the avalanche journal

THE VOICE OF **CANADA'S** PROFESSIONAL AVALANCHE COMMUNITY

SAFETY — AWARENESS — PREVENTION

SAFETY

Canadian Pacific has a long history of operating in the mountains and we have learned some important lessons about avalanche safety along the way. Safe operations through the mountains requires constant observation, collaboration and communications between our employees and the Canadian Avalanche Centre. Together we are making the backcountry a safer place to work and play.

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CANADIAN PACIFIC

the avalanche journal

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FALL 2013

Thank you to
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in this **issue**

Working **Together**

Karilyn Kempton
Managing Editor

THE AVALANCHE JOURNAL is getting back to its roots. We've spent the last few years sharing more information about public avalanche safety from the Canadian Avalanche Centre. While we still firmly support the CAC and its mandate, *The Avalanche Journal* will now focus more tightly on the professional avalanche industry in Canada—this is your magazine. We've even changed our tagline from "The voice of Canada's avalanche community" to "The voice of Canada's professional avalanche community." It's a small change with bigger implications. We'll still continue to publish three times per year, but we're looking at ideas to save costs moving forward because the CAC will no longer financially support the publication.

You will notice that we have a colour section in this issue. Thank you to the University of Calgary's Applied Snow and Avalanche Research program for making that a possibility. Check out Scott Thumlert and Bruce Jamieson's colorful research paper on bridging index values and stress bulbs on page 36.

My goal as Managing Editor is to start making each issue more thematic. The theme of Volume 105 (Winter 2013-14) will be Search and Rescue. I am looking for case studies and discussion papers on incidents; articles on SAR advances, teams, individuals, training or anything else pertaining to SAR; photos; and more. Do you have something to say about the SAR industry? We want to hear it.

The theme of Volume 106 (Spring 2014) is technology. Is your team or organization using new explosives tools to prevent avalanche fatalities? Do technological advances encourage you? How have you incorporated GIS tools into your procedures? Are you embracing new technology in the workplace and out in the field? How is transceiver tech changing? What do you have to say about technology? Let us know.

Thank you for your ongoing support and feedback on *The Avalanche Journal*. We strive to provide you with an informative, professional and entertaining publication that speaks to your specific needs and interests as avalanche workers. By narrowing our focus back to the professional avalanche industry, we hope that more of you may be compelled to write articles for your peers. Please email me at editor@avalanche.ca. Do you have any topics you'd like in upcoming issues? Drop me a line. I would love to hear from you. I hope you enjoyed your summer, but I'm sure falling leaves and dropping snowlines are getting you as excited for the winter as we are around the CAA office.

Here we go again,
Karilyn Kempton

Failure Plane

In Volume 103, we incorrectly attributed the photos in "Gravity Storm: March 6, 2012 at Sunshine Village Resort" to Sunshine Ski Patrol. The photos should have been credited to Brad White and Marc Ledwidge, respectively. Sorry for any confusion.

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ROBIN SIGGERS
Robin Siggers has been employed at Fernie Alpine Resort since 1976. After several seasons doing yoga with four year olds on the rope tow as a ski instructor for the kiddies program, Robin became a ski patroller with an attitude. He grew into an avalanche forecaster and CAATS Instructor for the next 23 or so years. He has been the Mountain Operations Manager at Fernie Alpine Resort since 2003, and is still happily employed. He is now known simply as Dylan's dad.
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ANGELA HAWSE
Angela Hawse is an IFMGA Mountain Guide, with a M.A. in International Mountain Conservation and over 25 years of guiding full-time. She is a member of the Instructor Team for the American Mountain Guides Association, a Senior Guide for Exum Mountain Guides and on the Snow Safety and Guide Staff for Telluride Helitrax in the San Juan Mountains, which she calls home.
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Born and raised in Nelson, BC, Madeleine Martin-Preney has made a conscious choice to have a lifestyle that lets her travel and adventure in mountain ranges around the world. To finance this, she has worked seasonal jobs as a wildland firefighter, AST instructor, hut keeper, hiking guide, practicum student, porter, field assistant and logistics person to mention a few. Her motto is "Live the life you love, and love the life you live." She now has a PO Box and home in Revelstoke.
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DAMIEN BANWELL
Damian Banwell is a CAA professional member, and a member of the Japan Avalanche Network. He lives in the mountain town of Hakuba, Japan, where he teaches ASTcourses, regularly ski tours in the Kita Alps, and farms vegetables insummer.
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SCOTT THUMLERT
Scott Thumlert grew up peering towards the Rockies from Lethbridge, Alberta and sliding around at West Castle Ski Resort. From there, he has done a lot of roaming with an eclectic mixture of engineering school, work and travel. Recently, Scott has been studying six sided solid water with the folks at ASARC and trying his hand at ski guiding.
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TROY LEAHEY
Troy Leahey has been a CAA professional member for 13 years and in the ski industry going on 20 years. He has been employed at Revelstoke Mountain Resort as Head Forecaster since its inception, with 13 years at Sunshine Village previously. He loves skiing, sailing, fishing, biking, his wife Jessica, and dog Penny—not necessarily in that order.
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CAA President's Message

REFLECTIONS

Robb Andersen
CAA President

THE EVENTS of this past spring warrant some reflection. I would like to start by thanking all the members who were able to attend the AGM. The support of the membership was inspiring.

The CAA continues to evolve as we work towards professional standards, practice standards and a clear scope of practice for members. There is a great deal of work ahead; the board is moving forward strongly from the momentum gained to ensure the committees and staff are well supported to achieve our goals.

This spring's AGM brought some changes to the Board of Directors. We say goodbye to Debbie Richie, who served on the board for a full six years, and Scott Hicks, who served on the board for a two-year term. I can't thank both Debbie and Scott enough for their contribution to the CAA while serving on the board. In my first year serving as President, both Scott and Debbie were cornerstones of the board. All of the board members relied on their wisdom and expertise.

Scott and Debbie have been replaced by Zuzana Driediger from Parks Canada (representative for Active members) and John Martland, a retired lawyer from Calgary (representative for Associate members). Both bring skills and experience the board needs. Zuzana's involvement with SAR and CARDA communities provides an important voice for the board. In addition to being the representative for the Alpine Club of Canada (Associate Member), John has a deep history in non-profits, including past presidency of the Law Society of Alberta. Both new directors are keen to join the board's work as we embark to tackle a new strategic plan to support the CAA's path of professionalism affirmed at this spring's AGM. All board and committee positions rely on volunteers. These folks make a significant commitment for the betterment of the CAA and its members. Thank you!

One of the most significant milestones of this past spring's AGM was the removal of the Qualified Avalanche Planner membership category, returning QAPs to professional member status. Without the QAP category, professional members can still demonstrate their individual training and experience with respect to their individual scope of practice. The work of the Professional Practice Committee will provide members additional tools to assist you with demonstrating competency to employers. I encourage all members to read the interview with ProCom Chair Doug Wilson in this issue of the *The Avalanche Journal*.

The Board and Executive Director have spent a significant amount of time on building a strong path for professionalism this past year. With the support of the Conduct Review Committee, Education Committee and Membership Committee, we were able to explore a few different options. After months of consultation, meetings, phone calls and endless emails, it was clear to everyone that removing the QAP category was essential to move our association forward, following models and experiences of other professionals and professional organizations.

I was somewhat encouraged by Kensi Gounden of the Law Society of BC, who presented at this spring's CPD session. Amidst a great presentation, he noted that within Canada, law societies have only standardized several elements of lawyer competency in the last few years. He encouraged us to take our time to do things right. I'd like to think we are trying to do so just that.

One of our key strategies going into the AGM was to provide the membership with a brief prior to the by-law vote. This was intended to help members understand the issues and the changes the board was recommending. The board and staff put a significant effort into communication directly with affected QAPs and with the membership. We will continue to be as transparent and engaging as we move ahead.

During the AGM, my presentation focused primarily the CAA's strategic plan. The last plan's focus was 2010-2013,

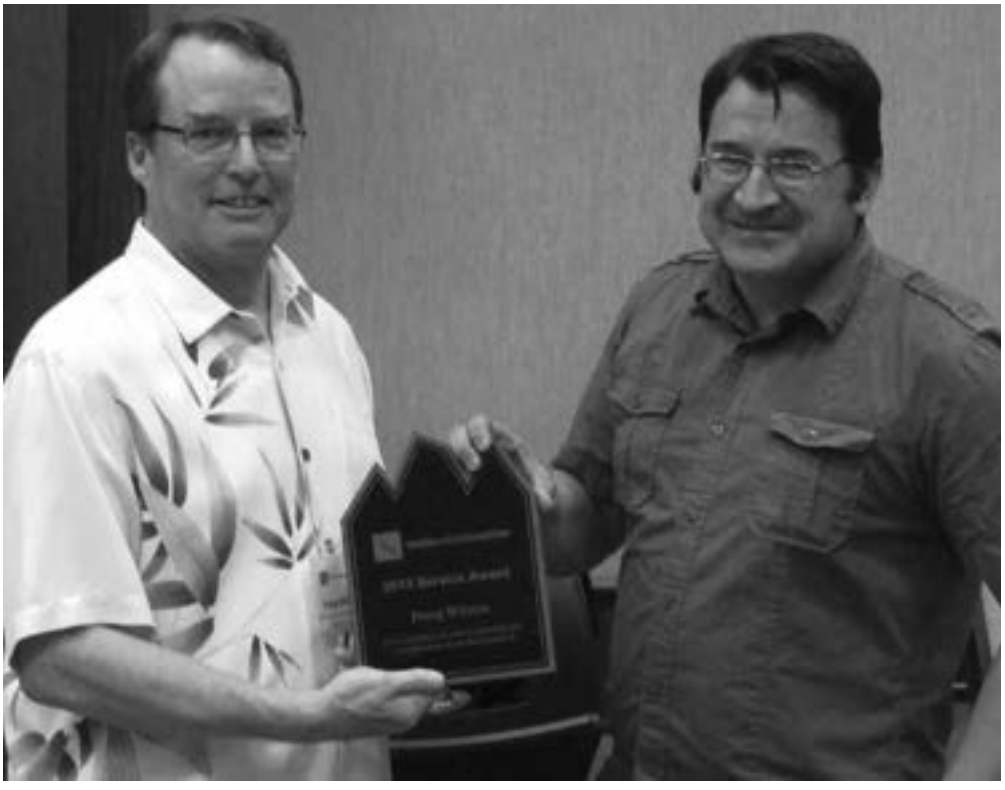
so now the board is working hard on the next strategic plan that will take us from 2013-2016. Over the summer, the board has been working with committee chairs and the staff on the key elements of the new strategic plan. The board is meeting for a few days in September to consolidate this work into something we can put before the membership for feedback this fall.

The strategic plan sets high-level goals supported by specific strategies and milestones. As a living document, the strategic plan will guide the CAA as a whole to achieving our goals, with critical annual reviews to ensure work plans, committee mandates, operation planning, budgets can be measured and evaluated for progress.

While there will be a formal comment period, I welcome the input from members at any time. If any member feels strongly about the direction the CAA is going to take over the next three years, contact me at president@avalanche.ca. I will bring any concerns or suggestions forward to the board for consideration.

Thanks,

Robb Andersen, CAA President



CAA Service Award

Each year, the CAA is proud to award Service Awards to honour the hard work and commitment to the professional avalanche industry that the recipients have demonstrated. Please join us in congratulating Doug Wilson, winner of the 2013 CAA Service Award for his leadership and contributions to professionalism.

CAA Executive Director's Report

TRANSITIONS

Joe Obad
CAA Executive Director

AS I TYPE, SIGNS OF FALL have crept into Revelstoke. Unrelenting summer heat has given way to cooler evenings. CAA headquarters here at 110 MacKenzie Avenue is a little busier each week as staff returns to meet the needs of members this winter. Conversations about summer plans describe what has happened, while hints of winter conversation sneak in as if hoping not to melt in the remaining sun.

At the CAA this time of year, we experience a mix of seasonal changes. We ready ourselves for what we know how to prepare for, and for entirely new changes we plan for the best we can. For our members and stakeholders, it's worth outlining some of those changes here to get up to speed for the season ahead.

You don't have to look too far for one of the changes—it's in your hands. The format of *The Avalanche Journal* has changed, and this change is reflected in the contents. The Canadian Avalanche Centre informed us this spring that it was pulling back from *The Avalanche Journal* to dedicate its resources to reaching its audience through the web and other means. The CAC was generous about this transition, and we wish them well in reaching the public in the ways best suited to them. To meet this transition directly, we changed the physical format of the journal (mainly the way it is bound) to keep production cost down now that the CAA supports these alone.

More importantly, the journal is now completely focused on the professional avalanche community. This focus comes as both a benefit and a responsibility. The journal will focus explicitly on the needs and interests of CAA members. With this benefit comes the need and responsibility to work with members and the international community to ensure these pages provide content relevant to you. We will still have articles on AST training, but the focus will be on supporting AST providers. CAC forecasters will still contribute occasionally, but they will do so as part of the rich dialogue of the community of avalanche professionals.

A year ago, we talked about the building of a new InfoEx platform as a promise, and soon after you crack the pages of this publication, many of you will be using the new InfoEx in your operations. The staff, development team and CAA members who acted as the User Acceptance Committee have worked hard to deliver a new feature-rich product. I want to thank those members who put in volunteer time to help the project team conceive of how the system should operate, and also focus the feature set we'll deliver this season. Many thank are due Pascal Haegeli for his tireless leadership and vision for this work, and the developers at Hookano who turned your "user stories" into working software. Lastly, our gratitude goes to Jonathan Neufeld and Mohammed Abousalem and everyone at TecTerra for their funding support and resolve to see this project through. You can read more about all these efforts on page 12.

Software is only as good as the people who use it: our members and subscribers. In turn, the CAA is only as good as the service it provides to you. Over the last several months, the board and I have been working on a new strategic plan to support the organization from 2014 to 2016. It has been heartening to see the degree to which the initial focus of this work has turned on providing you with value for your membership. Some of that value is well-described in this issue in separate pieces by Mark Vesely and Robin Siggers, on pages 19 and 22, respectively.

Yet we can only deliver member value by having you articulate what you need. At the 2012 AGM, several members pushed me and the board to work on updating our key guidelines—the Guidelines for Snow Avalanche Risk and Mapping in Canada and Determination and Land Managers Guide to Snow Avalanche Hazard in Canada. After a scoping meeting last fall and several conversations since, I'm pleased to say that with much help from the Technical Committee, we are setting the digital ink to dry on an application sponsored by Parks Canada to the National Search and Rescue Secretariat New Initiatives Fund to receive funding to update these guidelines. NSS will announce the successful projects in early 2014.

Suffice it to say it has been a busy summer here on your behalf in Revelstoke. We wish everyone the very best in the season ahead, and look forward to engaging you on the fronts described above and many more.

Joe Obad, CAA Executive Director

CAC Executive Director's Final Report

Gilles Valade
CAC Executive Director

I AM THRILLED to come on board as the new Executive Director of the CAC. I look forward to this new chapter of my life, with the all challenges and rewards that are expected. I have spent part of the summer getting familiar with my new role—the files, the issues, the projects and the people. I am fortunate to benefit from the hard work of my predecessors and inherit an organization with such dedicated and passionate people. I anticipate a very interesting year and I have been assured that we will be having an easy and calm winter with an unusually stable snowpack.

I would like to thank Karl Klassen for his assistance, patience and wisdom over the past couple of months. Karl did a superb job as the interim executive director and deserves all the praise and time off. He doesn't know yet but I have installed a direct line to his office. I would also like to thank Kevin Seel, Secretary Treasurer on the CAC Board of Directors. Kevin volunteered countless hours into the executive director search and hiring process, and his skills were invaluable to the process. Kevin has been instrumental in making my transition to the position seamless and pleasant.

Did I mention that I'm excited about living in Revelstoke? I have already started enjoying the great mountain biking and I can't wait to drive a full seven minutes to get to the ski hill.

On a different note, and one related to *The Avalanche Journal*, the CAC has decided to pull out of funding half of this publication and let the CAA take over completely. CAC staff will continue to contribute relevant articles of interest to CAA members and the close collaboration between our organizations will continue. While this decision was not an easy one, it was made for the following strategic and economic reasons. First, the CAC is developing a new membership structure that should be launched this fall. This new structure will involve different means of communication with our members and stakeholders. Secondly, when we examine the profile of our CAC partners and stakeholders, we realize most of them are not avalanche or industry professionals and have different needs regarding the information they require from us. Thirdly, as a non-government non-profit organization, the CAC has limited funds and has to prioritize its spending.

The CAC has decided to pull out of funding half of this publication and let the CAA take over completely.

When you read this, fall will be just around the corner. Enjoy this great time of year and play safe.

Cheers,

Gilles Valade, CAC Executive Director

Choose Your Own **InfoEx**

Karilyn Kempton

CUSTOMIZED REPORTS AND WORKFLOWS, GEOMATICS FEATURES, PERSISTENT WEAK LAYER TRACKING, AND POWERFUL DATA ANALYSIS ARE JUST SOME OF THE NEW FEATURES TO BE INTRODUCED WHEN THE NEWLY DESIGNED INFOEX LAUNCHES THIS FALL.

THE NEW PRODUCT may be a game-changer for avalanche professionals across the industry, as data inputting gets easier, faster and more effective.

Excitement is in the air about the October launch. Enthusiasm is shared by Project Lead and Subject Matter Expert Pascal Haegeli, TecTerra Director of Commercialization Programs Jonathan Neufeld, InfoEx Advisory Group (IAG) chair Brad Harrison, and User Acceptance Committee (UAC)/IAG member Josh Milligan, all interviewed for this feature.

How did the project come about? In 2011, Bruce Jamieson introduced the CAA and CAC to TecTerra, a government-funded not-for-profit that invests in and supports the development of geomatics technology. TecTerra approached both organizations about supporting development of a public avalanche information exchange. The CAC and CAA decided that first redesigning InfoEx was critical to establishing a base with the public components to follow. While TecTerra typically focuses on integrated resource management, the InfoEx project let TecTerra have a broad impact by working with an entire industry. Neufeld says that InfoEx was a natural fit for TecTerra. "It's information that's inherently spatial but was not being represented that way," he says.

TecTerra's funding represented a unique opportunity—in the past, the avalanche community has struggled to build large system with small amounts of funding at a time. Brad Harrison admits that previous iterations of InfoEx were "a bit of a Band-Aid solution," cobbled together over the years. TecTerra completely rebuilt the product from the ground up, which means it should be stable and long lasting. Executive Director Joe Obad adds, "Previously, developing InfoEx was the art of the possible—what became possible with TecTerra's investment was a whole new beginning."

Starting over allowed developers to create a robust, modern and technical architecture. "It's built for a modern era," says Neufeld. Historically, the system has lived on-site at the CAA; now, it is being migrated to the cloud (which is a network of internet servers rather than the CAA office). This will mean a reduction in technical issues. "It's really a safety of life issue, and it needs that kind of support," says Neufeld.

Pascal Haegeli managed the project, and provided "everything from expertise on how avalanches work to how the community works and thinks, and helped develop a software for people who don't want to spend a lot of time on software," remarks Neufeld gratefully. Haegeli has been involved in data-related projects with the CAA for a long time. He was involved when InfoEx was moved from manual transcription to the current system, "so for a long time I saw the potential that was there but we never had the funding to truly develop enough of a new system to take it to the next level," he says. TecTerra's funding opportunity now takes it there: "We're not just building this single software system that just sits there and eventually becomes obsolete—we wanted to build something that will address the needs of different segments, grow with the needs of the community and support the development of tools from within the community."

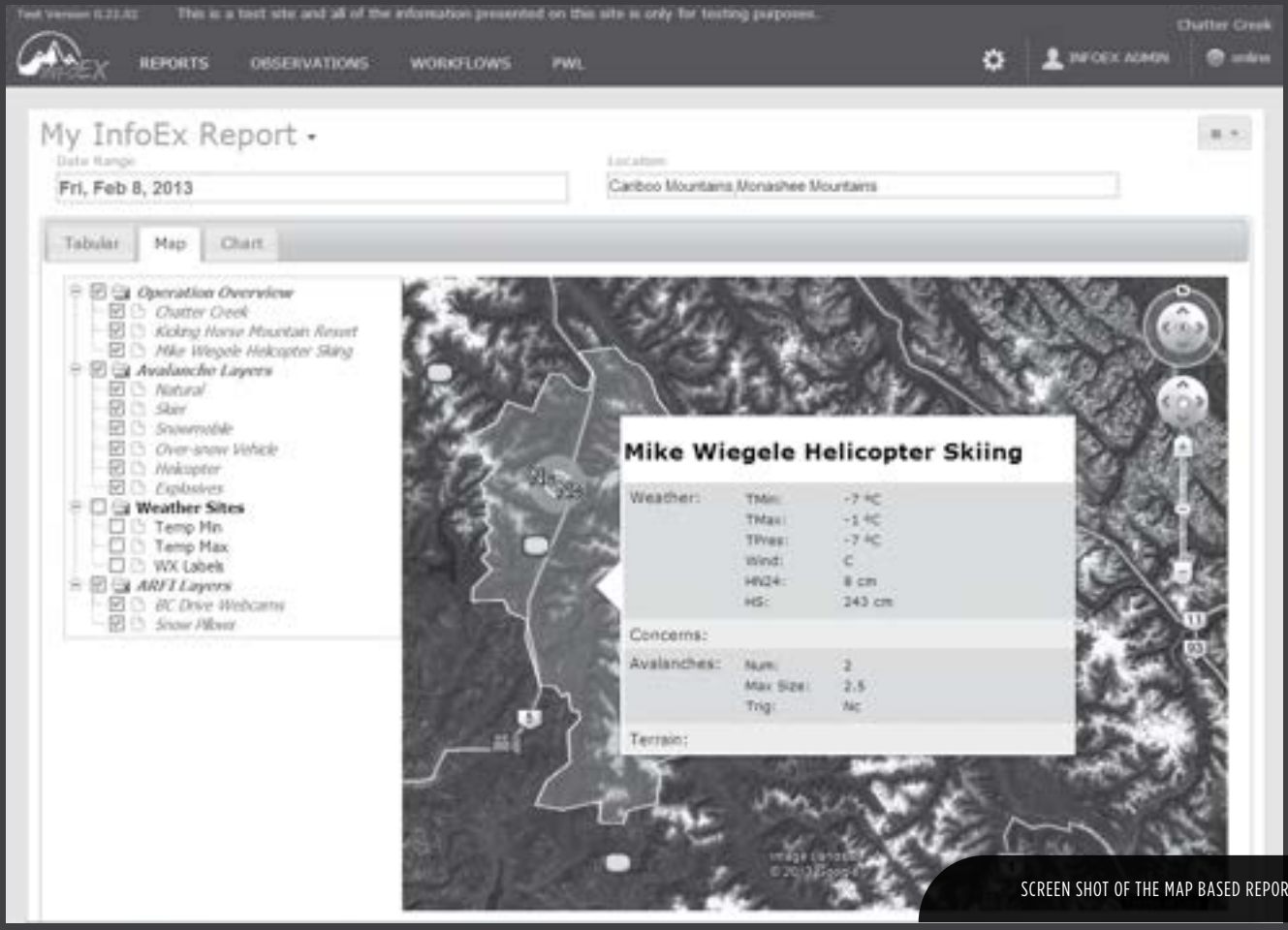
Haegeli spent several months last fall conducting interviews with a wide variety of InfoEx subscribers to find out what users needed and wanted in order to develop the new product based on those shared desires. "We're a very diverse community," says Haegeli, "but even within industry segments people think differently and there is usually a reason why." It's imperative InfoEx allows operations to do things the way they want to do it, he notes: "If it

fits more smoothly within their operation, it can be more naturally integrated with their daily routine, and the quality and frequency of data entry hopefully will increase as a result."

Early in the consultation, clear consensus emerged supporting customized reports. Users have personal ways of viewing the InfoEx report, and customized reports will fit individual needs of subscribers. Harrison hopes that making it more customizable so people can pick the operators they want to look at will make them happier to use InfoEx on a regular basis. The new InfoEx product will also eventually offer persistent weak layer tracking functionality, allowing users to filter reports based on PWLs they would like to follow. Users will be able look for activity on a specific PWL and see how other operators have assessed it in the same general region.

Another theme that emerged is that users want to enter their data as quickly as possible since they do not have a lot of time. "The way they do things now is based on years of practical experience, so we wanted the tools to adjust to meet those practices, not the other way around," Haegeli notes. "We need to use people's time wisely." InfoEx will be faster and easier, which will hopefully encourage operators to enter more detailed data. Increased data quality in InfoEx is a positive outcome for all, as more detailed information will be shared with the community. Easier data entry may discourage shortcuts in how data is inputted. In a text-based, tabular product like the previous InfoEx, shortcuts did not matter all that much. However, it will now be important to enter data property to ensure it's accurately categorized, whether it's on a map, in a filtered report, or on a graphical display—for you and others interested in your operation.

Haegeli also noticed that many operators did double data entry, entering information into InfoEx and also maintaining other database tools where they would record observations for operational record keeping. The new InfoEx product should provide good operational value to subscribers—they will have easy access to their own data, which will hopefully eliminate the need for double data entry and free up more time. "It would be nice if people using other products look at this and realize it's better," says Harrison. "It's simpler and will free up time for avalanche professionals." InfoEx will



SCREEN SHOT OF THE MAP BASED REPORT // CAA

// KEN BIBBY

allow subscribers to keep historical records that can be easily accessed and examined for patterns and trends. Users will be able to create reports that show avalanche information for an area over a whole season. Data will be much more powerful from now on, so again, the more detailed the better.

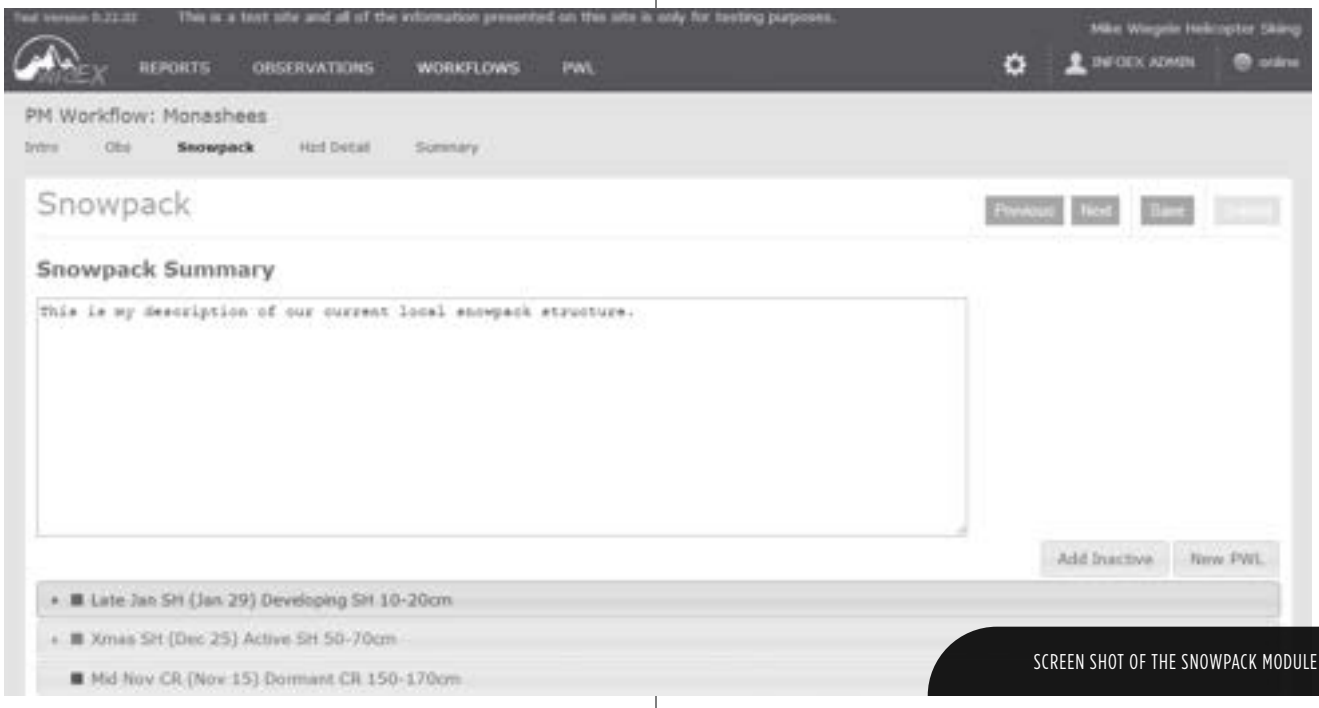
Customizable workflows are also a significant new component. While there is continuity among sectors, Haegeli noticed that no one does the same thing exactly the same way. Customized workflows offer a lot of flexibility. The InfoEx system provides a number of modules for different tasks that avalanche safety operations typically do regarding data entry or hazard assessment. Users can mix and match a workflow of tasks in whatever order makes the most sense for their operation, which means interaction with InfoEx should fit easily into operational practices. "The InfoEx tool will be an integral part of their day instead of an add-on," hopes Haegeli.

Users will be impressed with the geospatial features available on InfoEx. The primary focus has been visualization on a map layer. Displaying information visually will provide a whole new way of examining trends and patterns. The current exchange of information is very text-heavy, but this geospatial platform will take a lot less effort to comprehend. "It represents a seismic shift in how avalanche professionals will be able to understand the world around them," enthuses Neufeld. Users can look at the previous day's data by location and take in at a glance what is happening around them, and what neighbours are experiencing. Users will also graphically see trends when reviewing a whole season of data. This quick and easy knowledge translation distills data for the user, freeing up time and mental space for other work. "You can see it on a map and you don't have to think about it every time—it becomes instinctual," Neufeld notes.

One of the other goals was to make InfoEx flexible for the future. "The new system is intended to act as a platform that we can extend with new functionality over time," comments Haegeli. People within the industry may have the technical chops to build new tools, or operators might choose to work together to hire a software developer to create a new InfoEx plugin they'd like to have. For example, a big component of the mechanized skiing industry is run lists, so operators could come together to build a run list component. "Needs might change and technology might change, so you need a system flexible enough to go with that flow," Haegeli adds. "We will be able to grow this tool together as a community, which I think is very fitting with the general mandate of the CAA to support the industry as a whole. We can benefit from each other's work and take it up to the next level together."

If you are not currently an InfoEx subscriber, now may be a good time to look into it. "There is better value for existing subscribers," notes Milligan, "and if people are considering subscribing there is now a better value to InfoEx."

It's already the industry standard so it would be nice to have it even more entrenched, hopes Harrison. The more data the better, particularly from areas where there may currently be gaps. Its versatility and ease of use is a benefit, and Harrison thinks that might help attract new users without much connectivity. "We need to reach out to big and small users—mom and pop companies that may only have a satellite phone



SCREEN SHOT OF THE SNOWPACK MODULE // CAA

hookup," he says. At the same time, "It's super important that people want to use it. Nobody likes to be told what to do, particularly in this business," he laughs.

The avalanche community has participated from the beginning. The system was developed using what's called an agile process with a User Acceptance Committee (UAC) commenting on new iterations and features as the development team brought them out, allowing for important dialogue that helped the programmers understand the users' needs. This process generates buy-in because the UAC saw the system developing before their eyes. "The UAC has been critical to the success, because it means the community was really driving the project," notes Neufeld. To ensure the best possible product, varied users came back with helpful suggestions on what would and would not work. The UAC was quite a large group representing all different sectors of the avalanche industry that met regularly via telephone and video conferencing.

"It's been a good progression right from the beginning, explains Milligan. "We got to interact with the tool itself in the rudimentary stages of development, and work through basic functions to test them." Milligan praises the positivity of the UAC as far as steering the project goes, and he affirms that "the development team has been really good at implementing and listening to the UAC and making it into something the users want."

Haegeli hopes to launch a beta version of the new system mid-October, giving operators some time to familiarize themselves with the system and iron out any kinks before the season starts in earnest. There will surely be some hiccups, but Harrison's advice to all subscribers is to be patient with any problems and really give all the features a thought. "It's an excellent opportunity that's come along, and we need to seize it. If it doesn't work for you, hopefully we can make it work. These windows of opportunity don't come along every day, so when they do you've got to be ready to jump on board and make it work."

Everyone interviewed believes that users will be very pleased with the new system. "I think it may be a little bit daunting for some users because it's such a huge change and leap forward, but it's important that people take a little bit of time to familiarize themselves with the new tools and develop custom work flows in order to get the most out of it," says Milligan. At its core, InfoEx remains all about exchange of information—the new version is simply a more powerful tool to help avalanche practitioners collect and share information to make decisions.

Interested in subscribing or learning more? Contact Kristin Anthony-Malone at kmalone@avalanche.ca or visit avalanche.ca/caa/industry-services/infoex/subscribe.

New InfoEx Training Workshop and CPD Opportunity

HARNESS THE FULL POWER OF THE NEW INFOEX with a detailed introduction to the system's capabilities from Pascal Haegeli for InfoEx subscribers or CAA members. This vital opportunity will help you or your operation prepare for the InfoEx season through hands-on exercises. The workshop can be applied toward Continuing Professional Development for members. The workshop has three primary components:

- General overview of the system's principles and components
- Administration training for operations and end-users
- Practice scenarios for data recording, queries and workflows

WORKSHOP LOCATIONS AND DATES:

Revelstoke – November 18, 2013
Canmore – November 20, 2013
Nelson – November 22, 2013
Vancouver – November 25, 2013
Online Webinar – November 27, 2013
(overview presentation only)

Please register with Kristin Anthony-Malone at kmalone@avalanche.ca to attend.

COST

InfoEx Subscribers:	**Free**
(Two free representatives per subscriber)	
CAA Members:	**$30.00**
Non-CAA Members:	**$60.00**

Connecting With **ProCom**

Karilyn Kempton

I RECENTLY SAT DOWN WITH PROFESSIONAL PRACTICES COMMITTEE CO-CHAIR DOUG WILSON FOR AN UPDATE ON PROCOM'S WORK AND UPCOMING GOALS.

Why are professional standards essential to develop?

Professional standards are equally important for our members, the association and the public. We want professional standards in place so that the public can look at the CAA and our members and say, "they have a set of standards here that are intended to help me if I hire one of them." The association can look at members and say, "we expect you to adhere to these professional standards in your work life, and we expect you to treat the public—your employers and the people you contract with—fairly and ethically. And members can say, "I gain a benefit from membership in the CAA because I am well represented to the public, and I am clearly able to understand the playing field I am expected to work on." Those are the three different viewpoints that have to be represented, and I think we're getting pretty close to that.

How do professional standards differ from practice standards?

Practice standards and guidelines tell us how to do our work. They are technical in nature—*OGRS*, the *Land Managers Guide to Snow Avalanche Hazards in Canada*, and the *Guidelines for Snow Avalanche Risk Determination and Mapping in Canada*—and those can change and evolve. Professional standards talk to us primarily about ethical issues and personal attributes, about personal suitability to do the type of work we do. Professional standards are expected to endure for long periods of time without change.

Professional standards talk to us primarily about ethical issues and personal attributes, about personal suitability to do the type of work we do. Professional standards are expected to endure for long periods of time without change.

How do you define scope of practice?

Scope of practice describes the full spectrum of roles, functions, responsibilities, and activities that members of the association are educated and competent to perform. This is the broad view of the scope of all members of the association; it would be very unusual for a single individual to possess all of the competencies of the entire association.

We have no right to title or right to practice, so we can't hold anyone to hiring only CAA members who only do things the way we think things should be done. Our scope of practice should identify, for members and for clients, the type of work that members are best suited to take on because they follow our methodologies, apply our guidelines, and behave in the professional manner we have outlined in our professional standards.

Why is individual scope of practice important?

We don't have any strong way to differentiate between someone who got their CAA Avalanche Operations Level 2 two months ago from someone who got their Level 2 ten years ago, from someone who got their Level 2 twenty years ago. On paper they look pretty much the same, particularly to prospective clients and the public. We would like to work on methods that allow individual members to identify how, where and when they developed their individual scope of practice through their unique combination of CAA training, workplace experience and non-CAA training.

The Membership Committee is working on a proposal for identifying and managing continuing professional development (CPD) in the future. This effort will be closely coordinated with the ProCom and the Education Committee. We want to provide a system for people coming through CAA training to document goals they are setting, who they are working for, what type of work they're doing, and what their levels of responsibility are, and enable members to document that along with new training and experience throughout

Working Definitions

PROFESSIONAL STANDARDS: A set of performance expectations that reflect the values of the profession as well as the expectations that the profession and society have of the members.

PRACTICE STANDARDS: Provide technical information for practitioners to consider when undertaking avalanche related activities.

CAA MEMBERS ENGAGED IN LAST SPRING'S CPD CONFERENCE PROFESSIONALISM IN SCOPE // MARY CLAYTON

their career. The new system will certainly be more complex, and we'll have to establish it in a way that accommodates people who have been in the industry for decades as well as new members that will use this improved CPD system throughout their careers. This type of system will allow members to establish and document a deliberate approach to their individual scope of practice and will also accommodate improved mobility between the various types of workplaces where our members provide their services.

Is it difficult to develop standards and scope when the profession spans so many fields?

Professional standards can cover everybody because it's about professionalism and ethics. But the scope of CAA members is fairly broad, and not everybody does avalanche work all day every day. Some do avalanche work and apply CAA practice standards and guidelines for a small part of their day, and then move on to other things (while keeping CAA guidelines in mind as they reassess throughout the day). The CAA can only identify the scope that people get from the CAA, and that's what we're working on. Some people derive the scope of their work exclusively from CAA training and their field experience. There are a lot of other people who look to the CAA for part of their scope, and to other organizations for other parts. For example, some guides would be required to have taken some specific CAA training to obtain their guiding certification, but the majority of their scope comes from the ACMG.

Scope of practice is like a dome on top of all CAA members. No single member fills the dome by himself or herself. We have to respect that there are other professional organizations that, in some cases, also provide aspects of an individual's scope of practice. We intend to focus on the components of scope that are specific to membership in the CAA.

What kind of feedback have you received from members so far on professional standards and scope of practice?

It has been overwhelmingly positive. First, we went to the board and all committee members with a preliminary draft of professional standards and all felt it was a good direction to go. Then we had the Conduct Review Committee confirm that nothing contradicted their ability to meet their terms of reference, and we took some hints from there. Then we went to the membership at large with a survey in the spring and had very positive feedback. Each of the surveys provided a few items that we have found very useful.

Professionalism is obviously a long journey for the CAA—how can members participate on the road ahead?

We have an effective committee but we could use revitalization and new help. If people feel strongly about lending a hand, they can contact Aaron Beardmore at abeardmore@avalanche.ca and volunteer for the committee. We're looking for people who have a background in this type of work in particular. The other way to help is that when we provide material (and explanatory material along with it), we want members to consider all of it and give their honest, thoughtful comments.

What is ProCom working on next?

We are working on an overall scope of practice statement. We're also taking a half a step backwards on professional standards documents to make sure we align it correctly with the code of ethics and member feedback. And we're doing ongoing work with the membership committee in particular to come up with a proposed new scheme for CPD. So many committees have a stake in all of this moving forward. We'll also be checking to ensure that our efforts are coordinated with the outcomes of the Board of Directors' strategic planning session this fall.

A Farewell to the Qualified Avalanche Planner

Mark Veseley

AT THE CAA'S ANNUAL GENERAL MEETING on May 7, 2013, a motion was passed that removed Qualified Avalanche Planner from the CAA's membership categories. The near-unanimous vote sent the QAP category onto greener pastures and re-established professional as the highest practicing category of CAA membership. As a once-QAP, I felt it important to adjust my focus on the ground I was standing upon as a professional member again, and the journey the CAA took to get there, and maybe mourn a little for the QAP title so many of us worked hard to attain.

At the by-law vote to remove the QAP, I raised my voting card without hesitation, but immediately afterwards could not help but reflect with some frustration on the process I had been a part of over the past five years. The title's only meaning to me was in relation to meeting the terms of WorkSafeBC's regulation 4.1.1 on behalf of my employer; I considered myself a practicing avalanche professional on all other accounts.

The initial discouragement I felt was in relation to the amount of work put into the process. When I say work, I am not only referring to the personal process of self-auditing against the outlined requirements, identifying short comings, mapping out required development and planning for financing and time. It also refers to the amount of effort on the CAA's behalf to develop recommended minimum standards, courses and application processes in order to develop this new elite industry role. The amount of effort was nothing short of remarkable.

Unintentionally, the CAA contributed in part to the retraction of 4.1.1 as an enforceable regulation by WorkSafeBC. The requirements necessary to produce "qualified persons" based on our opinion of what the regulation stipulated resulted in the disqualification of much of our professional membership from being suitably qualified, leaving many to wonder when there would be enough QAPs to do the work WSBC required. Fully examining the contributing factors may now be a discussion best had in a coffee shop or beer parlour, and hindsight may reveal the decisions we have made as appropriate or otherwise.

My initial feelings of disappointment were quickly replaced with empowerment, liberty and pride. The process that the 4.1.1 regulation catalyzed within our association and industry has been nothing short of extraordinary. All the work many of

// AMBER WOOD

us undertook to become QAPs remains. I am empowered by the high quality training I have been exposed to. Courses like the Avalanche Search and Rescue Response and the Avalanche Operations Level 3 applied avalanche risk management concepts have pushed practitioners to develop and refine our skills. These and other courses that were perhaps initially developed to speak to the needs of a regulation, remain valuable opportunities for continuing professional development for all professional members.

090127 SURFACE HOAR LAYER DOWN 28 CM // WREN MCELROY

For me, it is liberating to lose the QAP title and rejoin the ranks of practicing professional member. I believe this title better represents all professional avalanche workers in Canada, regardless of the scale in which they operate, and unifies us as a group. I was further empowered by the work presented by the Professional Practices Committee—the hard work of many of our senior members maps out a path that paints a clearer picture of what our association and our membership could become and grow into. This road is another steep climb, but promises much maturation for the association as we continue forward.

Our association has some exciting momentum. I hope that all members recognize the potential our community has shown when we ensure that we are the best that we can be whenever issues surface that need our attention. The high standard of the Canadian avalanche industry is perhaps most clearly visible through the recent trend of international interest in the Industry Training Program, both with course participants coming to Canada, and holding our courses in international venues. I cannot help but feel pride, as I know a big reason for this trend is the work that people within our association have done and continue to do.

The loss of the QAP title may actually be a massive industry gain. It is liberating to seek professional development for the sake of making ourselves better as professionals rather than for an elitist title within our association. Education is not a means to an end, but rather a commitment to self-improvement throughout one's career. Our business is one of keen observation, data organization and interpretation of details where exposure to decision-making processes results in the continual development of knowledge and judgement in relation to one's environment, operations and one's self. Being a professional member seems to reflect this journey more than the QAP matrix ever could.

In closing, I think it is worthwhile to recognize the catalyst that was regulation 4.1.1 and take a moment to reflect upon and thank all of our peers who stood up to the challenges that were put before our association. We are certainly in a much different place than five years ago. If you're a professional member, celebrate your achievements and always keep focus on what makes you a professional. Keep learning and take advantage of the blossomed potential that has developed for all of us to participate in. Let's all continue getting better at what we do. Never stop learning.

Mark Vesely,
Former QAP and happily a professional member again
Avalanche Safety Director,
Fernie Alpine Resort

New Faces on the CAA Board

THE CAA WELCOMES THE NEW MEMBERS OF THE CAA BOARD OF DIRECTORS, ELECTED AT THE AGM IN MAY.

THANK YOU TO OUTGOING BOARD MEMBERS DEB RITCHIE AND SCOTT HICKS FOR THEIR HARD WORK AND COMMITMENT TO THE CANADIAN AVALANCHE INDUSTRY. DEBBIE HAS TIMED OUT AFTER SIX YEARS ON THE BOARD. AFTER SERVING ON BOTH THE CAA AND CAC BOARDS, SCOTT HICKS ALSO STEPPED DOWN TO SPEND MORE TIME WITH HIS YOUNG FAMILY.

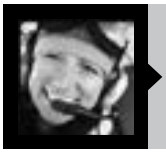
JOHN MARTLAND, DIRECTOR FOR ASSOCIATE MEMBERS: Now enjoying retirement in Canmore, John Martland worked as a trial lawyer in Calgary for many years. He served as President of the Law Society of Alberta, earned his Queen's Counsel, and belongs to a number of professional organizations. An active outdoor sports enthusiast, John belongs to the ACC and several wilderness and environmental groups. John is also a musician—he was a founding member of the Calgary Folk Club and the Calgary Folk Festival, and remains on the Folk Club board. He is also president of the Canmore Folk Music Festival. One of John's four children is Brendan Martland, a professional member of the CAA. He also has seven grandchildren.

John is happy for the opportunity to give back to the avalanche industry: "I have a background working for or with not-for-profit societies and am pleased to be able to participate in the CAA deliberations. It is special to give back to a sector from which I have derived so much pleasure."

John Martland

ZUZANA DRIEDIGER, DIRECTOR FOR ACTIVE MEMBERS: Zuzana Driediger joins the CAA as the Director for Active Members. Zuzana has worked at Mount Revelstoke and Glacier National Parks for 16 years, as a Visitor Services Attendant and Supervisor, Trail Builder, Artist and Designer, Avalanche Technician and currently as a Product Development Officer. Born in Prague, Czech Republic, Zuzana has called Revelstoke home for nearly two decades. Zuzana is involved in her local Search and Rescue group and spends a lot of time playing with and training her two German Shepherds for avalanche, wilderness and tracking work.

A trained artist, Zuzana was first introduced to the CAA when she painted a mural in the old CAA office and she has watched its growth with interest. "I find it an honour to be involved with such an internationally accredited organization that is still growing, and I'm looking forward to learning more about the organization and being a part of shaping its future."



Zuzana Driediger

What Has the CAA **Done For Me Lately?**

Robin Siggers

WHEN EXECUTIVE DIRECTOR JOE OBAD ASKED MEMBERS AT THE CAA SPRING CONFERENCE HOW THE CAA CAN PROVIDE BETTER VALUE TO THE MEMBERSHIP, I ASKED MYSELF WHAT BEING A PROFESSIONAL MEMBER OF THE CAA HAS DONE FOR ME. THE ANSWER IS THAT THE MORE I HAVE PARTICIPATED, THE MORE I HAVE GOTTEN OUT OF IT.

IN ADDITION to the obvious benefit of being recognized as a professional member in your working environment, the CAA provides the opportunity to work within the organization. That road leads to many places, and I believe that this opportunity to participate is one of the biggest benefits to membership. Get involved, meet the people, teach, work on a committee—you never know where it will lead you, but you will learn new things and get a chance to work with an amazing group of people. To me that is the true value of CAA membership.

I have been a professional member since the early 1980s when I received my Level 2 certification and began a career as an avalanche forecaster at the Fernie Ski Area. Since then, I have remained an active member in the CAA. Over the years, CAA members have become like a second family to me. The friendships that I have with professionals in the industry are very special to me. Each spring meeting, more friendships are forged.

When I began going to the meetings in those early days I was incredibly intimidated by the people in that room, icons of the industry. Scientists, renowned guides with amazing credentials—I was in awe. However, I was welcomed and encouraged to speak and participate. In those early years I pursued the opportunity and was fortunate to become an instructor with the CAA Industry Training Program. Through that experience I met and worked with many of instructors, and developed friendships with an incredible group of people. The instructor pool of the CAA is rich with folks who are at the top of their fields in the mountain community; having a chance to work with them was an incredible experience for me personally. I have also been able to teach courses in other areas and snowpacks and have learned so much.

When I began going to the meetings in those early days I was incredibly intimidated by the people in that room.

They say the best way to learn something is to teach it, and in my case this was so true. Teaching Avalanche Operations Level 1 taught me more than I could have imagined. I was inspired to go back to school to get a diploma in adult education. I also participated in the Level 3 courses and development, an amazing learning experience and professional development opportunity.

Another opportunity for personal growth and learning came when I joined the CAA Board of Directors. There I was exposed to the inner workings of the CAA and had the chance to expand my own experience in working with a very passionate and dedicated board and staff solving some complex issues. On the Education Committee I worked through issues with a group of people I have so much respect for. I have currently volunteered for more committee work and look forward to those experiences.

The spring conference is a great way to get involved, meet peers, participate in meetings and watch presentations. And there are always surprises—I groused to Joe Obad that I wasn't excited about the presentations this year. He told me to give them a chance. Sure enough, the public technical sessions at this year's AGM were a great variety and scope of topics relevant to all users. I stayed until the end Friday and was happy I did. I encourage all of you to take advantage of opportunities to get involved with the CAA, and your membership experience will be richer for it.

INSTRUCTOR COLIN ZACARIAS DISCUSSING TERRAIN WITH STUDENTS // ANGELA HAWSE

Continuing Education and the CAA Level 2

Angela Hawse,
IFMGA/AMGA Mountain Guide

We first read Angela Hawse's article on her CAA Avalanche Operations Level 2 experience in the April 2013 issue of the American Avalanche Association's The Avalanche Review. Thanks to Editor Lynne Wolfe for letting us share Angela's piece with you.

Avalanche Education and Mentors

"We make a living by what we get, we make a life by what we give"- Winston Churchill

Like winter, education is something I can't get enough of. It's that obsessive, insatiable curiosity you're familiar with. Working as a full-time guide, it's game-on, everyday. All cylinders have to be firing for thinking on my feet, daily uncertainties, and what-ifs. Margins for error are small.

I took the CAA Avalanche Operations Level 2 this winter to up my ante. I hit the jackpot in learning from some of the best. My short list includes Colin Zacharias, Rod Newcomb, Don Bachman, David Lovejoy, and Jerry Roberts. All have had a major impact on my career, decision-making, and longevity. I can easily recount experiences with each one that influences how I move through terrain, feel the snow under my skis and ask the right questions—but, most importantly, not pretend to know all the answers. Their examples, all the way back to my first American Avalanche Institute course with Rod and Don on Red Mountain Pass in 1984, still inspire me to probe, dig and ponder how to move with respect in the mountains, pay attention, and give more than get.

Why did I take the CAA Avalanche Operations Level 2?

It was the next logical step in my avalanche education, and simply put, I wanted to learn from the Canadians. It goes without saying why. Canadian IFMGA Mountain Guides are all required to have their CAA Level 2 certification. It stands to reason, I should as well. As a member of the AMGA instructor team, I'm required to pursue annual CPD, and I'm just keen to learn. I've spent enough time in Canada to know their top-notch winter guiding and avalanche forecasting operations are highly organized, methodical, and tight. I wanted in on it, and as a guide for Telluride Helitrax in the San Juan Mountains, it seemed like a good survival strategy.

Guide Standards

IFMGA certification is recognized as *the* guide standard in 24 countries. The US, Canada, New Zealand, and

Japan currently have the most comprehensive avalanche education requirements for certified guides. In Europe, formal professional avalanche education offered by national avalanche associations is not necessarily integrated into the guide training schemes. In most IFMGA countries, shorter format courses offered by the guide associations are pre-requisites for their respective ski and alpine exams.

What's Different?

The big difference between the US and Canada (and NZ), is the number of course and evaluation days. The Canadian process has twice as many assessment and course days. In the US for example, an AMGA ski guide candidate currently takes a three-day Level 1, a four-day Level 2, then a six- or seven-day Level 3. The same ACMG ski guide candidate in Canada would take a two-day AST (recreational course), a seven-day Avalanche Operations Level 1 with four to five assessment days, and a 15-day Avalanche Operations Level 2 with seven days of assessment.

The Avalanche Operations Level 2 is a 15-day program for avalanche professionals, split into three modules. The intensity, range of topics, time in real terrain, high standards and rigorous examination are unrivaled. Many who enroll take the three modules over the course of two or three winter seasons. I took them all this winter because I couldn't wait.

The diversity of students with wide ranging professional experience was an unexpected bonus. Represented were Japan, New Zealand, Sweden, Spain, Finland, the United Kingdom and many provinces in Canada. This medley of individuals, plugged into a well-organized operational process, provided key opportunities to hone listening skills, see the value of different perspectives and work effectively in small teams.

Over the course of 15 days, I engaged with 11 outstanding instructors. Most were IFMGA or ACMG ski guides, CAC avalanche forecasters, snow safety directors, and Ph.D. candidates. As expected, every topic was high-level and cutting edge. The variety of teaching styles, coaching and mentoring in and out of the field was exceptional.

AFTERNOON HAZARD ASSESSMENT // ANGELA HAWSE

Structure of the CAA Level 2

Module 1 was a four-day, classroom-based section that dove heavy into workplace directed human factors, group dynamics, and mechanisms at work in the snowpack. Sessions included interactive lectures, team building exercises, case studies and methods of applying risk theory to avalanche work. Strict time management added to stress, common in our workplace. Other than self and peer review, the Mod 1 and 2 have no evaluation component.

I took Modules 2 and 3 back-to-back in Whistler in December, with the goal of learning in a non-familiar snowpack, outside of the Rockies. Mod 2 was three and a half days, mostly in the field. Working in an operational context, we put team-oriented, real life decision-making from Mod 1 into practice. In our morning meetings, we identified the avalanche problem and broke it down, describing the avalanche character, sensitivity to triggering, spatial distribution, and terrain features where we expected to find it. Mod 3 was a seven-day practical exam. Everyday was an evaluation day with continued coaching, but high expectations of candidate performance.

The pre-course expectation was a daunting 20+ hours of reading of the course manual, technical papers, and *The Avalanche Handbook*. In addition, 50 pre-course questions, surveys examining thinking styles and hazardous attitudes, and reflections were expected in a structured learning journal. This all provided a super solid foundation.

What did I learn beyond my previous education?

It's impossible to condense 15 days of intense learning here. The operational focus of this program was invaluable. Repetition and daily methodology writing the AM and PM forecasts and operations plan helped establish a solid foundation for my day-to-day fieldwork. I've polished record keeping, increased my craftsmanship and refined many observation skills. I learned a great deal about operational efficiency that can make a good team exceptional and the importance of personal performance and participation. As I've always known, the L2 reinforced the value of asking myself "what did I learn today; and what I can take to my workplace tomorrow?"

Continuing Avalanche Education for Guides

I whole-heartedly recommend taking the four-day CAA Avalanche Operations Level 2 Module 1 for anyone wanting to build upon the AIARE or AAI Level 3 experience, or CAA Level 1 experience. If you work as a ski guide, either mechanized or touring, the complete L2 is a solid investment.

For more information on the CAA Avalanche Operations Level 2 check out: http://www.avalanche.ca/caa/training/avalanche-operations/level-2

REPETITION AND DAILY METHODOLOGY ESTABLISH A SOLID FOUNDATION IN THE LEVEL 2 PROGRAM // ANGELA HAWSE

THE START ZONE // JIM BAY

Case Study: Skier Accidental Near Revelstoke Mountain Resort

Troy Leahey

THIS CASE STUDY DETAILS a skier-triggered avalanche that occurred in the backcountry accessed from Revelstoke Mountain Resort (RMR) on February 22, 2013. The party included five young men, all new to Revelstoke. Three members of the party were involved in the avalanche. Two of these were partially buried; the deceased (an RMR staff member) was fully buried despite wearing an airbag. It was a size 2 slab avalanche with an approximately 40cm fracture line, which failed on an early February surface hoar layer.

Analyzing accidents has long been an important part of the CAA ITP program and in other risk reduction industries. It is easy to be the armchair quarterback after an incident and identify the mistakes people made, but I believe it is also important to identify what was done well in the rescue effort to use as a good learning tool.

My involvement in this accident was on a number of different levels. As a member of Revelstoke Search and Rescue, I assisted Buck Corrigan and Ryan Buhler with the body recovery the day after the accident. I watched and helped interpret a Contour headcam video worn by one of the rescuers during the rescue effort for local members of the RCMP and a representative of the BC Coroners Service. This was a sobering but interesting piece of footage; although the actions of those involved on the scene would be apparent to most readers, the footage required some explanation and interpretation for non-skiing investigators. I interviewed some surviving members of the group for clarification on the location of those involved and their actions for the Coroners Service.

I also led a debrief at RMR for friends and co-workers of the deceased, including the other young men involved in the accident. This debrief was the most challenging public speaking exercise I have ever undertaken. Our company president asked if I could speak about the accident, as staff members and friends in the community had unanswered questions, and answers can help lead to understanding and closure. I wanted to be quite frank about the obvious mistakes made, as they were an

opportunity for learning. I also wanted to commend the survivors on their effort and help them recover some confidence and dignity. I focused on the following points in the debrief.

MISTAKES:

- The most obvious mistake was the aggressive terrain choice—the danger rating at alpine and treeline was high. The five males were young, aggressive skiers with limited backcountry experience. This is the demographic we may expect to see on the avalanche fatality list. The deceased had skied in the terrain the day before and felt confident in his decision to lead the rest of the group to that zone. He had spent many days in this area in what had been a mostly stable season to that point. It was also the first major surface hoar cycle we had experienced in the season, and this type of avalanche failure may not have been familiar to a young German in Canada for his first winter. The CAC's avalanche forecast was bang on—as it usually is—but youth, overconfidence and a desire to ski steep powder caused this glaring information to be ignored.
- Poor group management. The first three skiers on the uptrack were all involved in the avalanche; they were obviously not well spaced out enough and were all engulfed by the slab. Luckily the last two in the group were slower and not affected by the slab failure, and were able to execute a fairly quick rescue. Complacency on uptracks is a common problem for less experienced backcountry travellers. The group of five had been split into the first group of three up front and the slower pair at the back, which leads to a lack of communication and no consensus in the go or no-go decision. The most educated member of the group had been a student of mine on a CAA Avalanche Operations Level 1 course the previous year in Whistler. I spent a lot of time speaking with him about their decisions that day. He admitted to having reservations about the decisions being made, but did not speak up and deferred to the deceased as the leader, since he was most familiar with the terrain.
- Improper use of an avalanche balloon pack. Wear the crotch strap if you are wearing an airbag. The deceased was near the surface with his airbag inflated and clearly visible from 100m away. He had not attached the crotch strap of his airbag. As the overburden of the slab he triggered from mid-slope overran his position in the toe of the debris, the airbag was lifted away from his back and above his head. This caused two serious problems. As the balloons and pack were pushed forward and downhill it lifted the pack, causing the chest strap to catch on his chin and impede his airway. Secondly, the buoyant airbag also pulled the victim's arms above his head, restricting movement and the ability to use hands to clear his own airway. The Contour video showed quite clearly the victim's lifeless arms well above his head. The space between the balloon pack and the victim's back was approximately 40-50cm.

WHAT THE RESCUERS DID WELL

- The two not involved took a safe route to the toe of the debris and did not expose themselves to any additional hazard. They quickly and efficiently went into rescue mode when they saw the airbag on the surface, and began the excavation by first removing the pack and digging to the head to clear the airway.
- The two partial burials ended up mid-path and were able to self-rescue and do a transceiver search of the slide path down to the victim.
- Group members performed good first aid on the victim. Once they uncovered his head, they immediately cleared an ice chunk from his mouth and pulled him out to a prone position where they started CPR. Considering the environment, they performed

THE DECEASED IS THE BLACK DOT. YOU CAN SEE THE UPTRACK WHICH EXITS THE SKI AREA BOUNDARY ON THE LOWER RIGHT SIDE OF IMAGE // TROY LEAHEY

excellent CPR with quality air movement as exhibited by the face of the victim in the video.

- The survivor with the most training took control of the rescue effort. He dispatched one of the members of the party to start moving back to the ski area boundary to report the accident as there was no cellular reception on the accident scene. This individual really led the first aid efforts as well.
- After at least a half hour of CPR, they made the decision to try to move the body with an improvised toboggan. They did not get very far as the conditions were very deep, but were able to move the body to a safe location out of the avalanche path. They then made the very difficult decision to leave the body and return to the ski area, as the weather conditions were deteriorating quickly. They left the body in a seated position under a tree with the inflated airbag and flagging tape arranged to mark its position, making our recovery very easy the next morning.

This was an unfortunate accident involving a group of nice young people from around the world enjoying the mountains in Revelstoke. There is nothing ground breaking about this accident other than the question of whether the airbag crotch strap could have made a difference. So why did I write this for *The Avalanche Journal* on a 30° July day when I'd rather be fishing? On a personal level, it brings back a bunch of vivid images and unpleasant emotions that make me sad. However, on the big-picture level this is an opportunity for others to learn and avoid mistakes in the future. A case study is really a story; this story may be repeated in Whistler, Banff or beyond. Hopefully the mistakes made and the triumphs that occurred in this accident will resonate and help others make better decisions in the mountains. That makes me happy. Have a fun, safe winter.

FULL PATH POTENTIAL // JIM BAY


MEC
FACT FINDER
OUTDOOR RESEARCH
MOUNTAIN GEAR AND SAFETY ESSENTIALS
Andrew Querner
Download and explore the free CAC app on Google Play or iTunes. Available winter 2013.

AST 1 RESCUE SCENARIO // TODD WESELAKE

AST Providers
Partnering with the CAC

BEGINNING THIS WINTER, AVALANCHE SKILLS TRAINING (AST) PROVIDERS HAVE PARTNERED WITH THE CAC TO PROVIDE FUNDING TO THE AST PROGRAM ON A PER-STUDENT BASIS.

THE AST PROGRAM HAS MATURED TREMENDOUSLY since inception in the 1990s. Throughout the years, teamwork between the CAA, AST providers, the CAC, and the CAC's funders, supporters, and sponsors has developed what may be the most successful recreational avalanche training program in the world. At the May meetings in Penticton, the CAC formalized a partnership with AST providers, who will now make a financial contribution to the CAC based on their student numbers to help offset some of the costs involved in developing and administering the program. The financial contribution will help the CAC ensure that the AST program has the support needed to grow and improve.

The CAC supports the AST program in a variety of ways. These include administrative support; promoting AST courses to the public, government, supporters and sponsors; maintaining intellectual property (IP), such as curriculum, instructor manual, and resources; providing instructor support materials; and developing new IP (e.g., the Companion Rescue Skills course curriculum). The CAC also employs an AST coordinator, and a variety of other staff is involved indirectly.

The CAA originally developed Recreational Avalanche Course (RAC) curriculum and instructor support materials using a National Search and Rescue Secretariat New Initiatives Fund grant (SAR NIF). SAR NIF funding also led to development of the Avaluator and the Decision Making in Avalanche Terrain Field Book, which form the core of AST 1 and 2 curricula. After these developments, the CAC funded significant revisions to AST IP to bring curriculum and instructor materials in line with the Avaluator and Decision Making in Avalanche Terrain Field Book. Costs for these developments over the years have been significant.

Until now, a few AST providers partnered with the CAC, but "the CAC felt it was time for the AST providers as a whole to help play a role in the future development of the AST program," says CAC Public Avalanche Warning Service Manager Karl Klassen, who served as Acting CAC Executive Director over the 2012-13 winter season and was instrumental in moving the partnership agreement forward.

Starting in late fall 2012, the CAC met with a representative group of providers to explore partnership options. After weeks of discussion, the group agreed that the most fair and simple way for AST providers to financially contribute to the partnership was on a per-student basis. All providers received the final draft of the proposal before the meeting in Penticton and had the opportunity to comment. "While there were a number of comments, in the end there was unanimous agreement that this was the best way to proceed," says Klassen.

The partnership outlines clearer, stronger and more formal ties between AST providers and the CAC, and Klassen believes that the money is only part of the benefit. "I think improved communication and more formal collaboration between the CAC and the AST providers is where the major benefit lies," he notes. "The providers will have opportunities to tell the CAC what they need and the CAC will be in a better position to respond to those needs."

New CAC Executive Director Gilles Valade agrees: "I support the provider partnership concept and look forward to working with the AST providers to ensure this program thrives."

The CAC appreciates the members of the AST working committee and other providers whose input and energy created this solution, and looks forward to continued growth in all areas of avalanche skills training. "The AST program has matured into what is clearly a very successful enterprise, so it was the right time to make this move," Klassen adds. "Given the strong support we saw from the AST providers, I think it's fair to say they agree."

How will money from AST providers be used?

FOR EVERY DOLLAR CONTRIBUTED BY THE AST PROVIDERS:

- 50% will be applied to cost of CAC operating expenses (administration and support services, e.g., those provided by the CAC AST Program Coordinator).
- 34% will be applied to the cost of CAC value added services (e.g., promotion, website, waiver, course certificates).
- 16% will be placed in a fund for development and renewal of AST intellectual property and/or other aspects of the AST program.

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Avalanche experts Gord Ohm, Jennifer Coulter and Martina Halik spend the winter gathering snowpack data and speaking to sledders and skiers about avalanche conditions in the backcountry around the Crowsnest Pass, Elk Valley and Flathead.

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South Rockies Local Observer team member Jennifer Coulter tests the snowpack for persistent weak layers that could increase avalanche danger.

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BRIDGE OVER TROUBLED FACETS

// JEFF SCOTT

Bridge Over **Troubled Facets**

Scott Thumlert
and Bruce Jamieson
ASARC - Applied Snow and Avalanche Research, University of Calgary

AGGRESSIVE SKIER: "WHAT DO YOU THINK ABOUT CHIMO'S RUN?"
SMART SKIER: "THAT SURFACE HOAR LAYER IS PROBABLY IN THERE."
AGGRESSIVE SKIER: "WELL, WE HAVEN'T SEEN ANY NATURAL ACTIVITY ON THAT LAYER IN A COUPLE DAYS."
SMART SKIER: "YES, BUT IT'S PROBABLY DOWN ABOUT 100CM, SO IF WE TRIGGERED IT, IT'LL GO BIG."
AGGRESSIVE SKIER: "DUDE, THERE'S THAT WIND CRUST IN THERE THAT WILL FOR SURE BRIDGE OUR STRESS!"
SMART SKIER: "I DON'T KNOW WHAT THAT MEANS, AND IT SOUNDS MADE UP!"

This hypothetical conversation discusses how deep our stress (force) penetrates the snowpack when we ski or snowmobile. How much does it depend on the kind of snow? How much snow of what kind do we need to effectively bridge a weak layer? When can we start to ski avalanche slopes with a weak layer in the snowpack? How can we explain sudden fractures beneath crusts in stability tests followed by no activity on that layer?

Juerg Schweizer and Bruce Jamieson (2001) investigated slab properties for many skier-triggered avalanche slopes. They found that most slabs are less than 60cm thick, rarely more than 100cm, but sometimes over 150cm. This study provided a lot of valuable insight into the skier's impact on avalanche slopes. But there is a lot of variation in the slab depth data; how would snowmobile-triggered slopes compare and what about the properties of those slabs?

To shed more light on how skiers and sledders impact the snow, we have been placing sensors at different levels in the snowpack and recording the force transmitted by a skier or sledder (Fig. 1). Not everyone loves boxplots as much as researchers, so Fig. 2 shows some colourful pictures of the numbers for snowmobile measurements. The pictures are separated into three typical snowpack resistance profiles: soft, medium and supportive. The hardness profile is shown on the left of the graph. The plots are made for a 35° slope (which why the bulbs are shifted to the right slightly).

We see the stress bulb for the soft profile about 75cm into the snowpack (Fig. 2A), whereas the bulb for the supportive profile is about 35cm into the snowpack (Fig. 2C). The average penetration of the snowmobile is shown as black at the top of the bulb, and, as expected, the soft profile allows more penetration compared to the supportive profile. Looking at these plots, it becomes obvious that our stress bulbs start beneath our sled or skis. So, if it is over-the-head 50cm ski penetration, then the stress bulb starts at 50cm and goes deeper from there (minus some stress absorbed by deforming the powder). The idea of harder snow supporting and spreading skier and sledder stress is not new; many folks call it bridging. Most Rockies ski enthusiasts keenly evaluate bridging as the season progresses until pesky depth hoar layers are buried deeply enough.

So the question is how much snow of what type do we need to bridge a weak layer. Many experienced ski gurus have an intuitive answer that, as always, depends on many factors. In casual conversation with many ski guides, the answer to this question varies greatly. Based on the stress measurements and using skier stability indices (Föhn 1987, Jamieson 1995), we arrived at a bridging index value of 130 for skiing. The bridging index is simply the thickness of layer multiplied by the hardness (1 for Fist, 2 for 4 Finger, 3 for 1 Finger, etc). What does bridging index of 130 mean? It can represent an infinite number of hardness profiles, but here are some examples:

- 50cm fist, 40cm 4F
- 20cm P, 25cm 4F
- 10cm F, 15cm 4F, 30cm 1F

Investigating a little further, we pulled some old ASARC profile data from skier-triggered slopes and looked at the bridging index. Fig. 3 shows the frequencies of bridging index values for skier accidental and ski-cut avalanches size 2 and larger. The middle of the bridging index values is about 130, but what about all those larger values to the right of 130? Those would probably be larger avalanches as

FIG. 1: MIKE WHEATER LOADING THE SNOW SURFACE ABOVE THE SENSORS. THE SENSORS ARE MOUNTED TO LONG ALUMINUM SHEETS THAT ARE INSERTED INTO THE SIDE OF THE PROFILE. THE DATA LOGGER IS IN THE BLACK BAG.

FIG. 2: THE PLOT SHOWS CALCULATED STRESS VALUES THAT ARE CALIBRATED TO MATCH MEASUREMENTS OF A SNOWMOBILE (σ IS THE SYMBOL FOR STRESS). THE DATA ARE GROUPED INTO THREE TYPICAL SNOW RESISTANCE PROFILES SHOWN ON THE LEFT OF EACH PLOT: PLOT A FOR SOFT, B FOR MEDIUM AND C FOR SUPPORTIVE. THE BLACK NEAR THE SURFACE OF THE PLOT REPRESENTS THE AVERAGE SNOWMOBILE PENETRATION INTO THE SNOW COVER.

FIG. 2A: SLED CONTOUR 2013 CALIBRATED SOFT SNOW.

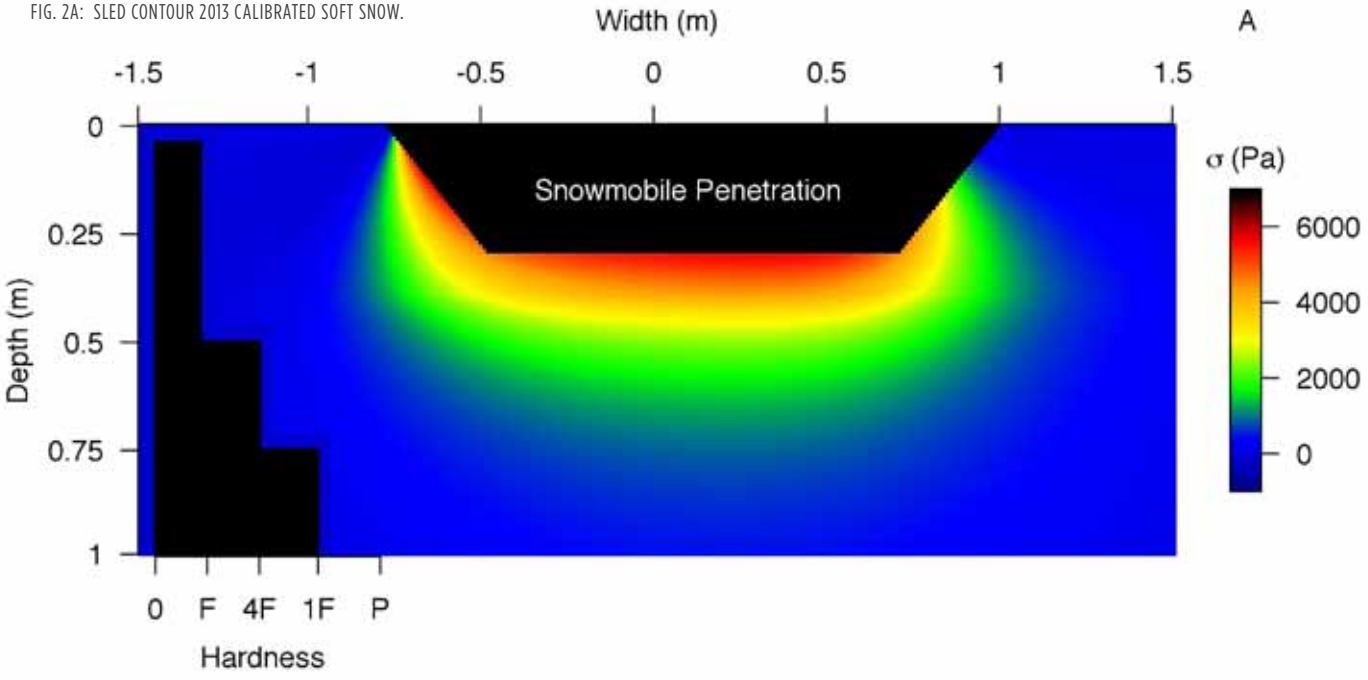


FIG. 2B: SLED CONTOUR 2013 CALIBRATED MEDIUM SNOW.

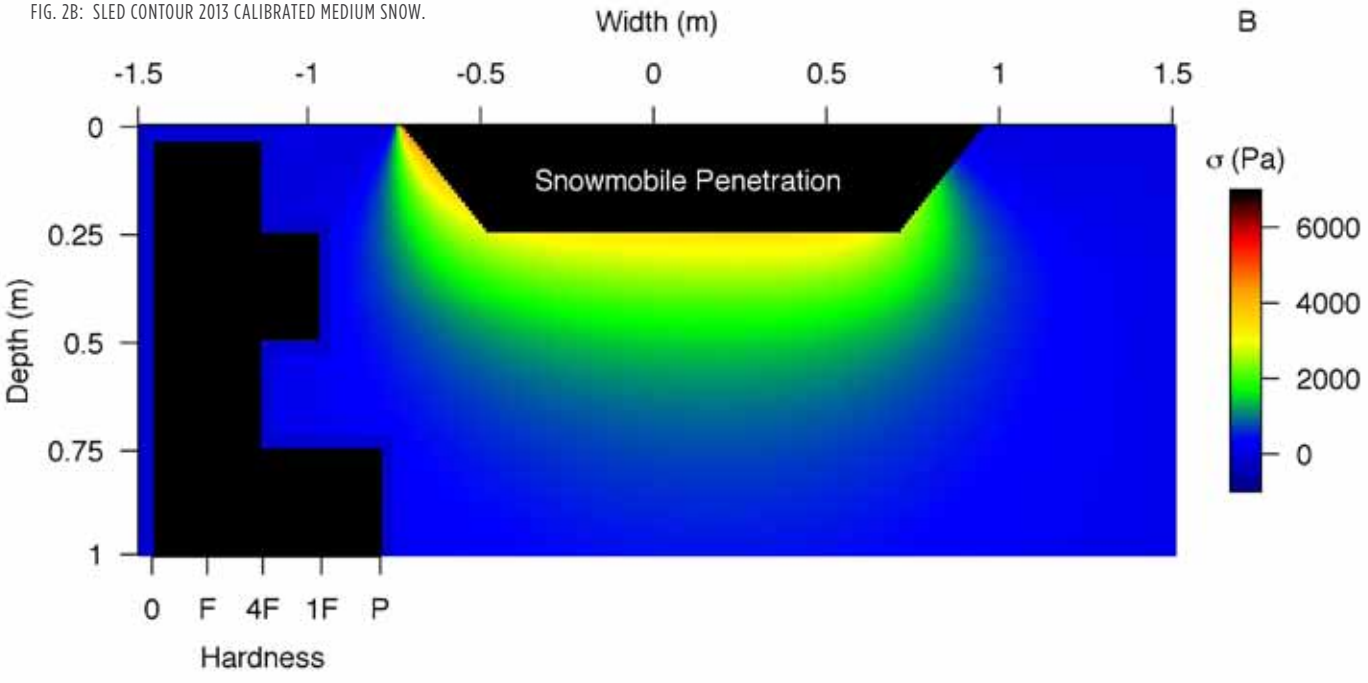


FIG. 2C: SLED CONTOUR 2013 CALIBRATED HARD SNOW.

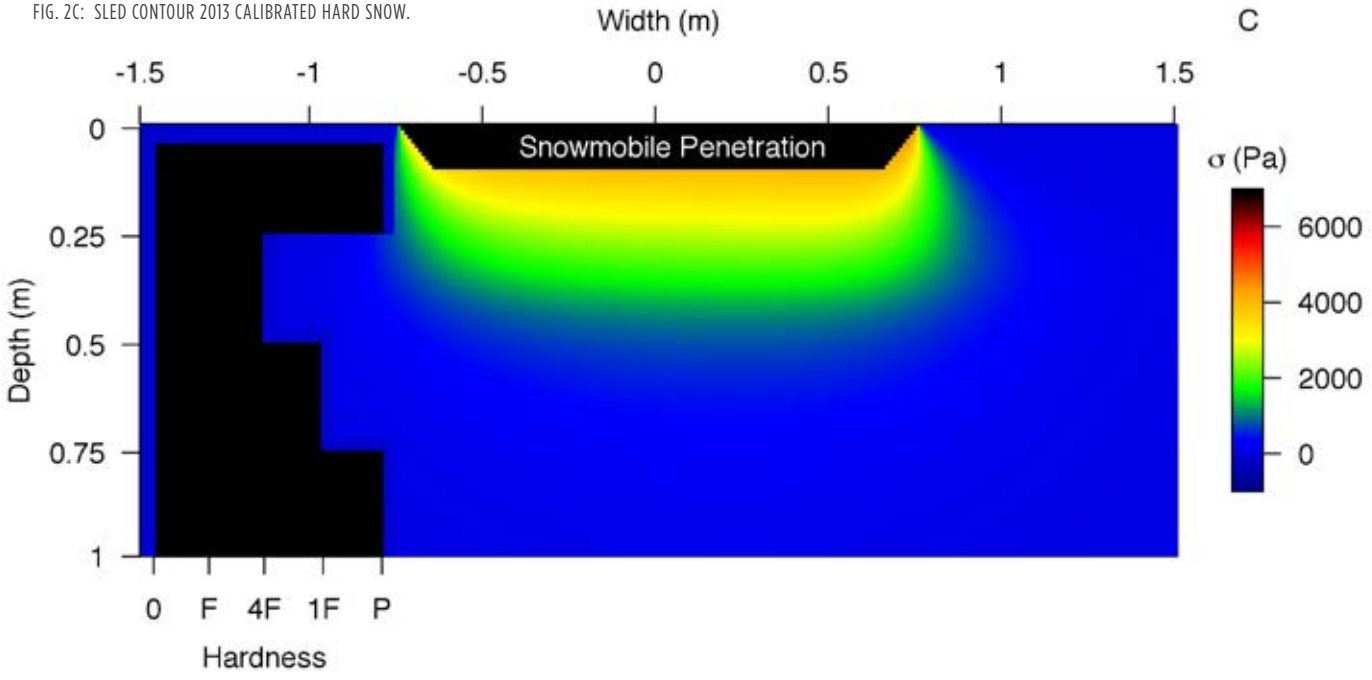


FIG. 3: FREQUENCY OF BRIDGING INDEX VALUES FOR 50 SKIER TRIGGERED AVALANCHES (SC AND SA). ONLY AVALANCHES SIZE 2 OR LARGER ARE SHOWN.

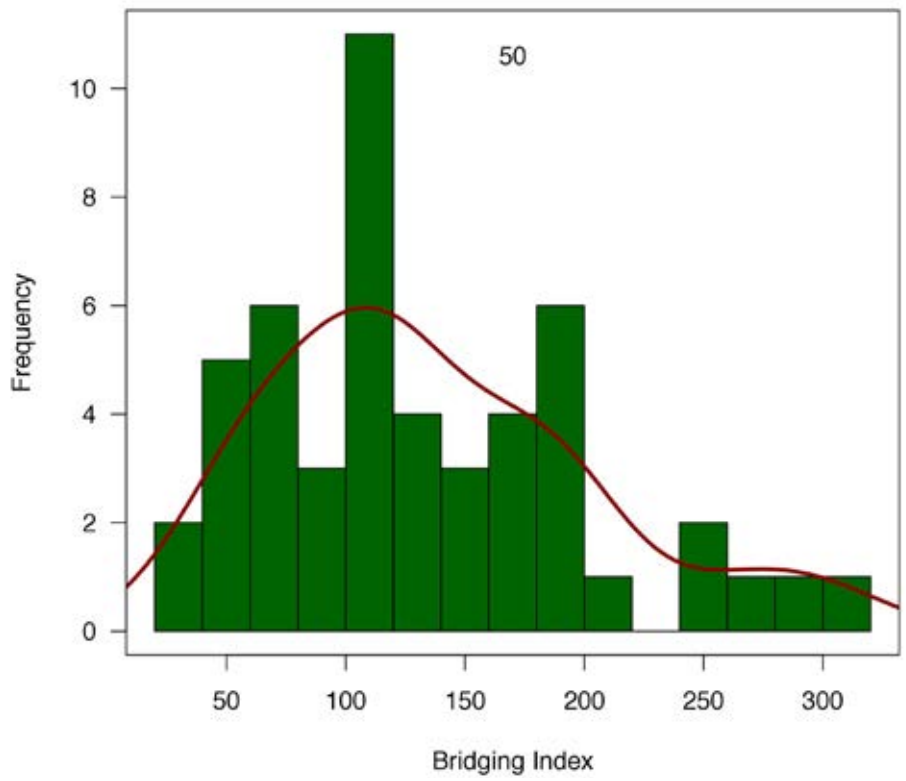
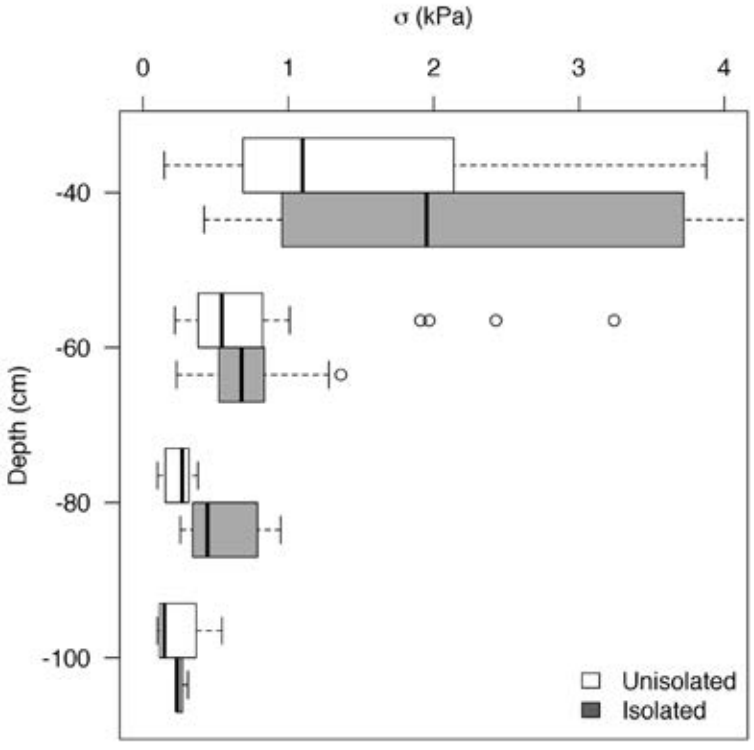


FIG. 4: STRESS (σ IS THE SYMBOL FOR STRESS) AT VARIOUS DEPTHS FOR ISOLATED AND UN-ISOLATED COLUMNS. THE MEASUREMENTS ARE FROM A TEST SIMILAR TO THE COMPRESSION TEST WHERE WE TAP ON THE TOP OF THE COLUMN. THE BLACK LINE IN THE BOXES IS THE MIDDLE VALUE AND THE BOXES ARE THE HALF OF THE VALUES.



well. As a first pass, this concept shows promise but needs some more investigating—more to come.

For now, let us fast forward a little in time. Let us assume we have a good idea how much snow of what type it takes to bridge a weak layer. We are out skiing and we are pretty sure we have enough bridge above our weak layer, but we should do a quick test to make sure. We dig out a small hole, cut a 30cm x 30cm column and start tapping away. Pop! We get a sudden fracture on those facets under the crust.

Scott Davis and Bruce Jamieson chatted about this hypothetical scenario this spring in Penticton. For many good reasons, in all our snowpack tests (CT, ECT, PST, DT, ST, RB—there are a lot!), we isolate a column of some size. Cutting of the snow when isolating a column eliminates the bridging strength of the layers. Consequently, there are many situations where we get sudden results, often under a crust, but do not see avalanches on the layer. Over coffee recently, Bruce remembered a well-developed facet layer under a 20cm hard crust in the North Columbias. The layer was producing sudden fractures, but guides were skiing steep open terrain without triggering avalanches. Fig. 4 shows some stress measurements from within stability tests. In some, we isolated the normal 30cm x 30cm column; in others, we only isolated the front wall, leaving three sides intact. We see more stress in the isolated columns than the unisolated ones, which is one reason why sudden results sometimes occur in snowpack tests but the adjacent slope cannot be triggered.

Bridging is an important concept to understand, although the usual caveat about the highly spatially variable snowpack applies. Even if we figure out how much snow is needed for effective bridging, thin spots with much less bridging always lurk. Much of the data shown here is preliminary and is presented to spark discussion and thought (i.e., do not take the 130 number as gospel!). This is currently an active research topic, so expect more information in the near future.

For further reading, there is a more detailed paper submitted to this year's ISSW in Grenoble.

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SHOVEL SHEAR TEST DURING ITP LEVEL 1 COURSE // IAN TOMM

Industry Training Program **News**

Emily Grady

"THE CAA IS THE GOLD STANDARD for avalanche training in the world." I recently heard this statement from a California-based IFMGA mountain guide pursuing his CAA Avalanche Operations Level 2 course, and it is reflected in our growing number of international students. Over the last three years we have tripled the number of CAA Industry Training Program courses offered overseas and more than doubled the number of international students taking courses in Canada. Given the ongoing discussions with Sweden, Iceland, Norway, Chile, and Argentina, I foresee continued demand for CAA Avalanche Operations courses from students around the world.

This "gold standard" statement encourages us to continually improve our professional avalanche education program. So with that standard in mind, there have been changes implemented within the ITP. One of the most significant changes is the decrease in the student-to-instructor ratio on the Avalanche Operations Level 1 and Resource and Transportation Avalanche Management courses. As of this year, there will be no more than six students per instructor on these courses. The objectives behind this change are to enable instructors to have more one-on-one time with students, to improve the amount of feedback to students, and to decrease logistical challenges.

Another change to our program is an increase in the Avalanche Operations Level 2 Module 2 from three and a half to a four days. The rationale behind this is similar to the Level 1 ratio decrease: we are promoting more field time and more opportunity for feedback to students.

Last year, we incorporated a digital mapping day into the Snow Avalanche Mapping but did not increase the number of course days. As a result, students did not have as many days in the field and therefore did not benefit from the all of the avalanche path examples. Based on student and instructor feedback, we have increased the mapping course to seven days to account for both the digital mapping day and all possible field days.

It is our hope that through these various changes we continue to meet the expectations of avalanche professionals both within Canada and beyond.

New PLA Review Process

Emily Grady

As of September 2013, ITP will be using a new Prior Learning Assessment form as recommended and created by the CAA's Education Committee. This form pertains to applications for equivalency and for waiving of a course prerequisite. Both application processes now involve a refereed self-assessment to be completed by a CAA professional member who has taken the course. Qualified ITP instructors familiar with specific course curricula will also review prior Learning Assessment for equivalency applications. If you have any questions regarding the new process please contact egrady@avalanche.ca.

ITP Tuition **Fee Adjustment**

SEVERAL ITP COURSES WILL SEE TUITION FEE ADJUSTMENTS FOR THE COMING WINTER TO ACCOUNT FOR INCREASED DELIVERY COSTS. THOSE DETAILS ARE NOTED BELOW:

- Reducing the student to instructor ratio from 8:1 to 6:1 for Avalanche Operations Level 1 and Resource and Transportation Avalanche Management courses.
- Increasing the Snow Avalanche Mapping course by one day to account for the digital mapping component.
- Adding the new Avalanche Control logbook to student materials for the Avalanche Control Blasting course.
- Increasing the Avalanche Operations Level 2 Module 2 from three and a half to four days of instruction in order to increase field time and opportunity for feedback.
- Increased expense rates for mileage across the board, particularly for snowmobile instructors hauling sleds.
- Increasing Avalanche Operations Level 3 instructor wages to ensure remuneration retains the expertise of a limited instructor base.
- Increasing instructor preparation time allocations for Weather and Avalanche Search and Rescue Response courses.

If you have questions regarding these fee increases, please contact Emily Grady directly at egrady@avalanche.ca.

Emily Grady
CAA ITP Manager

Thanks CIL

Thank you to continuing supporter CIL Explosives. President Everett Clausen presented a cheque for $10,150 to CAA Explosives Committee Chair Scott Aitken at this year's AGM. Each year, CIL Explosives donates a portion of their company's revenue to the CAA. Thank you to Everett and CIL Explosives for the ongoing support for the Canadian avalanche industry.

// MARY CLAYTON

Using the Avaluator v2.0 in Your AST 1 Classes

Damian Banwell

INSTRUCTORS HAVE A LOT TO COVER IN THE CAC'S AVALANCHE SKILLS TRAINING LEVEL 1 COURSE AND STUDENTS ARRIVE WITH HIGH EXPECTATIONS.

WE ARE ARMED with an instructor's manual, a thoroughly prepared and detailed resource that deserves to be well taught. Reinforcing much of what we teach, students are given the recently updated course manual *Backcountry Avalanche Awareness* by Bruce Jamieson. The ingredients for success are present, yet it can still be a challenge to deliver a respectable course with content held together in an orderly manner. To meet that challenge, I employ the Avaluator v2.0. It forms the keystone to the course structure. This article will look at some of the important teaching points in an AST 1 course, and consider how the Avaluator v2.0 holds them together.

My course delivery builds a storyline, following every lesson from the instructor's manual in a linear fashion. The AST 1 story has a number of distinct chapters, and the beauty of the Avaluator v2.0 is that it allows students to pull together many of the chapters in the storyline. When introducing the Avaluator v2.0 to my class, I am careful to point out that the kit comprises the entire shrink-wrapped package, including the very informative summary booklet. There are also two distinct yet overlapping decision-making tools within: the big picture trip planner card, and the slope evaluation card. I want students to understand that there is more to the package than the generic term "the Avaluator"—it is a sum of its parts.

A major component of the AST 1 curriculum is trip planning, which involves considering the human factors that group members may bring to your trip, selecting terrain that suits current avalanche danger, deciding the gear to take, and considering the weather forecast and changes during the trip.

Using the Avaluator v2.0 toolkit, we directly address how to select terrain that suits the current avalanche danger via the trip planner card. Wasn't that easy? Human factors—emotional bias in decision making—can be partially remedied if students consistently apply the structured decision-making system provided by the slope evaluation card. As for the weather and its impact on avalanche hazard, key weather factors are individually listed on the slope evaluation card, so students have that reminder in their pocket as well.

Consequently, the Avaluator v2.0 has allowed me to provide some support for three of the four main components

of trip planning. We spend a few hours teaching weather, avalanche bulletins, human factors and ATES. This long list of details and important pieces are distilled into the complete Avaluator v2.0 toolkit. This is a great benefit to the teacher and the learner.

I start my classes by taking students through a reasonably long sequence of building blocks, all of which can be comprehended individually; however, there is no collective meaning until I introduce the slope evaluation card. These building blocks include the nature and formation of avalanches, avalanche terrain, and terrain traps.

The first two contain considerable detail that can be drilled down through several levels (e.g., signs of instability within the nature and formation of avalanches). Within avalanche terrain we can focus on the start zone in great detail, beginning with start zone characteristics and drilling right down to micro terrain trigger points.

There is so much for entry-level minds to absorb that it is a challenge to teach it well and have it remembered. Again, here is where the Avaluator v2.0 comes in. The slope evaluation card allows both instructor and student to breathe a little easier. Just about everything of importance from the long sequence of building blocks is given meaning and structure by that one small card.

Before I introduce the slope evaluation card I like to ask my class for a quick summary of the important building blocks. I usually get "slope steepness," "convexity," "new snowfall," "shooting cracks," and, if I'm lucky, "wind loading." They are learning, but will they remember all that and much more in the field? Not without the pocket-sized slope evaluation card they won't. It does not cover everything and not everything on the card carries the same weight depending on climate zone, but there is so much valuable information on that card that as an instructor I simply cannot ignore the benefit it gives to myself and to my students. The really eager minds in class are also quick to appreciate the vital interplay between snow and terrain, and that risk is made up of probability, exposure and consequences. These concepts are at the core of the slope evaluation card. It is a great tool.

Another important AST 1 lesson that the Avaluator v2.0 helps with is decision-making competency. It is the reality check: how much training and experience do you really have? Where are you on the competency continuum? With overloaded ears and brains in class, most become aware that their knowledge base is minimal, and that it will take a long time for the concepts learned to become intuition. They need some help. Once again, the Avaluator v2.0 steps in to help deliver an AST 1 teaching point. As support systems, both trip planning and slope evaluation scale decisions are provided to entry-level backcountry users. The students who want to take their learning further respond well to this support and appreciate the guidance in their journey.

TEACHING BY EXAMPLE

Now that I have introduced the Avaluator v2.0 tools to my class, I always make an effort to deploy them in practice, to make them practical. As a class, we plan our field trip using the trip planner card. Whenever I'm asked a question I try to answer it in the context of the Avaluator toolkit. I do not just pass over the Avaluator tools once or twice and then move on—I keep coming back to them.

AVALUATOR V2.0 IN THE FIELD

We start the day by looking at our trip plan in all its components. Is it still suitable? At this stage I remind students of the trip planner card. We read the avalanche bulletin before leaving, so know the danger rating and whether there is a persistent weak layer problem. We then look at our slope evaluation cards at the trailhead to put the current regional avalanche danger and problems into the students' thoughts, and remind them of important things to look out for during our travels. Along the way, we apply the slope evaluation card to adjacent slopes hoping to highlight nuances that may be lost to untrained eyes, such as terrain traps, slope shape or incline.

Perhaps for the first time, they start to see terrain differently, recognizing that all slopes are slightly different and that those differences matter. Furthermore, by using the slope evaluation card, students appreciate that you need to be able to touch undisturbed snow and see lots of terrain to make fully informed evaluations.

After we have been stationary working on companion rescue, students take cards out of pockets to evaluate the slope we may climb and ride. If our route takes us through the treeline, the slope evaluation card is used again. We use it again if the weather changes. And, finally, we use it again at the top of the slope, where hopefully we can use the card to avoid one descent route in favour of another.

By repeatedly using the slope evaluation and trip planner cards, and through employing it myself by way of example, it becomes a comfortable support system in students' hands. At the end of the course, many students clearly understand what is required of them if they want to become a backcountry skier or snowboarder. That is one of my AST 1 teaching goals, achievable thanks to the Avaluator v2.0 toolkit.

HAVING YOUTH PREPARED FOR THE BACKCOUNTRY CAN SOMETIMES BE A TALL ORDER. KEEPING THEM ENGAGED DURING TRAINING IS KEY. // VINCE SHULEY

Modifying Companion Rescue **Skills** for Youth

Gwen Milley

LOCAL WHISTLER PARENTS ASKED ME IN NOVEMBER 2012 WHETHER WE HAD ANY COURSES TO OFFER 10- TO 12-YEAR-OLDS DURING THE WINTER MONTHS.

// VINCE SHULEY

PARENTS SOUGHT AN EDUCATIONAL ALTERNATIVE to the six-week Monday Ski Program offered to students in the Whistler Elementary Schools. Their children had participated in the Monday Ski Program for years and were looking for something a bit different.

I first thought about the AST 1 course, but the kids just were not old enough. I then looked at the Companion Rescue Skills (CRS) course and thought that it might work with some curriculum modifications. After reviewing the CRS curriculum, I decided to split the course into four three-hour sessions from mid-January to mid-February. Keeping the age of the students and their attention spans in mind, I felt that three-hour field sessions were definitely long enough. The potential students were very keen to try the course and we ended up with five boys ranging between 10 and 12 years old, all classmates from Spring Creek Elementary School. This felt like a good number of students for a trial run of the course, and I knew the boys and parents well.

Dary Hemmons was the lead instructor and was well suited for this course. Dary has been teaching AST 1 with the Pacific Alpine Institute for many years and is a father of three boys. He knows how to keep kids this age engaged during the field sessions.

With support from locally-run backcountry store Excess Backcountry, all students were provided with essential avalanche safety gear, packs, skins and skis. It is imperative that all students are outfitted properly for this course—providing current gear is important for the students' learning and safety.

Over the first three sessions, Dary focused on practical training with transceiver searches, starting with single burials then ramping up the difficulty to multiple burials with surface clues. The students all practiced recovering buried backpacks using different models of transceivers, probes and shovels. Each student led a rescue, and by using the latest technology and techniques for probing and digging they soon became quite efficient at searching and recovering multiple burials. Team search competitions with the boys were a great motivator and kept them engaged in the learning process. Each session was held in a different alpine area so that the students were exposed to varying terrain over the course. This also allowed Dary to incorporate avalanche terrain recognition and phenomenon in these sessions.

The last session was a fun day touring and skiing through simple avalanche terrain. Students had the opportunity to use all the gear they had been practicing with for the past three sessions. Although this was not part of the CRS curriculum, I felt it was a great addition and one supported by the instructor and parents.

Here are some lessons that we learned from holding this modified CRS course:

- Keep instructor to student ratio for this age group at a maximum of 1:6.
- Have all students use the same transceiver for consistency in learning.
- Include parents in the feedback session at the end of the course.
- Instructor must adjust teaching style to suit this age group so that children have fun while they learn. Dary did just that and was a real asset for the students in this role.

The feedback from both the students and parents after the course was very positive. A number of Whistler parents enquired about the course throughout the winter. I would like to offer the CRS course to this age group again in the 2013-14 winter season.

I believe that it is important for children who live and play in mountain towns to learn and properly perform rescue skills prior to heading out into the backcountry. Creating a solid foundation of skill sets at this age and a healthy respect and etiquette for the mountains will definitely benefit them and the backcountry community in the future. As they mature, hopefully they will continue their avalanche education and complete the AST 1 and 2 courses, becoming good ambassadors of the mountains and making good decisions while in the backcountry. By modifying the CRS curriculum to meet the needs of a younger age group, we were able to offer a unique adapted learning experience.

Gwen Milley is co-owner and instructor at the Pacific Alpine Institute, a Whistler Blackcomb Ski Patroller and a CARDA Handler and puppy instructor.

// VINCE SHULEY

Everything You Ever Wanted to **Know About a SPAW**

Mary Clayton

FROM TIME TO TIME, FORECASTERS AT THE CAC DETERMINE THE *RISK* OF AN AVALANCHE ACCIDENT IS ELEVATED AND A SPECIAL PUBLIC AVALANCHE WARNING (SPAW) IS ISSUED.

CAC FORECASTER PENNY GODDARD EXPLAINS A SPAW TO SOME OKANAGAN MEDIA OUTLETS // MARY CLAYTON

AS MOST READERS OF THIS ARTICLE will know, risk is not the same as danger. Risk is a combination of hazard (in this case avalanches), vulnerability, and exposure. Communicating risk, especially to a broad recreational audience over large regions, is an ambitious undertaking. Getting it right is a challenge. Our SPAWs are not intended for professionals and commercial operations. In fact, much of the data we use to assess the need for a special warning comes from these operations. Avalanche professionals, more than anyone, are aware of the problem. However, there is still some confusion and misunderstandings in the professional community about what a SPAW is, when/why it is issued, and what its intent is. This article is intended to help professionals learn about the CAC's SPAWs and let you know how you can help the forecasters determine if a SPAW is called for.

There are two key points to keep in mind with our SPAWs. The first: our target audience is backcountry users who are relatively untrained and unaware, and not regular or knowledgeable users of our forecasts. This is not to say that knowledgeable users get no benefit from a SPAW. For those with experience, a SPAW offers a heads up that we are concerned about something unusual in the snowpack and the details are in the forecast.

The second point is that we are conveying a message that danger ratings alone cannot convey. We know from surveys that unaware and untrained users tend to base their decisions on the danger rating only. Danger ratings are based on very specific parameters as defined in the North American Danger Scale. Certain criteria have to be met before we can assign one of those colours or words to a given area. For instance, a high danger rating requires that natural avalanches are occurring on a fairly widespread basis.

However, as all of us know, there are times in most winters when the danger rating—in isolation—does not accurately reflect the potential for an avalanche. Here's an example:

> *There is a persistent surface hoar layer below treeline. The layer has adjusted to existing conditions and no natural avalanches are running. A recent small storm has improved riding conditions but this minor additional loading has brought that surface hoar layer to the tipping point. Few naturals are running and the danger rating is at considerable. The weather looks good for the coming long weekend.*

When a non-obvious or hidden hazard like this exists, some backcountry users have a much different perception of the problem than the forecasters (and often the professional community). The decision to issue a SPAW in this scenario depends on factors likely to cause vulnerable people to be exposed to the hazard. These additional factors include things like riding conditions. When conditions have been poor and are about to improve, people are more likely to go out and perhaps tackle terrain that is too aggressive for the given conditions. Another factor is timing. It's no coincidence that most SPAWs are issued for weekends or holiday periods, as this is when more people are out in the mountains.

The combination of a significant avalanche problem not accurately communicated by the danger rating, and the increased likelihood of exposure owing to human factors of demand and timing, tip the balance in favour of a SPAW. Not because our forecasts lack the information people need but because we know there are still backcountry users who do not consult the bulletins, who tend to go into the mountains without doing much in the way of planning, preparation, or risk management, and who may not even be aware the CAC exists.

The SPAW process was first developed shortly after the CAC was born back in 2004. Then-Operations Manager John Kelly identified the need to reach out to backcountry users who were not using our website. He and I worked together to develop a strategy to solicit the media coverage that we still use today. By issuing a press release and giving interviews, we are able to broadcast our warning to reach people who may not otherwise have been drawn to read the bulletin.

Every SPAW is in the form of a news release, where we first define the geographical and temporal extent of our warning—where does it apply and for how long. We then define the situation in quotable language. There is no technical jargon, no crystal definitions, just simple messages delivered in a (hopefully) memorable way. The final part of the formula is to provide information that clearly defines ways to decrease risk. From the top to the bottom, we stress that these warnings are for *recreational* backcountry users.

In recent years, the CAC forecasting and communications teams have developed a well-defined set of criteria that need to be taken into account when considering a SPAW. We assess both physical conditions and human components of decision-making when determining whether a SPAW is warranted. Pent-up demand due to previous poor weather or poor riding conditions combined with a good weather forecast; improved riding conditions; danger ratings decreasing; a weekend, long weekend, or holiday period; and tricky conditions (which are not obvious) can combine into "perfect storm" for avalanche accidents and are a classic scenario in which we issue a SPAW.

When considering a SPAW, forecasters consult the professional community to gather information and solicit opinions. They do this by direct calls to local practitioners, via InfoEx, and most recently through the ACMG's Informalex. In this way, the forecasters provide the professional community with a heads up that a SPAW is being considered, discuss the reasoning, suggest the warning's spatial and temporal extent, and ask for feedback.

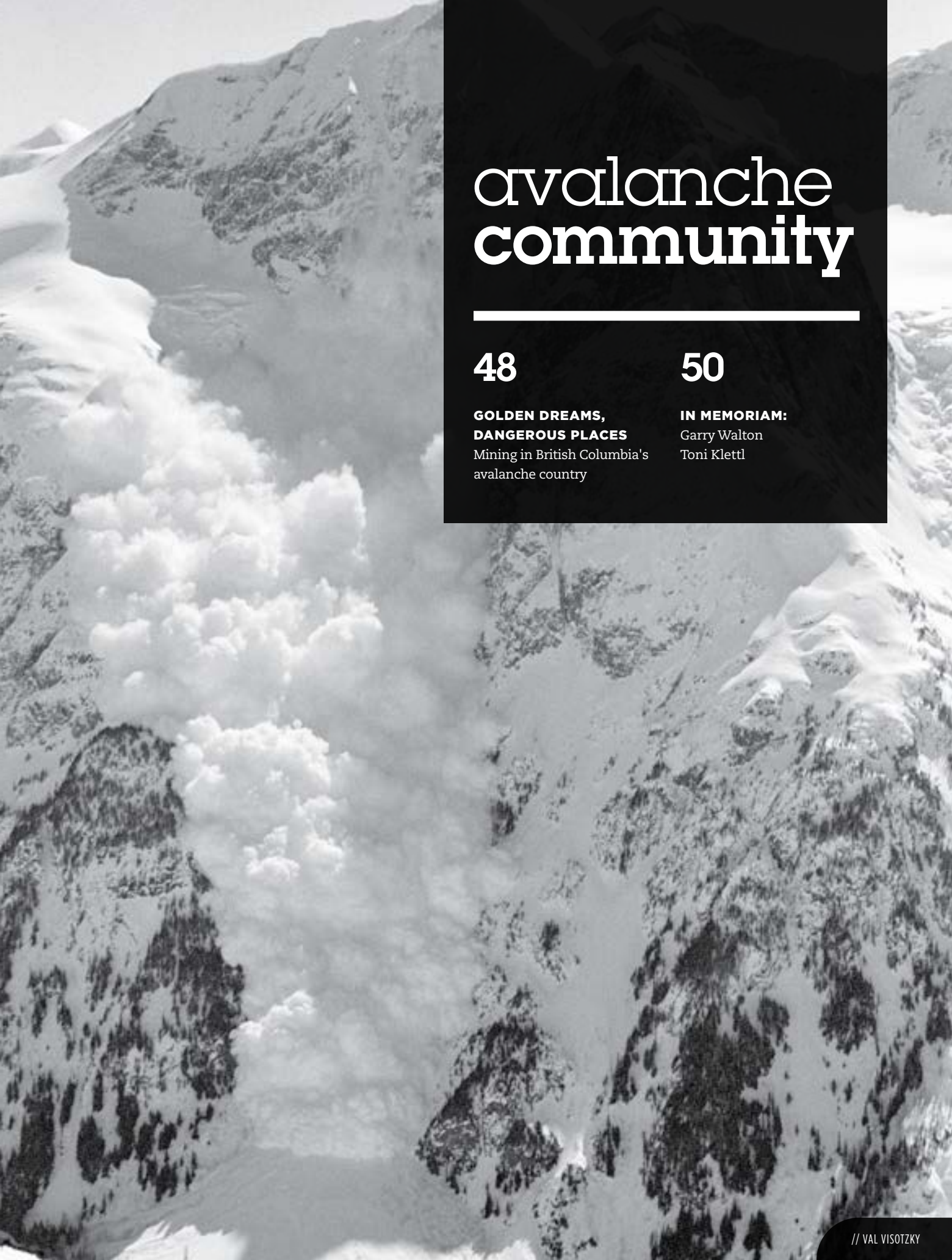
While we have no empirical measure to determine the success of our SPAWs (it is difficult to quantify accidents avoided) we feel we are on the right track based on input from our target audience and their loved ones. Emergency Management BC also believes in the process and supports our efforts. At the end of the day, if we can influence one more backcountry user to pay attention to the bulletin, or maybe even take an AST course, we call that an accomplishment.

SPAW Notes

As an avalanche professional, your input is always welcome. Here are some ways you can help:

- **Familiarize yourself with the criteria for issuing a SPAW. Think about the conditions from the perspective of our target audience—an unaware, untrained user.**
- **Send information to forecaster@avalanche.ca that might help the forecasters develop a better picture of local conditions in your area.**
- **Let the forecasters know what you think about the spatial and temporal extent for the planned SPAW.**
- **Offer your opinion about whether the interests of public safety will be enhanced by a SPAW.**

Please feel free to contact the forecasting office directly if you have questions or concerns. Contact details for the person to talk to is usually included in the heads up message. You can also call the forecasting office at 250-837-6405 and ask to speak to the manager on duty or the senior forecaster working on the SPAW.



avalanche community

// VAL VISOTZKY

CAF 2013-14 Memorial Fund **Grant Recipients**

CORA SHEA MEMORIAL FUND

Sara Orgué is the winner of the inaugural Cora Shea Memorial Fund grant. The Cora Shea Memorial Fund was established last August to honour the young researcher. The award supports the career advancement of women engaged in snow and avalanche science. Thanks to the generosity of many donors, the fund has accumulated over $11,000 in less than a year. One particularly touching letter came from Cora's cousins.

Women of any nationality, who are seeking to do avalanche research and/or study towards advanced avalanche practice, are invited to apply for a grant from the fund to assist them with their work. One grant between $500 and $1000 will be awarded annually. The deadline for applications is May 31. For more information about the fund and how to apply for a grant, follow this link, visit avalanche.ca/caf/programs/cora-shea-memorial-fund.

To donate to the fund, visit avalanche.ca/caf/support/donate and select "Cora Shea Memorial Fund."

CRAIG KELLY MEMORIAL SCHOLARSHIP FUND

Eric Layton was awarded $600 from the Craig Kelly Memorial Scholarship Fund to support his professional development in the CAA Avalanche Operations Level 2. The Craig Kelly Memorial Scholarship Fund was set up in the late snowboarder and aspirant guide's name to grant a maximum of $1000 in bursaries each year to individuals who wish to enroll in the CAA Avalanche Operations Level 2 course.

Colin Garritty and Craig Browne received funding from the Craig Kelly Memorial Fund in the 2012-13 season towards completion of their Level 2 courses. "I am honoured to have successfully completed the CAA Avalanche Operations Level 2 program with the aid of the CAF," says Craig Browne. "I feel the program was a great accomplishment and I look forward to pursuing my avalanche career. I am interested in gaining practical experience with backcountry lodge operations and I feel these goals are now in reach having completed the Level 2 program. I would like to give out a huge thank you to the CAF and Craig Kelly's family and friends for the support I have received from the Craig Kelly Memorial Scholarship."

Snowboarders interested in pursuing their Level 2 can apply for financial help. For more info, visit avalanche.ca/caf/programs/craig-kelly-memorial-scholarship-fund.

CAF SUPPORTS PARTICIPANTS AT ISSW 2014 IN BANFF

The Canadian Avalanche Foundation's ISSW Fund supports the preparation and presentation of applied avalanche research and innovative fieldwork at the International Snow Science Workshops held every two years in Canada or the United States. It is intended to assist aspiring participants, particularly practitioners and others with limited financial resources, to cover part of their expenses such as those associated with paper/poster preparation, travel and accommodation. For more information or to submit your grant application, go to avalanche.ca/caf/programs/grant-applications.

Schedule of Upcoming **Events**

WILDERNESS RISK MANAGEMENT CONFERENCE

September 30 – October 2, 2013
Grand Teton National Park, Wyoming

An outstanding educational experience to help you mitigate the risks inherent in exploring, working, teaching and recreating in wild places.
For more information: nols.edu/wrmc

INTERNATIONAL SNOW SCIENCE WORKSHOP 2013

October 7 – 11, 2013
Grenoble, France

The ISSW promotes exchanges between practitioners, mountain professionals and researchers in the field of snow and avalanches.
For more information: issw2013.com

SARSCENE

October 19 – 21, 2013
Chilliwack, BC

Join BC, Canadian and international search and rescue groups to learn about the latest trends, training and developments in the field of SAR.
For more information:
sarscene.ca/2013/index_e.asp

BANFF MOUNTAIN FESTIVAL

October 26 – November 3, 2013
Banff Centre, Banff, AB

The Banff Mountain Festival brings you the world's best mountain films, books and speakers.
For more information:
banffcentre.ca/mountainfestival/

WORLD EXTREME MEDICINE CONFERENCE AND EXPO

October 28 – 31, 2013
Harvard Medical School, Boston

Four days of knowledge, insight and innovation in the field of remote medicine including pre-hospital medicine, expedition medicine, disaster medicine and other 'extreme' medicine fields.
For more information:
boston.extrememedicineexpo.com/

Golden Dreams, Dangerous Places: Mining in British Columbia's Avalanche Country

John G. Woods, Wildvoices Consulting, Revelstoke
On behalf of *The Land of Thundering Snow Virtual Exhibit Project*

PROSPECTING AND MINE OPERATIONS IN BRITISH COLUMBIA HAVE BROUGHT MANY PEOPLE INTO THE HEART OF CANADA'S AVALANCHE COUNTRY. FOLLOWING THEIR DREAMS, THEY SCOURED THE LANDSCAPE AND PUSHED THE LIMITS OF HUMAN ENDURANCE AND INGENUITY—AND NOT INFREQUENTLY, PAID THE CONSEQUENCE AS SNOWSLIDES DEMOLISHED MINE-SITE BUILDINGS, OBLITERATED TRAILS AND TRAMWAYS, AND FOR SOME, BROUGHT THEIR QUEST TO A TRAGIC END.

LIKE THE PRECIOUS ORE the miners sought, information on avalanches and mining has been hidden from easy access within oral histories, yellowing local newspapers, and massive government documents. However, the computer age is ushering in a new bonanza where digital information is ore rich in stories of people, mines and avalanches. Massive digitization programmes are scanning old documents, deciphering the words, rendering them searchable, and offering new perspectives on the history of avalanches and mining.

For example, this comment appeared in an article published on January 18, 1896 in the *Kootenay Mail* newspaper published in Revelstoke: "Mining in this country in a pioneer camp during this season of the year is a very hazardous occupation, and one of the greatest terrors is the ever present danger of being caught in a snowslide."

As current research reveals new avalanche incidents, especially those involving fatalities, the records are submitted to the Canadian Avalanche Centre database and become part of the permanent record. While mining is not a CAC incident category, it is possible to group those records related to mining. Nationwide, mining-related fatalities now account for about 13% of all known avalanche fatalities—on par with self-propelled backcountry skiing, snowmobiling, railways, and avalanches affecting towns and service centres, and slightly greater than heli and cat skiing and mountaineering categories. These incidents are concentrated in British Columbia and Newfoundland and Labrador (Liverman 2007; CAC database 2013)

Pioneer mining from the 1890s to about 1920 in the Selkirk Mountains in BC's Kootenay district was a rich source of both ore and avalanche tragedy. The Noble Five Mine near Sandon was particularly hard-hit as described in *The Ledge* newspaper published in New Denver on March 15, 1900: "Every spring witnesses the fatal sweep of the snowslide in the Slocan, the most terrible of which is that known as the Noble Five slide. It has a list of several victims, to which was added two more early Thursday morning." For the 'Noble Five,' this tally now includes four fatal incidents from 1895 to 1913 resulting in seven deaths (CAC database; 2013).

Given the extreme locations of some of these mines, it is surprising to learn that the miners attempted to work them year-round. In fact, the early winter may have been a preferred time as it helped them with "raw-hiding" the ore from the mines. The ore was wrapped in leather bags and then dragged down-slope on trails that often crossed avalanche paths.

SNOWSLIDE PETERSON: BACK FROM THE JAWS OF THE WHITE DEATH

At least two oral histories tell the story of 'Snowslide Peterson' seemingly returning from the dead as a snow-encrusted form stumbling through a cabin door. Like much of the history of the pioneer mining days in British Columbia's rugged mountains, Snowslide's story is short on detail. Oral histories agree on the central element. Earlier that day, Snowslide had been swept away by an avalanche in the mining country above Duncan Lake. Unable to find his body and believing him dead, his companions had returned to their cabin for the night when to their astonishment, he re-appeared amongst the living. From that day, Edgar Peterson was known as Snowslide Peterson in British Columbia's West Kootenay's mining country (Orchard 1965; Chapman 1980).

Classifying the historic records can be challenging, as demonstrated by the famous Britannia Mine slide of March 21, 1915 that killed 57 people at this remote site north of Vancouver (Minister of Mines BC 1916): "…The mine was closed for a time in the early months of the year owing to a disastrous snowslide which killed fifty-seven men and carried away part of the tramway system, bunkhouses, and upper works; this accounted for the decreased production…The snow and land slide in March, which wiped out the mine camp, upper tramway terminal, crusher building, machinery…"

However, there is uncertainty over whether this was a snowslide, mudslide or landslide. Evans (2000) maintains that this disaster was caused by a landslide. If that was the case, then why was the incident specifically reported as a snowslide in the Minister of Mines report? As Peter Schaerer (personal communication 2013) observes, this event may have started as a snowslide setting off a subsequent mud and landslide at lower elevations. While not currently in the CAC database (June 2013), the incident could be included as a complex slide event.

Two digital sources are particularly useful in looking for old reports of avalanches in BC's mining country. While the annual provincial mining reports generally do not index avalanche accidents, frequent references to snowslides can be found when they are filtered through word searches (e.g., avalanche, snow, slide). For more colourful and human-interest content, many historic BC newspapers are now online courtesy of the University of British Columbia Library Special Collections.

And so the litany continues throughout the mining records wherever the chance to "strike-it-rich" combined steep terrain with heavy snowfall. Twenty-six men lost in 1965 at the Granduc Mine near Stewart, BC; nine killed at the Molly Gibson Mine above Kokanee Lake December 25, 1902; seven miners who went into the Chilcotin's "Motherlode" mine in the autumn of 1934 never to be seen again alive, their grim tale being told in the scattered remains found the next spring.

SLIDE IN THE VICINITY OF THE NOBLE FIVE MINE IN 1897 NEAR SANDON, BRITISH COLUMBIA (APPROXIMATE LOCATION 49.9889°N 117.2009°W) // GLENBOW ARCHIVES PD-339-25

ACKNOWLEDGEMENTS:

The Canadian Heritage Information Network provided funding to research the history of snow research and avalanche safety in Canada for the development of a virtual exhibit on this topic. The "Land of Thundering Snow" project is administered as a consortium of partners led by the Revelstoke Museum and Archives. The University of British Columbia Library provided online access to historical newspapers. Peter Schaerer suggested examining the BC Minister of Mines Annual Reports and has consistently encouraged research into the history of avalanche safety and science in Canada.

SOURCES:

British Columbia Heritage Newspapers (URL: http://historicalnewspapers.library.ubc.ca/).

British Columbia Minister of Mines Annual Reports (URL: http://www.empr.gov.bc.ca/mining/Geoscience/Publicationscatalogue/annualreports/Pages/default.aspx).

Canadian Avalanche Centre Avalanche Incident Reports (URL: http://www.avalanche.ca/cac/library/incident-report-database/view).

Chapman, P.W. 1980. Ethel Garrett White Lardeau Valley, 1902-19230. Transcript from taped interview in BC Archives T3697:0001.

Evans, S. G. 2000. The 1915 and 1921 disasters at the Britannia Mine complex, Howe Sound, British Columbia; geotechnical implications for intensive resource development in steep mountain watersheds in the Coast Mountains. Conference Proceedings: GeoCanada 2000, Calgary, Alberta May 29-June 2, 2000.

Liverman, D. 2007. *Killer Snow: Avalanches in Newfoundland and Labrador*. Flanker Press, St. John's, NL

Minister of Mines BC. 1916. Annual Report of the Minister of Mines of the Province of British Columbia for the Year Ended 31st December 1915.

Orchard, I. 1965. Mr. and Mrs. Harrison. Taped interview in BC Archives T0346:0001/0002.

Avalanche Accounts
Empire Cabin, March 9, 2013

Madeleine Martin-Preney

"HEY NAT, I'M GOING TO START SKIING; WATCH ME."

THE SLOPE WAS INVITING, glistening snow, with a nice long moderate/steep line out to the bowl's high point where we would regroup. One turn, two turns; I started to relax into the slope, but seconds later noticed large blocks forming around me. I couldn't hear anything; I stared in horror as I tried to ski out right but was met by an ever-extending crown line and thousands of pounds of snow pulling me downslope. Below me was a sizeable larch. I was too entrenched to move to either side of it. *Wham*—I hit the tree full on, darkness enveloped me, and I was under the snow.

Still fully conscious, I was extremely aware of my body as it went completely limp, rag-dolling down what was once my ski line. I hit numerous trees as I was dragged down the slope and remember fleetingly thinking that I was a goner once my head or back smashed into one of those trees.

Wham—I hit something with a lot of force, but this time was pinned against it as the snow flowed past me, shoving itself up my back and underneath my jacket. My head was bowed down slope; as the snow flowed over and past me, I couldn't tell if I was buried or not. Eventually, the snow's pressure diminished, and I could lift my head slightly. I saw blue sky and a branch. A sense of relief washed over me as I realized I was not buried, I was still alive, and I could feel my entire body. Looking down, I could see the slide flowing and slowing down, a sizeable debris pile fanning out onto the flats below. I was caught in between two trees; my torso was partially wrapped around the trunk of another sizeable larch with my legs below me. My skis and backpack had been ripped off without me noticing. I didn't recall letting go of my poles.

I yelled to the group that I was ok. I tried to pull myself up, and while I could stand on my left leg, I looked down and saw that my right lower leg was at an odd angle—much floppier than usual. I tried to deny that anything was wrong, but as I lifted my snow pants, oozing blood told me otherwise. I stopped trying to look at it.

A friend soon skied down to me, and then another. They dug a small platform and laid me down on a Z-rest brought for their dog. They covered me with down clothing, and despite the warm sun, I started to shake as shock set in. We discussed how to get help; we likely needed a heli evacuation. Parts of the bowl and near the cabin had cell reception, so I told them to find my backpack and cellphone. We could hear sleds, and earlier we had seen a Stellar Heli Skiing helicopter. We were by no means stranded, and it was only 10:00 on a bluebird day. We still had a lot of daylight left for a rescue, which helped ease my mind as I fought to stay calm and breathe.

Rachel Reimer: A friend looked at me: "She has no spinal injury but her leg is broken. Help me move her."

I saw blood in the snow, already dripping from her leg through multiple layers of clothing. Open fracture. I stabilized her leg as the three of us lifted her out of the treewell and onto the mat. She was lying level, her right leg rotated inwards above her ski boot. Gently, I cut away the layer next to her skin. Her tibia protruded from a thick gash. About two inches of bone and subcutaneous fatty tissue was visible, as was the thin layer of muscle.

Another first aider made it down to us and I asked him for help. Sunglasses on and eyes disguised, he nodded, but I could tell from the set of his mouth that he was deeply affected.

TELL US YOUR STORY
If you have been involved in an avalanche and want to share your story, email us at: stories@avalanche.ca

// J. REMPLE

She was shivering uncontrollably, wrists cocked and fists clenched, teeth chattering. Mumbling and writhing her head from side to side, she was moaning and trying to communicate with us about the rescue. "What layer did it slide on? We have to report it. Are you calling for help?" Always a leader, she was trying to solve the problem at hand. I told her to focus on her breath, to trust us. "Don't take off my boot, okay?" she said, voice thick with pain. I looked at the bone jutting into the top of her boot liner, and the boot itself with her foot inside lying at an angle. My first thoughts were of circulation. Did she have a pulse below the injury site? Was she in danger of losing her limb? I looked straight into her eyes and said calmly, "Ok. Just breathe. You're going to be fine."

I took bandages from my kit and wrapped her leg, and covered her with all the down jackets and extra layers we could find. I pulled a first aid sheet from my kit and a friend filled in vitals. I couldn't find pulses in either wrist, and could barely feel one at her carotid artery. She was drenched in perspiration, eyes struggling to focus. Skin blazing to the touch. She was in shock in a big way. First vitals were less than ideal, but she was alive. Only a broken leg. A thought from my first aid training crept in: "Shock is a degenerative condition that, unless reversed, can lead to death." A second thought: search and rescue in backcountry can average between five and seven hours.

I checked the bandage. Blood was leaking through it. Dripping. Damn it! Her boot would have to come off. The wound went below her boot liner and without even pressure on every part, she would continue to bleed.

I made eye contact with the other first aider and we bent over her leg. In a barely audible whisper I said to him, "We have to take this off." We both knew it could cause our friend a lot of pain. We came up with a plan. I would reach inside and clamp onto her boot liner and her foot, and he would gently lift the ski touring boot shell off her foot. I leaned close to Madeleine's face. "We have to stop the bleeding, so we need to take your boot off." She grimaced, and whispered, "Okay." Her breathing quickened. My heart nearly broke.

Loosening the buckles brought a rush of blood and an increase in her pain right away. After a few seconds of delicate cooperation, it was finally off, with very little movement of her injured leg. We kept the boot liner on for warmth. I added more layers to the bandage, able to reach fully below and above the wound, applying pressure to the flesh around the bone without aggravating the bone end. Vitals again. No improvement. It had been 30 minutes of severe shock. But now we had the bleeding under control, so all we could do was wait. It would either get worse, or it wouldn't.

After fifteen minutes I took a third set of vitals. Her breathing leveled out considerably, and her wrists and hands relaxed. Still drenched in sweat and burning to the touch, she was no longer shivering as dramatically. Eyes closed, but facial muscles relaxed. It was working. She was coming back.

I have never experienced such helplessness in my own body. After a while, the two that had gone for help returned with

// NATALIE STAFL

news that SAR would be on their way within the hour. We soon heard the drone of the helicopter. They chose to load me internally rather than longline me, and soon a paramedic and a SAR member were at my side with Entonox and a blood pressure cuff while my friends helped to bring up the clamshell and basket stretcher. I was lowered down in three separate 15m belays before they could slide the basket along the snow to the helicopter. I was up in the air on the way to Trail, straining to look out window at Retallack's tenure, and then the Kokanee and Woodbury Glaciers (the Entonox must have been working well). My kind rescuers propped me up with a pillow, and gave me some sunglasses.

That evening at the Kootenay Boundary Regional Hospital, doctors inserted an IM nail in my broken tibia, attaching it with screws, top and bottom. I had a second surgery days later to remove antibiotic beads. I spent a week in Trail. My hemoglobin had plummeted and sometimes sitting upright would make my head spin. It's been a steady road to recovery since then with five months nursing a large open wound, though a leg infection flared up after three and a half months, which put me briefly back in the hospital.

From a rescue perspective, things went very smoothly. My friends were all competent in first aid, critical thinking, problem solving and, of course, backcountry travel. This was crucial and let me remain calm and focus on myself.

Stellar Heli Skiing warned SAR that an avalanche with skier involvement had occurred, and they should expect to get a call soon. They were re-fueling when the call came in. We were fortunate that the event occurred early in the day with spectacular weather for extraction and flying.

How did it happen? The area was new for all of us except me, who had previously skied one day in the area, though not that exact spot. The previous day, we spent the afternoon digging pits on various aspects, observing as much terrain as we could and noticing some smaller natural slides on different aspects. Our pits and compression test results were not particularly alarming, but we were aware of a couple of significant PWLs in certain areas, mostly the mid-February crust/surface hoar combination. Our conclusion was that with careful terrain choice, we would be able to ski fairly safely in most areas. Our group was mixed in terms of experience—some had been skiing together for years; others had just started backcountry skiing this season. All were fit, enthusiastic and positive, and looking forward to five days of skiing.

I was seen as the knowledgeable one, so when we set out as a group I was in the lead. Some of us had discussed where to go, and others were happy to follow behind. We decided to follow along the ridge to ski the slopes across the bowl by

Cabin Peak, reasoning that it would be a great run and would set us up for our next objective of another climb across the valley. We figured that although south facing, it was early enough in the day that solar effect would not be strong enough to destabilize the snow, and because it was a windward slope, perhaps less affected by the surface hoar layers found in other more protected areas.

As I led along the ridge, staying back from the cornices on the north side, I didn't hear or see anything in the snow that made me second guess our decision. I dropped into a small 'safe' area that had barely enough room for all nine of us to de-skin and regroup, but it seemed like the best option at the time. One by one, people sideslipped to where I was, and I directed them to the flattish area around me. I assessed the slope, and it looked great—a nice moderate to steep line on a rib-feature of the larger slope with a small stand of trees farther down that led into the bowl below, and then a high point with a few more trees. I decided that would be our regroup area, as it would be well out of the way of any sluff or avalanche debris if something were to happen. It would also give people a good visual of where to aim for while going down one at a time. The friends close by agreed that it sounded like a good plan. I was ready first, and since I knew where it was I wanted to get to, I suggested that I go ahead. A friend pointed out that there was a small section below the trees where I would be out of visual contact until I skied out into the bowl below. I started skiing, and the rest of the story you know already.

We continually work on terrain assessment, and unfortunately the times you learn the most are often the times when something goes wrong and you must sharply scrutinize choices. In this case, I neglected to think twice about the comment that I would be out of sight after a certain point—this should have been a red flag that I was about to ski an unsupported slope. The trees on the slope gave a false sense of security, and perhaps if we had taken an extra few minutes to look critically at it, we would have decided it was too unsupported to ski or taken a step back to look at some other options.

My hope in sharing this story is that it will open up a space for people to discuss their own incidents as well, and not feel shame in having made a mistake. As an AST instructor, I will now have a very different answer to the inevitable student question, "Have *you* ever been in an avalanche?" I intend to use this (thankfully) lived experience as a way to impress the power of the 'x' factor, and the importance of humility, respect and communication on every recreational backcountry enthusiast I instruct. I am fortunate enough to be able to learn from this experience, and it would be even better if it opens up an opportunity for others to learn as well, in whatever way possible.

Happy trails,
M.

// CAA ARCHIVES

In Memoriam: Garry Walton 1927-2013

Peter Schaerer

WITH THE PASSING AWAY of Garry Walton the Canadian avalanche community has lost a dedicated member, caring friend, educator, supplier of equipment and a leader of social activities.

When Industry Services of the British Columbia Institute of Technology (BCIT) assumed the responsibility of administering professional avalanche courses in 1974, Garry was assigned as co-ordinator. He did not confine himself to organizing the course ventures, preparing course books, mailing brochures and accepting students, but he assisted also in defining the training objectives and conducting seminars for the instructors. His dedication to the avalanche courses was above the expectation of an administrator. He pushed through bureaucratic rules, visited courses on location and relished the contact and friendship with the instructors. Under his leadership, backed by BCIT resources, the Canadian professional avalanche courses and their instructors achieved the high standard that became known widely. The avalanche course instructors of the 1970 and 1980 years will remember Garry's powerful words on how meeting rooms must be organized and how to interact with the students. Memorable also were the social dinners that Garry organized for instructors. Because of his effective leadership qualities, he was asked frequently to chair meetings of the CAA and the Canadian Avalanche Foundation.

In their first years, the professional avalanche courses were a joint venture of the National Research Council of Canada (NRCC) and the BCIT. As a research office of the NRCC I have worked closely with Garry in developing the curriculum and organization of the courses.

In 1985, Garry was laid off when the BCIT was forced to reduce programs. BCIT continued the administration of the avalanche courses but unsatisfactorily. When the CAA complained about the unacceptable performance, BCIT contracted Garry to manage the program in the winter of 1987-88. The successful arrangement lasted only one year before BCIT disengaged itself entirely.

In 1985-88, Garry served on the CAA board as Director of Associate Members. He was one of the most efficient board members, making recommendations for the success of the CAA and carefully checking document drafts. The CAA remained his love and he continued to attend the annual meetings where he enjoyed the contact with the old friends.

After his employment with BCIT had ended, Garry's activity included mechanical drafting and the production and sale of snow observation tools and avalaunchers through his company SEAR. A large avalauncher for application in underground mines was among the equipment he built. Unfortunately, the demand of the mining industry was insufficient for making the invention a financial winner.

Garry Walton was not only an educator and distributor of equipment. His interest extended to the well-being of the members of the CAA. One of his concerns was to send personal get-well messages to injured and sick members.

Garry Walton was a unique person who was loved despite his sometime brusque behaviour. Many who had worked with him and enjoyed his personal contact often asked him for assistance in tasks that needed public relations or solutions of problems. We miss him!

// MIKE BOISSONNEAULT

Memories of **Garry**

John Tweedy

WITH GARRY WALTON'S PASSING, it is fitting to remember him and share our experiences with those less familiar with who Garry was and how he fit into our avalanche family.

Garry was not a mountain person nor a skier, boarder, or sledder, but was still an important member of our community. He supported us in so many different ways, especially as the CAA matured. He was there at the beginning of the CAA and with a few of us before the CAA. He had vision, wit (oh, how his wit and dry humor will be missed!), and a sense of the moment when it came to the CAA's development into a global contributor to avalanche safety.

My sharing is personal. We got to know each other better on a one on one adventure. It all has to do a Blitzkrieg trip to Oakland, California in the mid-1980s.

Garry had decided to throw in with Pete Peters of American Rocket Crafters Ltd. I love that company name! Pete was "Mr. Avalauncher" in North America back in those days. Garry was going to help Pete market his launchers in Canada. Eventually Garry would design, build and market his own avalauncher.

The plan was to drive my brand-spanking-new Plymouth Voyager minivan (with no seats in it) to Oakland to pick up four avalaunchers in pieces. We'd bring them back to Canada where Garry would assemble them and try to sell them for Pete. My wife at the time not very keen to have the family wagon used to "run arms" across the border, but Garry convinced her that it would be a "piece of cake" or a "walk in the park."

Anyone who has ridden with Garry at the wheel will remember how much your knuckles hurt from hanging on to anything you could get your hands around while travelling at "Walton Warp Speed". My knuckles still hurt after all these years. But Garry drove with such passion and instinct that after a few hours I started to relax and enjoy the ride.

Arriving at Pete's walled compound a day and a half out of Osoyoos, we quickly loaded the van for the trip north. Pete was nervous—he lived in the heart of a Black Panther neighborhood and wanted a speedy turnaround. After a quick meal and a few hours of sleep, we launched northwards with our avalauncher booty. We were both blown away by Pete's operation; we couldn't stop laughing when we realized he stored his tail fin assemblies in the dishwasher. I think we both slept on boxes of tail fins that served as a lumpy bed.

We made it through the border at Blaine, Washington with no fuss. An hour later, we dumped the load at his home in Surrey and I made my way back to the Kootenays, wondering if any of that actually happened or was just a vivid dream.

Those 72 hours with Garry were priceless to me, and I reckon to him as well. We talked about anything that came to mind; we laughed until our sides hurt; we contemplated the Universe and came up with no solutions—just more laughter!

Garry made me and many others smile just by walking into a room. You knew something wise, witty or plain loco would come out of his mouth soon enough, but there was always validity in his comments.

He was a good man and a great friend for over 35 years. He touched my life as a positive influence and offered sage advice when I asked for it. I will miss him.

John Hetherington

FROM BCIT AVALANCHE COURSES to SEAR Search and Rescue to his humorous and sardonic comments at the spring CAA meetings, Garry was always a fixture in the avalanche community. His passing marks the end of an era and he will be missed.

In Memoriam: Toni Klettl 1927-2013

Peter Amann and Loni Klettl

// KLETTL FAMILY COLLECTION

It is with sadness that we note the passing of Toni Klettl, one of the true pioneers of the Canadian avalanche industry. Toni spent most of his career working for Parks Canada in Jasper where he was in charge of public safety from 1972-85. He was also a backcountry warden and spent many of his summers living in the warden cabins of Jasper National Park with his wife and four children.

Toni was born in 1927 in Neunkirchen, a beautiful little town in the Austrian Alps near Innsbruck. He scampered around the Alps as a little boy, working hard at various farms that needed work. His own family could not afford to feed him. At seventeen he was called up for the Army and joined the 6th Mountain Division, a commando-style unit that was sent into very tough places to get the job done. He was involved in one of the worst battles on the Eastern Front. Toni received two Iron Cross awards for this bravery in battle.

Toni immigrated to Canada in 1951 and worked in various logging camps throughout northern Ontario and BC. He came to Jasper in 1952 and worked a variety of jobs, one being the powder man on the building of the Trans Mountain Pipeline. He first worked for Parks Canada as a gardener. Toni signed up with the Warden Service in 1955 after receiving his Canadian citizenship. Then the real fun began. In the early days, Toni was responsible for teaching rock schools and climbing skills to the Wardens, before his partner and boss Willi Pfisterer arrived.

Toni worked in Jasper at the old Whistlers Mountain ski hill as a patroller. He spent much of his time skiing at Marmot Basin where local Bill Ruddy started running snow coaches up the mountain to where people then skinned up to the peaks of the Basin. In 1956, Toni was called to Marmot Basin to respond to an avalanche accident where his good friend Charlie Dupres was killed in an area now called "Charlie's Bowl." This sobering event brought the realities of avalanches close to home and Toni was influential in starting the first avalanche program in Jasper National Park.

Toni worked full time at the ski hill each winter starting in 1964, when Marmot Basin Ski Lifts Ltd. received a licence to operate. Parks Canada looked after the ski patrol, avalanche control and maintenance of the ski hill. Toni was involved in introducing the 105mm recoilless rifle and the avalauncher to Marmot in the late 1960s.

He spent much of his time at Marmot, and then in later years focussed on public safety, which included avalanche control work and hazard reduction on the Icefields Parkway. In 1986, Marmot Basin Ski Lifts took over the responsibility of avalanche control, ending a long era of Parks Canada's involvement in the avalanche control at the ski hill.

Toni was kept on as a consultant (to watch us young guys) and I remember him coming to speak with us at the ski hill. Toni was a gentle person, kind and easy to talk to. What he did not say in words he passed on with confident and reassuring body language. He was very good at understanding people and he was a pleasure to talk to.

It was not for another 25 years that I had the chance to speak to him in some detail about his life in Jasper. He became excited, like a child again, as he talked about the early days of Marmot, Parks Canada, the things he had done and, especially, all the people he worked with. I will always remember and appreciate one of his sayings, coming from a man who spent his life working with avalanches. When summarizing all his years working in public safety, he said: "The whole damn thing, you know, that's amazing. When they started out, and finally you figured you are doing something, and after something happens you realize you don't know that much."

A whole new generation of avalanche professionals owe debt to the pioneers of the industry. Toni was a great man who advanced our industry during a time when things were new and there was much less avalanche knowledge. I feel lucky to have met Toni, lived in the same town, and gotten to know his children and family. I appreciate all the knowledge and stories he passed on to those he worked with and touched. He will be truly missed, and will remain an inspiration to all of us who follow.

// DAVE GAUTHIER

GeoHazards6
Looking for Avalanche Research

Dave Gauthier

THE 6TH CANADIAN GEOHAZARDS CONFERENCE (GEOHAZARDS6) is looking for avalanche papers. The conference will be held June 15-18, 2014, at Queen's University in Kingston, ON. Abstracts are due October 30, 2013.

Having spent some time since my days as a full-time avalanche researcher working on landslide and rockfall problems, I can confirm that the state-of-the-art in avalanche practice, science, and engineering has gone mostly unnoticed by the broader geohazards community. I think that in many ways the reverse is also true. But, there is a solution: the best way to close this gap is to bring everyone together next June at Geohazards6, where we will have strong group of presentations and posters on applied research and case studies on avalanches, as well as the other geohazards. To do this, we need more avalanche papers than past years. I encourage you to consider presenting a paper. Submit a short abstract online at geohazards6.ca before the end of October. If you are on the fence or have any questions, please drop me a line anytime at chair@geohazards6.ca. Even if you do not submit a paper, please visit the website for general details about the attending the conference. It will definitely be worth the trip.

We have confirmed keynote lectures on Canada's tsunami vulnerability, the Johnson's Landing landslide, and managing geohazard risks to pipelines. We are also planning a full-day workshop on risk assessment and communication for linear infrastructure like pipelines, railways, highways, etc., where we will gather a group of experts from outside the normal geohazards community and work through some of the big challenges and knowledge gaps in our current practice.

The GeoHazards conferences are the premiere forums in Canada for the sharing and dissemination of scientific and engineering knowledge related to geohazards. Geohazards affect a broad spectrum of public and industrial interests in Canada. In many ways the risks posed by geohazards are increasing as we spend more time in hazardous places, and place more infrastructure there. The need to assess, mitigate, and communicate these risks is likewise becoming more relevant to more Canadians. GeoHazards 6 will include applied research reports and case studies related to a broad range of geohazards, and the risks they pose, with the goal of sharing ideas, approaches, and solutions to similar but unique engineering and scientific problems related to geohazards.

Dave Gauthier is a P.Geo. He studied geology at Lakehead University in Thunder Bay, Ontario, was thrice a ski-bum, did a Ph.D. with ASARC at University of Calgary, and worked for a bit in BC and back in Thunder Bay. He is now doing a post-doc in geological engineering at Queen's University. Dave is also consulting on a variety of different geohazard projects, many with a focus on linear infrastructure like railways, roads, pipelines, etc.

Two Fathers, Two Sons and Mama Bear

Story by Stéphanie Lemieux and photos by Justen Bruns

STATS	
SKIERS	Walter and Justen Bruns, Ian and Thomac Bunbury and Stéphanie Lemieux
DISTANCE	130 km
ELEVATION GAIN	10,000m
DAYS	11
START	Bugaboos
FINISH	Rogers Pass

Last spring, I embarked on an adventure with two fathers and their two teenagers: Walter and Justen Bruns and Ian and Thomas Bunbury. I was invited to join the team (or more accurately, I invited myself) as a practicum to gain more mileage ski touring in complex terrain. The Bugaboos to Rogers Pass ski traverse is a classic 130km trip through the Purcells and Selkirks ranges in BC. It contains its fair share of challenges and rewards (for more information about the traverse, check out the new edition of Chic Scott and Mark Klassen's *Alpine Ski Tours in the Columbia Mountains*). It took us 11 days to complete it.

DAY 1: CONRAD ICEFIELD // **INSET RIGHT** DAY 9: BOOT PACKING UP THE BEAVER OVERLOOK

FROM THE BEGINNING, I knew that signing up for a challenging ski traverse with two 15-year-olds and their fathers—none of whom I had ever met—was a risk in itself. We have a saying in French: "ça passe ou ça casse," which translates to "it passes or it crashes." Years of experience as an adventure tourism teacher for young adults made me confident that I would enjoy the human dynamics. I had the feeling that I would put my hard skills to the test without much interference, and that's how it rolled. Justen and Thomas not only share the same passion for climbing and skiing, but their fathers are both professionals in the avalanche and ski industry—it's in their blood. The teenagers' skills surpassed my expectations. Their maturity, technical skills and most of all, their expedition behavior was A+. Their fathers were truly inspiring role models, having to lead by example through sometimes difficult decision-making situations. I was a spectator of loving father-son relationships, and I was also actively participating in the fellowship and success of our adventure.

The two weeks before our departure date, my friend Sébastien took advantage of a window of good weather and snow stability to do the same traverse. Our group caught the last glimpse of that window for our first four days of the traverse. It was cool to see Sébastian's ski tracks as we traversed the Conrad Glacier under the spring sun. It gave us the illusion that we were not that secluded.

We lost one of our team members on the middle of fourth day. A helicopter flew Ian out after he made the difficult, but sensible, decision to retire from the expedition due to physical problems. It was tough for all of us, especially for his son Thomas, to see the disappointment in Ian's face. At that point, the expedition took a different turn. The weather pattern changed, Sébastien's tracks disappeared and Thomas and I were going to share a tent and stinky boot liner smells. My role in the team also changed. My self-invite now had a real purpose—taking weight off Walter's shoulders as much as I could by participating in the decision making, breaking trail and helping around camp.

Just as Ian left, a couple of moist size 2.5 avalanches buried Sébastian's uphill tracks from the previous week. This was the first time during the trip that the weather and snow conditions narrowed down our route options to a point that I felt squeezed by the terrain. A low pressure system that was going to leave approximately 50cm of snow (and rain below 1,900m) started to show its arrival signs that night. We were still two days away from the Kingsbury Cabin, where we would wait one day for the worst of the storm to go by. We began an exercise in whiteout navigation through complex terrain. This is what I had asked for, and this is what I got: the full deal. Our team's strengths were put to the test—Walter's mountain guide skills shone, and

DAY 5: CAMP AT MALACHITE CREEK

DAY 6: THOMAS ARRIVES AT THE MARK KINGSBURY HUT

DAY 9: SKINNING DOWN THE BEAVER CREEK VALLEY

Thomas and Justen walked up and down each mountain steadily with their heads down. I never heard anything negative come out their mouths; instead, they mumbled silly jokes and songs that made Walter and I laugh about 10% of the time.

We spent a relaxing day off cooking our most fancy meals at the cabin. This was exactly what our bodies and morale needed to face the second half of the traverse. Not surprisingly, Thomas and Justen still had the energy to go for a little ski tour around the hut. After the storm, conditions remained unsettled until the end of the trip. Lack of visibility was the main obstacle, along with the presence of some new overhead hazards and new snow instabilities in the alpine. The new snow and the lack of visibility really slowed us down. In order to respect our trip plan, we had to do more than 12-hour days.

We reached the Glacier Circle Cabin on day 10. We were exhausted from the slog down the névé, and the three laborious rappels down the Deville Headwall. The term laborious might be a little too harsh for Thomas and Justen, who nailed the rappels like pros. But for my 120-pound body, it was literally labor. I clearly remember Justen yelling, "You can do it, Steph!" and, "Keep going, you're almost there!" as I struggled my way down the rope with my expedition backpack with skis on it. Feeling reckless, we probably resembled the desperados from the photo in Chic Scott and Mark Klassen's guidebook. We felt ready to commit illegal acts like getting firewood in the forest to warm up the hut. I cooked up my best, saltiest soup for the boys, accompanied by balsamic and cheese crackers. The idea of not finishing the next day was out of question for Thomas and Justen. They were even willing to get up before 05:00 the next morning, an even more ambitious task when you are 15 years old.

The whiteout conditions stuck around all the way to the end of the Illecillewaet Névé. After winding our way through the foot of the glacier like horses running to the barn, we heard a voice across a creek trying to get our attention. To our surprise,

it was Ian. He had skinned up from the parking lot to welcome us and finish the trip as a team. We had done it!

In the summer heat wave, I have planned a leadership course that I am teaching this fall to my adventure tourism students. You know the disparaging saying: those who can, do; those who can't, teach. The Bugaboos to Rogers Pass traverse is an example of something that I couldn't have done; that is, I couldn't have led the traverse. The level of skill needed to do so was beyond me. But there are many ways to show leadership when you learn the specifics. This was an adventure in which I was the "glue," a made-up leadership style that I particularly fancy. I was the mama bear, responsible for keeping it together, making it enjoyable and safe, and ensuring that the basic survival needs were met. On top of that, I was able to meet my personal learning objectives with the help of Walter's knowledge and experience, Thomas and Justen's fearless attitudes and strong ambition to become guides, and Ian's wisdom in making the hardest decision of the whole trip.

To my new friends who I love,
Mama Bear.

Stéphanie's **Trip Tips**

TIP 1 ·Practice rappelling 30 meters three times with a loaded expedition pack, skis and poles before the trip.

TIP 2 ·It should be mandatory to carry a some wet-naps and a small pit stick when you're a teenager sharing a tent with a woman who is not your mother.

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THE TEAM

The leader: Walter Bruns, mountain guide and former president of Canadian Mountain Holidays Heli-Skiing.

The medicine man: Ian Bunbury, ski patroller and avalanche dog handler at Whistler Blackcomb Ski Resort.

Left: The keener, Justen Bruns, aspiring mountain guide, avid climber and amateur photographer.
Right: The joker, Thomas Bunbury, aspiring mountain guide, avid climber and melomane (French for music lover).

The Mama Bear: Stéphanie Lemieux, avalanche forecaster and adventure tourism teacher.

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