakers will grow and should help the avalanche industry prepare for storms similar to the one on December 3.

Ensemble output is available through the weatheroffice’s website under “Analyses & Modeling” at:
http://www.weatheroffice.gc.ca/ensemble/EPSgrams_e.html

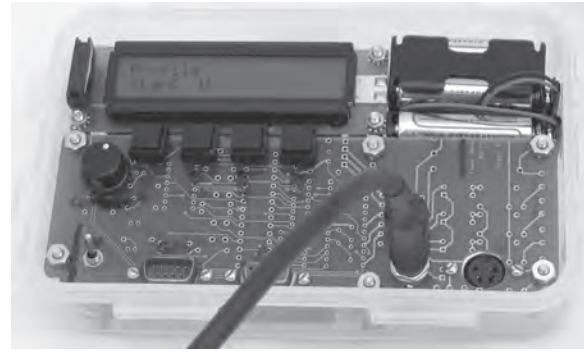
Information and reports on the MJO are available through NOAA’s Climate Prediction Center at:
http://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/mjo.shtml

A Prototype Temperature Profile Probe

By Craig Hollinger

A single sensor temperature probe, pushed into the snow much like James Floyer's density profile probe, doesn't have the quick response to give an accurate measure of the temperature gradient. Such a probe would have to be pushed into the snow very slowly, which would be a time consuming method to read the temperature gradient. I thought if multiple sensors were used, a probe could be inserted all the way into the snow, left there until it stabilized, then the complete profile read at once.

I have an electronics engineering background and, although I'm not practicing engineering much these days, I like to keep my mind sharp by working on small design projects such as this temperature profile probe. The probe (see Photo 1) is made out of surplus electronic modules left over from previous projects and other bits and pieces of scrap parts.



Above: The temperature profile probe sitting next to a shovel for size comparison. Below: The data logger. The LCD screen shows the temperature profile function.

The Sensors

A few years ago I discovered an interesting temperature sensor. It's a digital sensor and communicates via a single data line. The temperature reading is returned in degrees Celsius. A number of sensors can be connected in parallel on a single data line which greatly simplifies cabling requirements. If thermocouples or thermistors were used, a pair of wires per sensor would be needed to connect to a data logger. With the digital sensor, only three wires are required.

Each digital sensor has a unique code for identification. A controller, such as a data logger can send commands down the data wire to tell the sensors to take a temperature reading, then polls each one (using their ID code) individually to get the data.

There is a problem using a number of discrete sensors to measure a temperature gradient, in that the sensors don't all return the same temperature reading for the same temperature. The sensors used in this probe have a guaranteed accuracy of +/-0.5˚C, therefore there could be as much as a 1˚C difference between two sensors. With the critical temperature gradient (for facet growth) being 1˚C/10cm, this level of accuracy is not acceptable. An accuracy of +/-0.1˚C would be better. The error characteristic of these sensors is complex, and a simple slush-bath single-point calibration cannot correct their error.

I characterized a group of sensors by placing them, along with a reference thermistor, into a bucket of water and antifreeze mixture and putting the bucket into my deep freezer. After the antifreeze cooled to about -18˚C, I took the bucket out. As the mixture warmed up, I recorded readings from the sensors every few minutes. I repeated this process using boiling water. With the temperature data collected, I was able to calculate a set of coefficients for each sensor that mathematically correct their error. With this crude method, I was able to reduce the relative difference between each sensor to about 0.2˚C.

The Probe

The probe is made from and old aluminum ski pole, drilled every 10cm to accommodate 11 temperature sensors. Each sensor is mounted on a small piece of circuit board held in place with screws. The space around the sensor is filled with epoxy. Three wires run the length of the probe to inter-connect the sensors. A cable, terminated with a stereo microphone plug, runs out the handle on the top of the ski pole. The microphone plug connects the probe to the data logger.

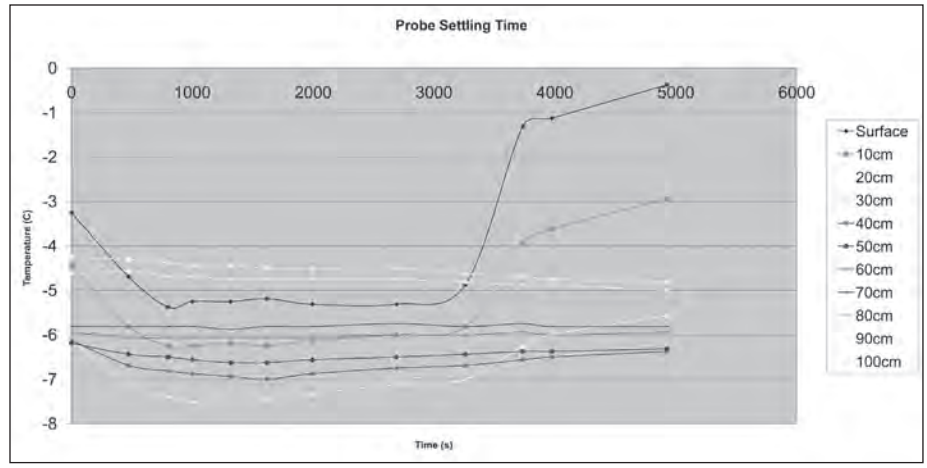
The Data Logger

Temperature data is read and stored in non-volatile memory in the data logger by a microprocessor. The logger (see Photo 2) has a two-line by 20-character LCD and four push-button keys for the user interface. There are connectors to plug in a GPS unit for position data, a PC to upload the temperature data and the probe. A Lock & Lock brand food storage box provides a water-tight enclosure for the electronics.

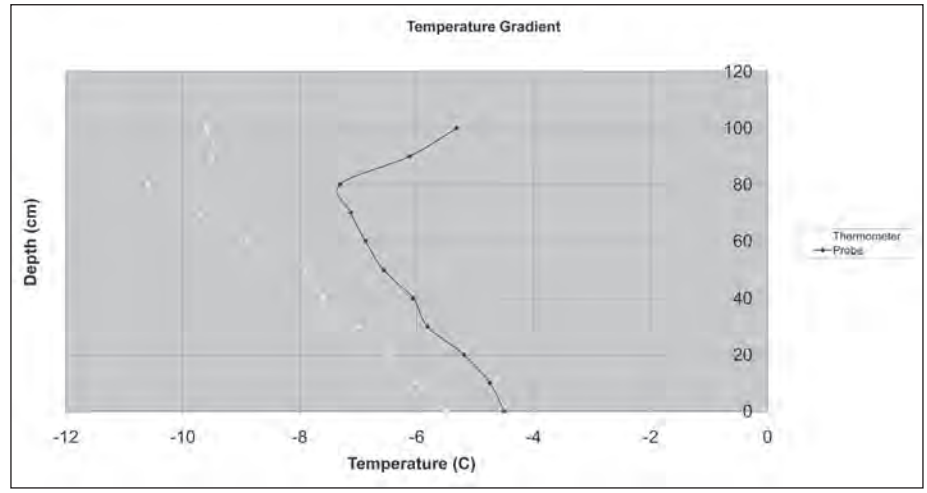
By using the pushbutton keys, the user can scroll through menus to access the different functions of the data logger. The functions are: read a temperature profile; review the 11 recently read temperatures; upload the stored temperature profiles to a PC; erase the stored data and; set the internal clock.

Each time a temperature profile is read, a record is stored in the internal memory. Each record contains the time and date the profile was taken, the position read from the GPS receiver (if connected), and the 11 temperatures, in order, from the surface to the 100cm depth. There is enough memory to store over 1,220 records.

The data uploaded to a PC is in a comma separated variable (.csv) format that can be easily imported into a Microsoft™ Excel spreadsheet. The data logger can also accept simple commands from the PC that duplicate the user functions.



Graph 1: Temperature profile probe settling time. The data from all 11 sensors is plotted over the time of the test and shows a settling time of about 600 seconds (10 minutes).



Graph 2: An example of a temperature profile. A manual profile is plotted alongside to show the digital thermometer error.

Field Trials

I wanted to compare the probe to our standard method of measuring a snow temperature profile. I dug a pit and inserted the probe into the snow about 15cm back from the wall. I took snow temperature measurements with a digital thermometer inserted next to the probe every 10cm and recorded the readings in my field book. Each time I took a manual reading, I logged a profile on the data logger. Taking this many profiles allowed me to determine how long the probe would take to reach equilibrium (see Graph 1).

When I got home after the first field trial, I plotted the readings taken by the probe and compared them to the readings I took manually. I was shocked at the difference between the probe profile and the manual profile. After some head scratching, another field test and some experimenting at home with the thermometer, I determined the thermometer had a large error. It was reading about 2˚C colder at -12˚C! The temperature gradient plot in Graph 2 shows the error. The probe and the manual profile agree on the shape of the gradient.

I did a third field test with a different thermometer and obtained better results. This experience has made me question the accuracy of the cheap digital thermometers we all use in the field.

Conclusion

This crudely built probe has shown that a temperature profile instrument can be made using discrete temperature sensors. It's a useful tool that quickly reads snow temperature profiles. Tuning up the sensor calibration process would improve probe accuracy, and changing the probe design would reduce the time to reach equilibrium.

Craig Hollinger has been ski-mountaineering for 20 years. He is a newly certified Assistant Ski Guide and a former electronics engineer who now resides in Nelson BC.

Craig Hollinger collection

Conceptual design of a digital snowpack probe

Tegan Morrison (tegan.a.morrison@gmail.com), Cristina Heureux (cristin.lheureux@gmail.com),
Vicki Mitchell (vpmitch@gmail.com), Alexander Quartero
Department of Civil Engineering, University of Calgary

No one is going to argue that current snowpack profiling techniques are not subjective. The best efforts have been made to standardize the tests, such as the hand hardness test, but in the end it comes down to the opinion and experience of the observer. A digital snowpack probe has the potential of reducing the subjectivity of snowpack analysis by quantitatively measuring important snowpack properties.

In this article we will discuss the approach we took to developing a conceptual digital snowpack design. Before we begin, the context of the project itself warrants an explanation. We are a group of fourth-year civil engineering students at the University of Calgary. In order to graduate we are required to complete a fourth-year design project. While the list of potential projects usually consists solely of pedestrian bridges and overpasses, this year Dr. Bruce Jamieson managed to sneak in a snowpack stability probe design project. We were lucky enough to make the cut and have worked together for the past eight months to complete the project.

The objective of the project was to generate new ideas for a snowpack stability probe that meets the needs of avalanche forecasting programs. Although a few snowpack probes have already been developed, most were designed by researchers for research. We took a fresh approach and focused on developing a probe specifically for avalanche forecasting. We began by interviewing several forecasters to compile a comprehensive needs assessment. Then we looked at the current snowpack probes and talked to several researchers who were either involved with the development of the probes or who have used the probes in their research. Finally, we came up some new ideas for a preliminary probe design based on the results of the needs assessment and an understanding of current probes.

Our needs assessment consisted of the results from six forecaster interviews. We interviewed
- Rob Whelan, ACMG Ski Guide and Assistant Manager Kootenay, Canadian Mountain Holidays
- Colani Bezzola, IFMGA Mountain Guide and Mountain Safety Manager, Canadian Mountain Holidays
- Marc Ledwidge, IFMGA Mountain Guide and Manager of Mountain Safety Programs, Banff, Yoho, and Kootenay National Parks
- Scott Aitken, Avalanche Technician, Coast-Chilcotin, BC Ministry of Transportation,
- Anna Brown, ACMG Ski Guide and Public Avalanche Forecaster, Canadian Avalanche Centre
- Dave Iles, Avalanche Control Program Director, Lake Louise Mountain Resort

We asked each forecaster a series of questions regarding the ideal physical and technical characteristics of a snowpack probe, and some of their requirements regarding application and use. The important interview results are summarized in Table 1.

From these results we came up with 13 design goals, which we used to develop the design constraints and criteria for our design. One of the most important goals was to develop a probe that not only met the performance requirements of the forecasters, but also costs less than $5,000.

	Highlights
Physical Characteristics	• Weight: less than 3 kg • Size: fits into a standard (35 L) day pack • Easy assembly: 10 – 15 minutes for set-up and push • Replaceable parts so that individual components can be replaced without sending the whole probe away for repairs
Functionality	• Snow hardness and temperature are the two most important snowpack parameters to measure • Depth accuracy between 1 cm – 5 cm • Layer detection resolution of less than 1 mm
Data Acquisition and Output	• Results immediately available in the field • Option to attach meta data and GPS coordinates in the field • Wireless data transfer • Dual-Format display with both the digital profile and “block” profile available.

Table 1: Summary of forecaster interview results.

We looked in depth at four existing digital snowpack probes to assess the advantages and disadvantages of their designs.

1) SnowMicroPen (SMP): A motor driven probe with a cone tip that measures hardness relative to depth (Marshall et al., 2007).
2) Capacitance probe: A probe with a wedge shaped tip that measures the density of the snow relative to depth (Louge et al., 1998).
3) New Generation Rammsonde (NGR): A fixed length probe (1.67 m) that measures hardness, conductivity (wet or dry snowpack), and reflectivity (relative density of the different layers to predict grain shape) relative to depth (Abe et al., 1999).

4) SABRE probe: A probe with a round tip that measures hardness and temperature relative to depth (Mackenzie et al., 2002).

We spoke with six researchers who were either involved in the development of an existing probe or who have used at least one of the probes in their research.

- Dr. Hans-Peter Marshall, Research Associate, Arctic and Alpine Research Department at University of Colorado – SABRE and SMP
- Steve Conger, Avalanche Specialist/Applied Meteorologist at Ava Terra Services Inc. – Capacitance probe
- Eric Lutz, PhD Candidate, Earth Sciences at Montana State University – SMP
- Christine Pielmeier, Scientist at Swiss Federal Institute for Snow and Avalanche Research – SMP
- Dr. Osamu Abe, Snow & Ice Research Center, National Research Institute for Earth Science & Disaster Prevention, Japan–NGR
- Dr. James Floyer, Geoscience Department, University of Calgary – SABRE

Component	*Cost (CND)*	*Weight*
Probe structure	$30	300 g
Probe tip	~$20	~100 g
Force measurement: Subminiature load button	$400	~20 g
Temperature measurement: Passive sensors and radar unit	~$100	~250 g
Depth measurement	~$50	~5 g
Hand held display unit	$1500	500 g
Data transfer	~$100	~50 g
Total	**$2200**	**1225 g**

Table 2: Cost and weight comparison table.

We began the design process by establishing design constraints based on the results from the forecaster needs assessment. The five design constraints were

1) Measures depth
2) Measures temperature
3) Measures hardness
4) Portable
5) Operable in typical winter weather conditions.

We divided the probe design into seven components, identified the problems associated with each component based on existing probes and the researcher interview results, re-thought important concepts, generated new ideas, researched alternative technologies, and developed a preliminary design for each component.

Preliminary Design

Probe structure:

Structurally the proposed probe consists of 50 cm segments with a custom connector design. The length of the probe can be easily adjusted by varying the number of segments used, and the connector design eliminates the need for cables running between the segments. Figure 1 is a schematic of the custom connector design, which was based on the power switch for the Ortovox F1 transceiver.

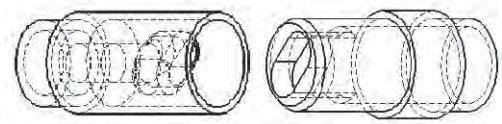


Figure 1: Custom connector design.

Probe tip:

After assessing the advantages and disadvantages of the wedge shaped tip (capacitance probe), the hemispherical tip (SABRE), and the conical tip (SMP and NGR), we decided on a conical tip with a maximum diameter of 10 mm to balance maximum sensitivity to changes in layer hardness and durability. The tip is shown in Figure 2.

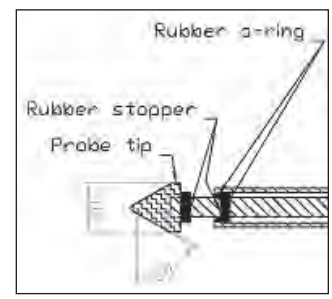


Figure 2: Conical probe tip.

Force measurement:

We settled on a subminiature load button to measure hardness. The subminiature load button is not as accurate as the technologies used in the existing probes but it is inexpensive, it operates well below freezing, and is accurate enough to measure the subtle relative changes in force resistance between layers.

Temperature measurement:

The challenge of using a temperature sensor at the tip of the probe is finding a sensor material that has a short enough response time to accurately measure the temperature gradients as the probe is pushed through the snowpack. To overcome

this challenge, we incorporated a strip of passive temperature sensors along the length of each probe segment. An external radar unit transmits a signal to the passive sensors and the reflected signals vary according to the temperature of the sensors. The temperature response time of the passive sensors is slow, so the probe will have to be left in the snowpack for a short time for accurate results. We justified this acclimatization time because it gives the forecaster time to record meta data.

Figure 3: Trimble Recon®

Depth measurement:

Accurately measuring the depth of the tip as the probe is pushed through the snowpack has proven very difficult. It seems there are no easy answers. We propose a new approach to depth measurement that has not been tried before. Ambient light sensors are spaced at 20 cm intervals along the length of the probe. As the probe is pushed into the snow and the light sensor moves across the air/snow threshold, the sudden change in light intensity will trigger the sensor. Because we know the distance of each sensor from the tip of the probe, as each sensor is triggered we can determine the depth of the tip.

Data transfer:

Problems with the wires running from the measurement devices within the probe, through the length of the probe, and to external data collection devices have plagued researchers using the existing probes. With the recent advancement in wireless data transfer technology it is now possible to avoid these problems. The data signals from the force measurement and depth measurement devices in our probe will be transferred from the probe to the external handheld computer using Bluetooth® technology.

Handheld device:

The major challenges of finding an appropriate handheld device for data collection and display was to ensure the device was operable well below freezing, that it had enough memory to store the data collected from upwards of 200 pushes, and that the screen was visible outdoors. The Trimble Recon® (Figure 3) computer was built specifically for harsh outdoor conditions, and despite being the heaviest and most expensive device we considered it is by far the most rugged and appropriate for this application.

The final probe design incorporates each of the seven components (Figure 4). It is

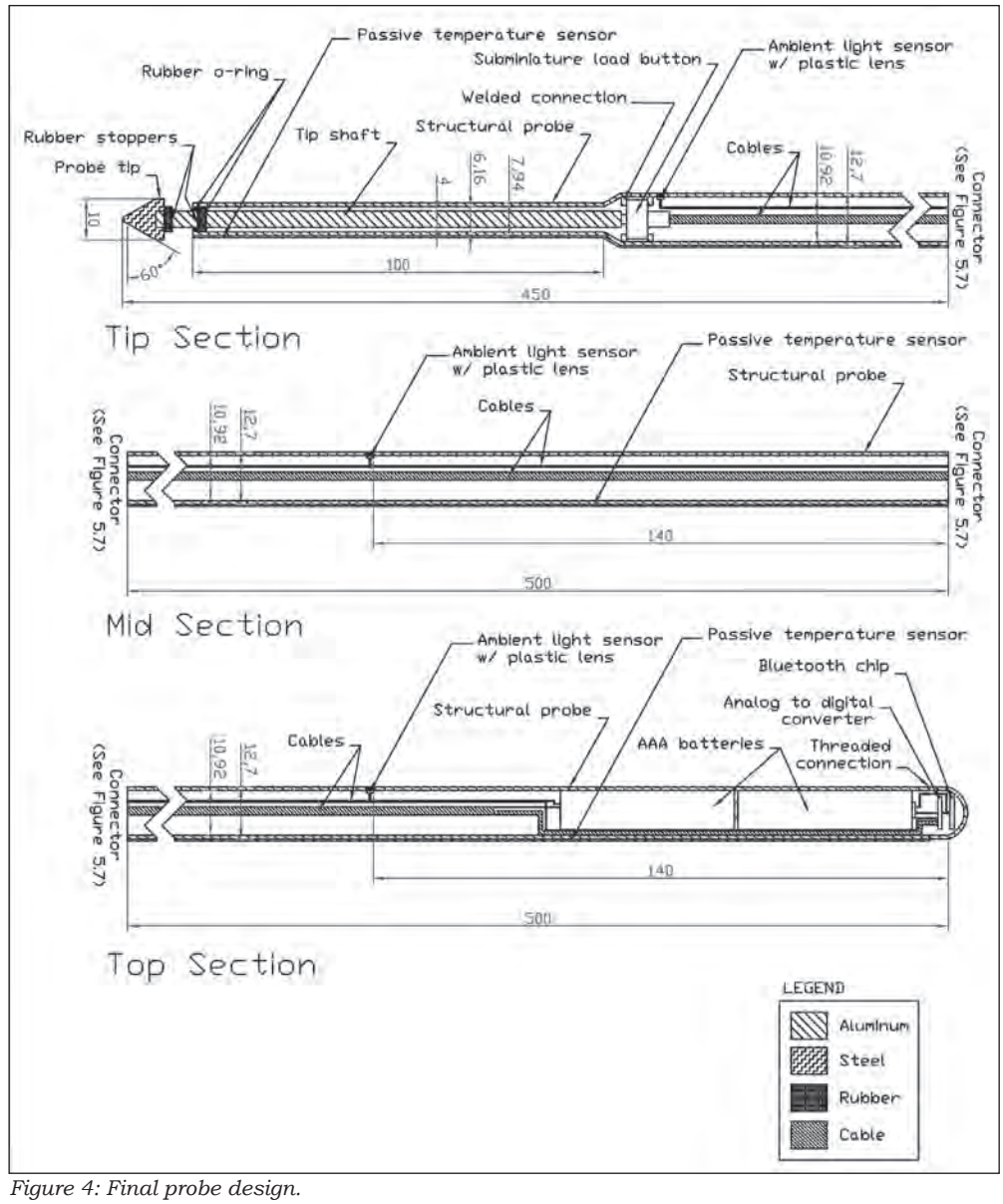


Figure 4: Final probe design.

important to remember that this is a conceptual design and requires further mechanical and electrical development.

In order to successfully meet the objective of the project our proposed probe had to be lightweight and cost less than $5,000. Table 2 shows a summary of the preliminary cost and weight calculations. Additional costs such as machining, electrical connectors, software and profit have yet to be considered.

At this point in the design process we are set to achieve the goals that we set forth. However, this conceptual design incorporates new ideas and technologies that have yet to be tested. We hope that the ideas presented here are a fresh approach to the development of a digital snowpack probe that will be carried forth. Our 185-page project report is available from tegan.a.morrison@gmail.com. Please contact us with any questions, suggestions, or comments.

Acknowledgements

Thanks to Bruce Jamieson and James Floyer for their guidance and encouragement. And many thanks to all of the forecasters and researchers we interviewed.

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Courtesy of Tegan Morrison

CAA Members on The Roof of the World

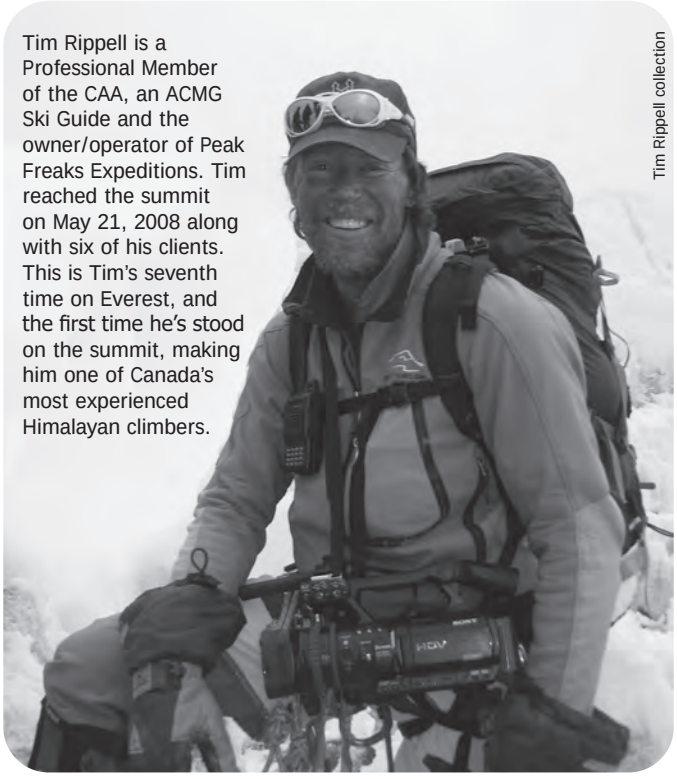
2008 was a big year on Mt. Everest, the highest point on earth. By the end of June, 290 people had reached the summit and three of them are CAA members. Along with the three pictured here, Calgary teacher Andrew Brash also made it to the top. Andrew was the keynote speaker at the CAF's fundraising gala in February of this year. Congratulations to all!

Canada West Mountain School

CAA Professional Member Brian Jones and Active Member John Furneaux reached the top of Everest on May 25, 2008, climbing with a group from Vancouver-based Canada West Mountain School. Brian is the school's director and an IFMGA Mountain Guide. For him the ascent is the realization of a goal to guide the Seven Summits—the highest peaks on each of the seven continents. This is the first time a Canadian climbing company has led expeditions to the tops of all Seven Summits.

Canada West Mountain School

Tim Rippell is a Professional Member of the CAA, an ACMG Ski Guide and the owner/operator of Peak Freaks Expeditions. Tim reached the summit on May 21, 2008 along with six of his clients. This is Tim's seventh time on Everest, and the first time he's stood on the summit, making him one of Canada's most experienced Himalayan climbers.



Tim Rippell collection

Transitions


Mark Bender collection

Mark Bender

Lead Content and Curriculum Developer, eTraining Project

Mark Bender has been working as an instructor on the CAA's Industry Training Program since 2002, so he is no stranger to the association. When the position of Content and Curriculum Developer for the eTraining project came open, Operations Manager Ian Tomm had Mark on his short list right from the start. "Mark has been one of our most valuable instructors for a number of years now," says Ian. "I knew he had the experience and mind set for the job."

Mark comes to us from Golden, where he's lived for the past two years, and before that he was in Canmore for 13 years. Mark began working in the snow at Lake Louise in the early 1990s, where he started his career as a ski patroller and ended up as an avalanche technician. He began guiding in 2000 and is now a Ski Guide, working for a number of operations both mechanized and ski touring.

During the off-season, Mark is into bikes in a big way. He rides all types and likes to restore older models. He's also been coordinating the logistics and transportation needs for a multi-national bicycle tour operator for close to a decade. In addition to recreational pursuits, Mark is also currently enrolled in the BC Provincial Instructors Diploma program through Vancouver Community College, which is a course designed for adult educators.

Mark says he's enjoying the atmosphere at the CAA office. "The CAA has many exciting initiatives and the eTraining Project is one of them. I am excited to be a part of something that is pushing boundaries, and the end result will benefit many people, not just those in the avalanche world."

Many Thanks


CAA Archives


CAA Archives

Many thanks to former board members Andrew Nelson and Mike Mortimer. Andrew is stepping down as CAA Director for Associate Members, while Mike is stepping down as CAC Director for Supporters. Both were elected in 2006 and have volunteered countless hours since then to the advance of those two organizations. Thanks again Andrew and Mike, and all the best for the future.

Dan McLellan
CAA Director for Associate Members


Dan McLellan collection

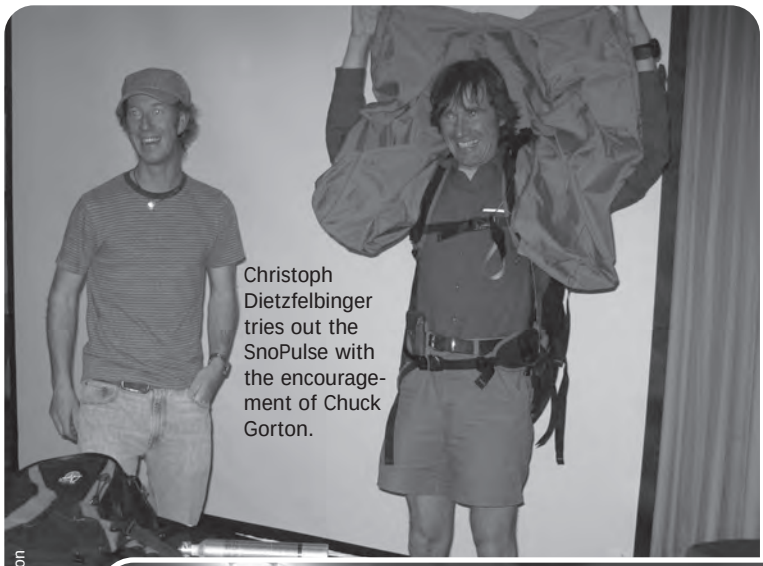
Dan grew up in Kitchener, Ontario and moved to Lake Louise in 1988 for a one- winter break from studies at Carleton University in Ottawa. Twenty years later, he's still there. Dan is the Mountain Operations Manager at the Lake Louise Mountain Resort, working with the grooming, snowmaking, trail crew, ski patrol and avalanche control departments at Lake Louise to produce and maintain the skiing and riding experience offered to their guests. Dan became interested in avalanche work shortly after his arrival in Lake Louise. He completed his CAA Level 2 in 1995 and working in the avalanche control department at Lake Louise for several seasons prior to moving into a management role. Dan hopes to continue to find ways to streamline and enhance interaction between the CAA/CAC and Associate Members to the benefit of both in all areas—from the products and services purchased from the CAC by Associate Members to co-operative efforts in public awareness and education.


Cam Roe collection

Cam Roe
CAC Director for Supporters

Like his predecessor Mike Mortimer, Cam comes to the board of the CAC with many years of volunteer experience with the Alpine Club of Canada. Cam has served on the national board of the ACC since 1994, and became president of the club in 2005, a position he still holds. Cam is a software developer and the Vice-President and Chief Software Architect for PsiNaptic Inc, a company he co-founded in 2000. He has a Bachelor of Science degree with a double major in Computer Science and History from the University of Calgary and is currently working on a master's degree in Software Engineering.

Cam has lived in Calgary for 35 years and has been climbing and skiing in the Rockies since he was a child. In 1976 he attended his first ACC General Mountaineering Camp and has been leading trips for the club since the early 80s. He lives in Calgary, Alberta with his wife, Leslie Black and their two sons, Sam and William. He also recently became a volunteer with the Canadian Ski Patrol at Lake Louise ski area, and enjoys the opportunity to ski with his sons on the weekends while patrolling. He's looking forward to the opportunity to contribute to the future of the CAC. "The CAC is a worthwhile organization with a huge job to do," says Cam. "Hopefully my experience will be of some benefit to the work ahead."



Christoph Dietzfelbinger tries out the SnoPulse with the encouragement of Chuck Gorton.

Mary Clayton

Former CAA President Bruce Allan

John Kelly

CAA President Steve Blake is all smiles with Rowan Harper of Sunshine Village Resort.

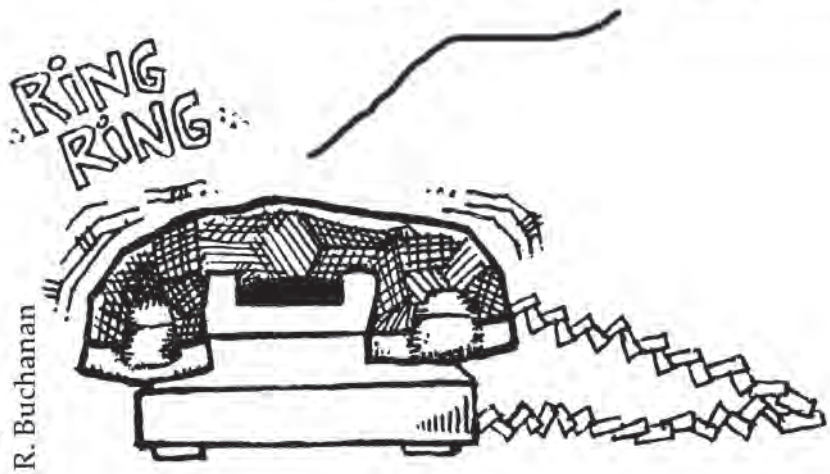
Mary Clayton

Early morning spin club. From left: Chris Borstad, Mike Boissonneault, Mary Clayton, John Hetherington and Pascal Haegeli. The leader of the pack is behind the camera.

Niko Weis

Flakes

"Hello - you've reached the Canadian Avalanche Centre in July. If you would like to speak to the voice-mail of an avalanche technician who is currently lounging in a hammock, please press one. If you would like to speak to the voice-mail of an avalanche technician who is presently on belay, please press two. If you would like to speak to a live voice, not in the office but outside, trying to tan the rest of his/her body to match their sunburned faces, please stay on the line. Today's response level is rated at moderate. The definition for moderate is natural call-backs are unlikely, manager triggered call-backs are possible..."



R. Buchanan

Photo: Canadian Pacific Railway Archives

Making tracks in the backcountry since 1884.

Since coming to Western Canada over 100 years ago, Canadian Pacific Railway has been a pioneer of backcountry exploration and safety. By finding the first route through Rogers Pass and opening the West. By building Mount Macdonald Tunnel, the longest railway tunnel in the western hemisphere, to avoid the avalanches and dangers of the Pass. By hiring Swiss guides to help ensure tourists stayed safe while mountaineering and exploring the backcountry. That tradition continues today through CPR's partnership with the Canadian Avalanche Association to make the backcountry a safer place for people to work and play.

To find out how you can support the Canadian Avalanche Association, please call 1-250-837-2435.

www.cpr.ca

CANADIAN PACIFIC RAILWAY
Ingenuity.