

Avalanche

REVIEW

VOLUME 27, NO. 1 • OCTOBER 2008

www.AmericanAvalancheAssociation.org

2007/08 Season Roundup



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I had a fantasy of drawing one of those spider-web diagrams with Montagne's name in the middle with lines branching outward to each person he significantly influenced in the avalanche field, and then outward again to each person they influenced, and so on. But I realized that the paper would need to be the size of a football field to contain all the names.

—Bruce Tremper
John Montagne In Memoriam, p11

April 7, 2008

Dear Lynne,

Here is a CD of a skier-triggered avalanche that happened up here in Alaska in mid-February on Sunburst Mountain up at Turnagain Pass. We thought you might be interested in including it in a future issue of *The Avalanche Review*.

The sheer size of the slide and the fact that the victim survived without injury is amazing by itself, but we were also able to assemble quite a collection of photos of the avalanche in motion due to the number of people out playing that day who witnessed the slide. Our very own Matt Murphy happened to be up there on Sunburst the day of the accident and was the first person to locate Ian's signal and pinpoint his location. The weather stayed bluebird for a couple days after the slide, so Matt, Nancy Pfieffer, and I were able to go investigate and take some photos. The photo of Nancy holding a probe in front of a 10 ft. high section of the quarter-mile wide crown face is especially humbling.

Thanks for such a great publication!

Lisa Portune
Chugach National Forest Avalanche Information Center



Photos by Lisa Portune, CNFAIC

See **Turnagain Pass** on page 27 for more photos & information about this event.



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The mission of the AAA is:

- A. To provide information about snow and avalanches;
- B. To represent the professional interests of the United States avalanche community;
- C. To contribute toward high standards of professional competence and ethics for persons engaged in avalanche activities;
- D. To exchange technical information and maintain communications among persons engaged in avalanche activities;
- E. To promote and act as a resource base for public awareness programs about avalanche hazards and safety measures;
- F. To promote research and development in avalanche safety.

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Articles, including editorials, appearing in *The Avalanche Review* reflect the individual views of the authors and not the official points of view adopted by AAA or the organizations with which the authors are affiliated unless otherwise stated.

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from the president

The last time I wrote, my theme was about anticipating and managing change. A flurry of changes have taken place. Sadly, we've lost yet another of the great US avalanche pioneers – John Montagne. John was not only a great avalanche professional, researcher, and mentor, but as Karl Birkeland has written, "John was an exemplary human being." We will all miss him.

You'll also read in this issue about the wonderful collaboration that took place over the summer to move, archive, and catalogue Ed LaChapelle's library and records. Once the cataloging is completed, these papers will be accessible in Silverton with special thanks to the Center for Snow and Avalanche Studies and Ed's son, David LaChapelle, a resident of Silverton, CO.

AAA has been busy behind the scenes to create a unified US avalanche presence on the web. Working together with www.avalanche.org and the FS National Avalanche Center, we are updating avalanche.org to provide a simple and clear pathway to avalanche information for both professional and recreational interests. Special thanks go to Chris Lundy for helping to coordinate the project as our new IT committee chair. Phase One should be implemented early this coming winter with additional improvements planned for the near future. We are also developing an e-directory for AAA members, which will ultimately replace the hard-copy directory mailed out each year.

Important, please help us out with updating your information! Check www.avalanche.org and the AAA booth at ISSW, as we will be asking for submission of the most current contact information from all avalanche course

providers and all members. Also check our current home page and calendar for any AAA events or let us know about your regional professional seminars and we'll post the dates, place, links, and contact info.

The Education Committee held a special meeting after last April's Governing Board meeting and is continuing its work on guidelines, AVPRO programs and scholarships, and increasing opportunities for professional continuing education. AIARE's instructor training and professional-development programs provide some excellent models, and we are pleased to have their participation on the Education Committee. Ben Pritchett of AIARE and Ron Matous of AAI have joined the education committee; a special thank you for all their help.

We've had the summer election; even-numbered years mean a vote on section and affiliate member representatives. Special recognition and thanks go to departing Section Reps Fay Johnson and Evan Woods, and a generous welcome goes to the new ones, Scott Savage and Patty Morrison. We also have a new secretary – Mike Bartholow will take over from Andy Gleason while Andy tries to keep up with his youngsters Charlie and Maddie. Andy, thanks for your years of incredible note-taking and valuable insight. Another round of thanks goes to all those who continue to serve the American Avalanche Association and our membership.

As we all ready ourselves for another unique winter and get ready for another incredible ISSW, I hope you can grab a few more glorious autumn days.

—Janet Kellam, Ketchum, Idaho ❄️

from the editor

As I put final touches on TAR 27/1, I am struck by a common thread between the two themes of this issue: National Avalanche Center season summaries and a many-faceted memorial to John Montagne.

For most of the avalanche centers whose summaries appear here (*starting on page 16*), the activism of Friends groups stands out as key to their successes. Their communities value their contributions enough to donate time, money, and energy. The centers keep us thinking, making smart decisions and paying attention in avalanche terrain.

What's notable in reading about the distinctive life of Doc Montagne (*see page 10*) was his ability to build community around him, to make people "bigger than they were." Doc was a mentor who, as Bruce Tremper recalls, inspired those around him to be members of the "fellowship of learning." When we go into the snowy world, the trust between partners, "I got your back," becomes crucial. Part of being in that fellowship entails paying attention, sustaining community and communication, supporting one another in dicey conditions, making real decisions, and being brave enough to examine them afterwards. Because of that camaraderie, I look forward to exploring with my winter partners more than any other season or activity.

I've been able to identify some upcoming TAR themes for this winter. The December issue will include a memorial

to Mike O'Leary, the Homer avalanche forecaster who, sadly, is the newest addition to the AAA's list of avalanche workers killed while working. We'll also have another look at multiple burials, snowmobile statistics, and the impressive terrain of the Snettisham avalanche cycle near Juneau. Looking even further ahead, the February issue will focus on terrain mapping and GIS technology with a liberal sprinkling of new ideas, techniques, and technologies from ISSW, CSAW, and other ongoing investigations.

In other AAA news, the mentorship project is alive and well. We've connected a number of aspirant avalanche workers with advisers in their prospective fields. We have a library of relevant articles to use as references, soon to be posted on the updated AAA and avalanche.org Web sites. The education committee is tackling relevant issues like certified instructor continued education and avalanche school accreditation reviews. Please contact a AAA board member if you'd like to be involved. We need the participation of professionals from all aspects of our snow and avalanche community!

If you have ideas or articles, photos or comments, please don't hesitate to contact me. Submission guidelines are available at www.americanavalancheassociation.com.

I look forward to seeing many of you in Whistler, and look forward even more to sharing a skin track with you.

—Lynne Wolfe, editor ❄️

metamorphosis

Staff Changes at the Gallatin National Forest Avalanche Center

After working with the GNFAAC for 8 years, Scott Schmidt made a career change and left a life in the snow for one involving water. Scott was hired by an offshore company to remotely pilot submarines. Really. Stationed on a ship sailing the high seas, Scott will work six to eight week rotations repairing and laying telecommunication cable on the ocean floor. Needless to say, the pay is slightly better and it's easier on his knees. The downside is that he'll miss out riding our new 1000cc Yamaha Nytros. If he asks nicely I may let him take one for a spin, however he's got a penchant for cartwheeling them so I'll probably need a hefty damage deposit.

Although we're losing a seasoned veteran, we're welcoming his replacement, Mark Staples. Mark is a Big Sky ski patroller, NOLS instructor, and MSU grad student, as well as an avid backcountry skier, budding motorhead, and climber. Last season he worked part-time in place of Ron Johnson who was recovering from knee surgery. Mark was a great addition to the team. This winter, besides forecasting and teaching, Mark will take over Scott's duties of putting up and maintaining the weather stations and managing all the data. Before he left, Scott pulled Mark aside and imparted his secret of employment longevity: make everything you do look extra complicated and confusing so they never fire you. In Scott's case it worked, and we'll miss him.

—Doug Chabot ❄️

From Max Forgensi, UAC Manti-LaSal

My wife and I had our first child, who was born during a low-pressure system on March 31. Tindra Marin is now just over 3-months old.

The avalanche center was put on the back burner as I took some paternity leave during the first part of April.

I have a new job with the Forest Service. It is a permanent full-time position in recreation which allows me to do a bit of everything I like to do with the forest service...fire, avalanche, and trails. I am the rec/campground lead (GS-7). As a result of my new duties, I will be less involved with the avalanche center than I have been in the past, although still an integral part. I hope that we will be flying another position (director) soon.

❄️

NEW CERTIFIED INSTRUCTORS

Ron Johnson
Sarah Carpenter
Larry Heywood
Tim Keating

NEW PROFESSIONAL MEMBERS

Erik Birkholm, South Lake Tahoe, CA
Liam Bailey, Kirkwood, CA
Eeva Latosuo, Anchorage, AK
Doug McCabe, Big Sky, MT
Anne Keller, Mazama, WA
Dylan Taylor, Bellingham, WA
Lisa Portune, Girdwood, AK
Kevin Huggett, Snoqualmie Pass, WA
Don Carpenter, Victor, ID
Glenn Kessler, Mt. Hood Parkdale, OR
Craig Patterson, Park City, UT
Nick Armitage, Big Sky, MT
Mark Saurer, Park City, UT
Solveig Garhart, Olympic Valley, CA
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Jerry Casson, Seattle, WA
Katherine Fitch, Roslyn, WA
Aaron McDonald, Issaquah, WA
Jason Simons-Jones, Crested Butte, CO
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Russell Hunter, Boulder, CO
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Victoria Kerr, Crested Butte, CO
Alan Gordon, Juneau, AK
Amy Knight, Durango, CO
Don Shockey, Menlo Park, CA
Matt Kendziorski, Big Sky, MT
Chris Wilbur, Durango, CO
Ryan Kapes, Big Sky, MT
Richard Browne, Browning, MT
Carlos Bassetti, Prescott, AZ ❄️

mailbag**From Mark Staples of the GNFAC:**

Hi Lynne, This may be of some interest for TAR. I was teaching an avalanche class for the Gallatin NF Avalanche Center to Yamaha for their riders. We were in the mountains outside of Cooke City, MT on May 5 when those guys were there to test and develop some of the 2009 and 2010 machines.

It was an incredible opportunity to teach an avalanche class to these guys. The weather and visibility were amazing! This combined with the mobility of everyone being on hot new sleds made for a unique avalanche class. We taught a quick (1.5 hour) classroom session in the morning then went into the field. We were able to ride all over the place and practice with beacons, practice rescue scenarios, but more importantly we were able to look at, talk about, and cover lots of terrain. We never stayed in one location for more than 20 minutes, and we kept everyone's attention at a high level. Plus some of these guys had tons of local knowledge about wind patterns and recent accidents that made a very interactive class.

I've yet to teach an avalanche class as incredible as this one. Being on May 5, it didn't make much sense to dig any pits, but that's not a big focus for snowmobilers anyway. Our ability to cover such terrain far outweighed being able to see anything interesting in the stratigraphy of the snowpack.

We look forward to teaching more with this group of pro riders. The instructors were myself and Dale Gullet (another instructor for the GNFAC). —Mark Staples ❄️



Mark Staples (blue coat) and Dale Gullet (at left) of GNFAC taught a fast-paced avalanche class to pro riders on prototype machines in May, 2008. photo by Jim Vizanko, Yamaha

A Clarification from Erich Peitzch:

I wanted to submit a correction to my article, *Wet Slabs: What do we really know about them?* from last issue (26:4). I wrote:

"Second, the timing of explosives needs to be very precise within a relatively short window, and that window is difficult to predict. This was exemplified when an inbounds skier was killed by a wet-slab avalanche on a heavily skied slope in the spring of 2005 after a morning of control work."

However, to be more specific, a slope assessment was completed, but no explosive work was completed that morning. I just want to clarify. ❄️



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aaa news —

Mike Bartholow: New AAA Secretary

Howdy! My name is Mike Bartholow. I was nominated by Andy Gleason to replace him as the Secretary of the Governing Board of the American Avalanche Association at the 2008 spring meeting in Sun Valley, Idaho. As secretary, I'll be responsible for – among other things – recording and keeping the minutes of the Governing Board Meetings and Member Meetings and sharing them with you in TAR. As a new voting member of the Board, I have a big responsibility for helping steer the AAA into the future. As you'll read in Andy's summary of the spring meeting, there are a lot of exciting changes on the horizon for the organization. I look forward to the challenges we'll have in the future.

A bit of background about myself: I've been a skier all of my life and a backcountry skier for over 15 years. I've spent most of my time in the Sierra and Cascades, and after 5 years in Juneau, AK, and 2 years in Minturn, CO, have come back to California to the mountains I love best. I've been a member of AAA for about five years and a professional member for two years. I have taken a couple of AAA Level 1 Courses, an AAA Level 2 course, and both phases of the National Avalanche School. Over the years I've



taught avalanche courses, backcountry skills courses, and telemark skiing; worked as a volunteer and professional ski patroller at Eaglecrest Ski Area in Juneau, AK; and spent two seasons as the lead backcountry ranger for the Vail Pass Winter Recreation Area in Colorado. This winter I'll be guiding, teaching avalanche courses, and spending a bunch of time in the backcountry with my 2-year-old son Owen and my wife Kristen.

I should thank Andy and the rest of the Board for their kindness and support. I'm excited for the opportunity to work with such a great group of folks. I'm also very proud to be part of such a great organization and community like the American Avalanche Association. Please feel free to contact me at mikebartholow.a3@gmail.com if you have any questions, suggestions, or concerns for the AAA Governing Board.

—Mike Bartholow ❄️

American Avalanche Association Spring Board Meeting Overview

The American Avalanche Association's semi-annual board meeting took place in Ketchum, ID, this April. The meeting was well attended by 19 members of the governing and executive boards. Janet Kellam and the crew from the Sawtooth National Forest Avalanche Center put on a smooth meeting and social event at Janet's home. Many thanks to Janet for the great hospitality!

Our treasurer, Bill Glude, informed us that we need to increase revenue and cut costs and it was generally agreed that we need to increase our membership. Various ways to increase membership were discussed, including our new online membership renewal. Executive Director Mark Mueller informed us that SWAG will be updated this summer with the goal to have the updated version at ISSW this fall.

A new avalanche.org Web site will be run by Shirley Studebaker with the help of Chris Lundy. They will separate the site into recreational and professional sections in order to be more user friendly for recreational people. It is believed that a more unified presence on the web will help with advertising revenue. The AAA has a new Information Technology (IT) committee, and Chris Lundy was nominated as the chair.

The education committee reported on the successful AVPRO course in Little Cottonwood Canyon, Utah that had to be rescheduled due to a lack of snow in the fall. It was decided to have next year's AVPRO course in SW Montana next year from Jan 24 to Feb 1, 2009. There will be a second course in Breckenridge, CO, from Feb 22 to Mar 1, 2009. Regional continuing education programs were encouraged with the AAA donating about \$1500 for three seminars every other year, on off-ISSW years.

The membership committee admitted 44 new Professional members and 20 member affiliates into AAA this year.

The Search and Rescue committee informed us that the 36 avalanche fatalities in the US for 2007/08 was the highest number in 50 years.

The research committee received no applications for practitioner research grants this year, so the money designated for grants will be used to move the Ed LaChapelle library from McCarthy, AK, to Silverton, CO. After Ed's recent passing, his library will be brought to Silverton, CO, per the wishes of his son David. Betsy Armstrong has offered to organize the library.

It was decided that the AAA e-mail membership list would not be used for commercial purposes, but a committee is considering using the list in other ways.

The AAA is accepting Business Supporters who will have a presence on our Web site with donations.

The AAA earmarked \$1500 for sponsorship for ISSW 2008 Ladies Night to encourage women snow scientists and avalanche professionals.

Membership dues for AAA will be raised \$10. The new rates will be Pro \$50, Member Affiliate \$45, Subscriber \$30 starting on November 1, with an option for current members to renew at the current rate for multiple years. Lifetime membership dues increased to \$1000 from \$800.

The education committee met on the following day with some late spring skiing at Sun Valley courtesy of the Sun Valley ski patrol (thanks for the tickets!). The next AAA board meeting is at ISSW in Whistler, BC, on September 21, with the general meeting scheduled for Wednesday, September 24.

—Andy Gleason, AAA Secretary ❄️

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Senator Beck Study Plot, photo courtesy Center for Snow and Avalanche Studies

BACK BY POPULAR DEMAND: AVPRO AAA Avalanche Professionals Course

Due to increased levels of interest, the AAA will be running two AVPro courses this winter. The first course will be in southwest Montana from January 24 – February 1, 2009. The course will be based out of Bridger Bowl and the surrounding backcountry for half of the course and at Big Sky for the other half of the course. The second course is scheduled for February 21 – March 1, in Breckenridge, CO.

The AVPro is a high-level, comprehensive avalanche course geared for professional avalanche workers. 60% of the course will be conducted in the field with the remaining 40% of the course in the classroom. The course is intensive: eight days long (plus a day off in the middle), each day consisting of nine to 11 hours of instruction.

The AVPro course has been a tremendous success each of the last three years it has been run. It has been taught by some of the top avalanche educators in the country, with guest appearances by leading experts in a variety of avalanche fields. Participants will be exposed to a wide variety of topics, including avalanche-control strategies and techniques, guiding techniques, efficient and accurate snowpack-analysis strategies, and the most current rescue technology and strategies.

In order to participate on this course, one must have taken one of the following: a three-day Level 2 avalanche course, both phases of the National Avalanche School, or the equivalent of in-house training and experience.

For more information on this course, visit www.americanavalancheassociation.org or contact Sarah Carpenter: sarahlovesnow@yahoo.com, 208-787-4235. ❄️

what's new

Brian Lazar: New Executive Director at AIARE

The American Institute for Avalanche Research and Education (AIARE) is pleased to announce that Brian Lazar of Boulder, CO, will be taking over the reins of the executive directorship from Tom Murphy. Brian has been with AIARE since its inception in 1999 and has been on the AIARE Education Committee for the past 6 years.

Brian began his career in the avalanche industry in the early 1990s working as a ski guide and avalanche course instructor for Jean Pavillard at Adventures to the Edge in Crested Butte, CO. He later founded the Boulder-based guide service Alpine World Ascents, where he is co-owner and avalanche program director.

After a decade of guiding, Lazar returned to graduate school where he studied snow and ice mechanics in the Chugach Range of Alaska and worked as a researcher with the Institute of Arctic and Alpine Research. Over the last several years he has been doing consulting work as a snow scientist, glaciologist, and hydrologist for many projects for the ski industry.

"I have been involved with AIARE since its beginnings nearly a decade



ago," Lazar said, "and look back at what this organization has accomplished and how it's grown with a great sense of accomplishment. What a long way we've come since the beginning, when AIARE's founding fathers (and my mentors) Jean Pavillard, Karl Klassen, and Tom Murphy began meeting in Crested Butte basements and living rooms to discuss the development of a consistent approach to avalanche education in the US."

Murphy commented, "Brian represents the next generation in avalanche education. To be turning AIARE over to such a capable, likable, and intelligent individual brings me great joy. Brian has the skills and the experience to take AIARE to the next level."

Murphy will stay on and help out with the transition and will stay involved with outreach programs and the AIARE Web store. ❄️



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Colorado Snow and Avalanche Workshop

The upcoming Colorado Snow and Avalanche Workshop (CSAW) will be held at the National Mining Museum and Mining Hall of Fame in Leadville, CO, on October 8. The Mining Museum has room for 350 participants at the 9th Avenue location on the north side of Leadville.

Eight speakers will offer a variety of interesting historical and technical topics: from avalanche history in the San Juan mountains by long-time snow workers Betsy & Richard Armstrong, to a winter forecast for Colorado by National Weather Service forecasters from the Grand Junction NWS office. Other speakers will include Ethan Greene from the CAIC, David Sly from Orion Explosives, Tom Murphy from AIARE, and Mike Gillispie from NRCS.

Leadville provides a more central location in the state as well as excellent opportunities for a short recreational escape at the lunch break, plus the usual after conference libations that have become a trademark of the event.

Participants are encouraged to pre-register through the CAIC web site, www.avalanche.state.co.us – look for the CSAW link. As an integral part of the event's success, the suggested donation remains at \$20. Anyone having trouble swallowing the cost of larger and more elaborate events will find the CSAW to be a fun, educational, and enjoyable event. Hope to see you there. ❄️

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Mark the Mountain Guide: Avalanche!

Review by Faerthen Felix

I recently read a pair of studies demonstrating a dramatic and continuing downturn in American interest in spending time in the great outdoors. This is profoundly disturbing to those who would protect and sustain natural areas since, as the authors point out:

“...it has been found that environmentally responsible behavior results from direct contact with the environment and that people must be exposed to natural areas as children if they are to care about them as adults. Extended periods spent in natural areas, as well as creating a role model, seem to create the most environmentally responsible behavior and increased involvement in biodiversity conservation.”

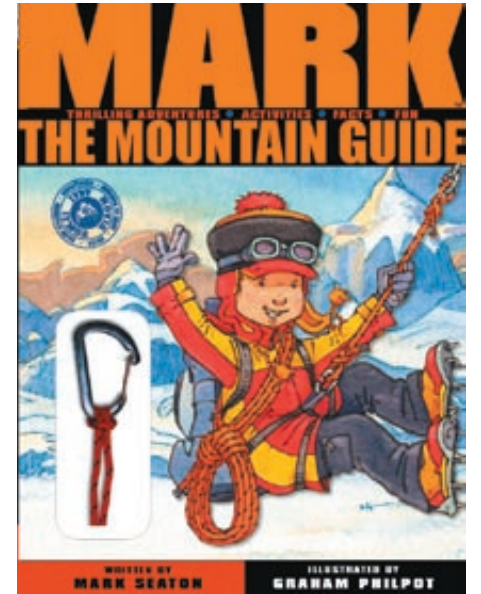
So, how to get children to care about wild places so they don't sell them off as adults? Expose kids to nature as often and in as many exciting ways as possible to displace time spent with electronic media. Here's a little book that can help spark a child's interest in getting out into the mountains: *Mark the Mountain Guide: Avalanche!* from Boxer Books.

The author, Mark Seaton, is a British mountain guide who lives with his wife, three adventurous girls, and their Bernese mountain dog in the iconic Chamonix valley. Mark guides climbers and skiers in the French, Swiss, and Italian Alps. Mark Seaton and David Bennett, a publisher of children's books, conceived the book while they climbed Mont Blanc together. David Bennett was responsible for commissioning the *Where's Waldo?* books which have sold over 40-million copies worldwide.

Graham Philpot, a gifted and prolific children's artist best known as the creator of *Antony Ant*, illustrates the books. The quintessential British mountaineer Sir Chris Bonington provides the book's introduction and the International Federation of Mountain Guides Association offers their seal of approval to the technical section at the end of the book

This, the first book of the series, begins with an avalanche that blocks the path to the Marmot Mountaineering School, requiring Mark and his band of friends to climb out over the Applestrudelhorn to return to the village.

Most of the characters are engaging animals, including Leo the mountain dog and three little marmot mountaineers. The book's illustrations are delightfully evocative watercolors of mountain scenes and climbers, full of the detail that kids love to explore. They include a map and an introductory overview of all the places visited in the story. My personal favorite is a two-page spread of stars and a glowing igloo perched above a moonlit fairytale landscape of steep ice, rock, and snow.



At the end of the story, an instructional section explains more about some of the phenomena encountered along the way, including child-friendly explanations of what causes an avalanche, how mountains are formed, and why stars are so bright at altitude. A glossary defines mountain-related words from the story, including terms like avalanche, crampon, gorge, glacier, and mountaineer.

This section also includes practical information to get kids started on their mountaineering careers, like how to build an igloo, what a mountaineer wears and carries in his pack, and how to tie a couple of useful knots. To facilitate this particular skill, the book includes a toy carabiner and a length of accessory cord. Due to this potential choking hazard, the book is not recommended for children under the age of three.

Finally, children's books that promote mountain culture! I'm sending copies of this wonderful book to all the little kids I know...if only out of self-interest.

REFERENCES

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- Mark Seaton, www.markthemountainguide.com, www.markseaton.com
- Graham Philpot, [www.boxerbooks.co.uk/people.php?range=&people_name=Graham Philpot](http://www.boxerbooks.co.uk/people.php?range=&people_name=Graham+Philpot)
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- Sir Chris Bonington, www.bonington.com
- The International Federation of Mountain Guides Associations, www.ifmga.info

Faerthen Felix is a former avalanche forecaster and editor of The Avalanche Review who currently manages a 9,000-acre Sierra Nevada mountain watershed for research and education under the University of California, Berkeley. Having done many ski-mountaineering routes in the Alps, the author eagerly anticipates the day that the normal route on the Applestrudelhorn comes into ski-able condition. ❄️

Ortovox S1 Transceiver Upbox

A new, updated S1 transceiver is now available from Ortovox with enhanced features, and last season's unit can be easily updated to the latest specifications. With this accessory and a computer, the S1 can be kept up to date with the latest software enhancements. Upbox also allows users to print a report of the transceiver's activity. Upbox is a small electronic sleeve that slides over the top of any open S1 and includes a USB cord and software update CD. The software is compatible with all Windows and Macintosh operating systems.

S1 Upbox will be available only to professionals and select retailers. See the S1 Upbox demonstrated at ISSW. ❄️



National Park Avalanche-Control Decisions

by Don Bachman

Two very different decisions on avalanche-control proposals in National Parks in Montana and Wyoming were documented and released this July.

Glacier National Park

The first of these is a Preferred Alternative (B) published (June 2008) in the Final Environmental Impact Statement (FEIS) by Glacier National Park (GNP) for Avalanche Hazard Reduction by the Burlington Northern Santa Fe Railroad (BNSF). The BNSF mainline corridor right of way passes under 14 avalanche paths in a six-mile stretch of Stevens Canyon with starting zones within Glacier National Park. These paths have a vertical fall distance ranging from 900–3,200' and affect about 22,000 linear feet (4.2 mi) of the double-tracked corridor that passes between the Flathead National Forest and GNP. Of this distance, 4,820' of the impacted area is protected by avalanche sheds. Rail traffic exceeds 50 trains per day, with virtually all train dimensions greater than one mile in length.

Avalanche impacts to the corridor are not annual, though significant cycles have historically occurred with blockage, property damage, and several early 20th century fatalities. More precise avalanche observations and train-delay records since 1978 indicated that seven avalanche cycles have disrupted train traffic and average of about 40 hours for each cycle event. There were no avalanche events reaching the corridor in the 2007/08.

The railroad proposal made in early 2005 was to develop a forecasting program that would guide the use of explosive mitigation from deliver systems including 105mm howitzer, helicopter bombing, and possibly blaster boxes and other alternative methods. Two sheds would be extended a total of 250'.

The preferred alternative displayed in the Draft Environmental Impact Statement (DEIS) prohibited the use of explosives except in the case of life-threatening emergencies and recommended approximately one mile of total avalanche-shed construction that would manage the risk situation. The approximate cost of \$100,000,000 was unacceptable to BNSF, and they withdrew their proposal. However, the EIS process was continued and the Record of Decision (ROD), which documents the selected alternative, has gone to the desk of the Intermountain (NPS) Regional Director for signature.

As a result of this process, BNSF gained an increased awareness of the avalanche problem. They directed their consultant to write and implement an avalanche-forecast program that has also increased awareness through personnel training and safety procedures over the past two winters. Daily observations and evaluations have met with acceptance and response through operational compensation when elevated avalanche potential is forecast.

Yellowstone National Park

A very different transportation corridor issue was analyzed by Yellowstone National Park (YNP). Sylvan Pass lies seven miles west of the East Entrance Gate at an elevation of 8,555' adjacent to slopes containing 19 south aspect avalanche paths which cross the roadway with a vertical fall distance range of about 350–900'. Frequency of natural events are within the one- to five-year return period, though records are scant until very recently. The road has open to over snow vehicles during a c. 90-day season, though management by closure results in a reduction in the actual season. Active avalanche mitigation has been the policy since about 1973. Early efforts were with a 75mm recoilless rifle. In 1997 a 105mm howitzer was positioned on the gun mount in the fall and retrieved in the early summer. During the 2005/06 season a helicopter-bombing program was initiated with contract workers to complement the artillery efforts.

Records for the past 13 years show a high of 4387 visitors in 2000/01, to a low of 493 visitors in 2007/08. The visitor per day (vpd) range based on a nominal 80-day open corridor is a high of 55vpd down to the most recent season at 6vpd. Last year the cost of avalanche mitigation on this corridor was \$227,196 with personnel and helicopter expense having the greatest fiscal impact. An additional grooming expense of \$71,610 was incurred on the 19 miles of corridor tying in to the main system of YNP groomed OSV trails.

The analysis and decision-making process for Sylvan Pass has been ongoing for at least the past five years of YNP Winter Use Analysis. Part of that analysis was an Operational Risk Management Analysis (ORMA) which is chronicled in TAR 26/3 (February 2008). The DEIS process identified an alternative which would close the pass to motorized winter access, however the preferred alternative was for a hybrid alternative which would keep the pass open under a "full forecasting program" of management by closure, which would not include active mitigation measures.

The final EIS for the park-wide winter-use management decision, issued near the end of 2007, provided for an amended Sylvan Pass resolution pending mediation sessions with Wyoming public officials. The mediation participants, known as the Sylvan Pass Study Group, met during the winter and recommended in June, 2008 that beginning in the 2008/09 season, the Sylvan Pass corridor "...be open for motorized and non-motorized oversnow travel for a limited core season from December 22 through March 1 (68 days) each winter subject to weather, safety, equipment and fiscal constraints." The group went on to say that "...management of the avalanche risk cannot guarantee the pass will be open every day of the winter season." The schedule will be accomplished though

active avalanche mitigation measures including use of the howitzer and helicopter bombing. The Amended Record of Decision (ROD) reflecting these recommendations was signed and issued on July 16, 2008.

The decision also specified a limit of 30 Best Available Technology (BAT) snowmobiles and two snowcoaches be allowed through the East Entrance per day. Total park-wide OSV daily entrance is limited to 540 BAT snowmobiles and 83 snowcoaches over the 164-mile groomed road system.

Safety constraints identified in Office of Safety and Health Administration (OSHA) Findings and ORMA recommendations include remoteness, access to gun mount through avalanche terrain, and exposed firing position. YNP has determined that initial enhanced operations costs will be \$3,465,750, including access protection, concrete bunker and warming hut, rescue/recovery team vehicle, unexploded ordnance recovery, and other one-time costs. The annual Enhanced Operations cost increase will be \$157,410 over the ongoing 2007/08 level. This places the future annual cost at \$456,216 for the 68 day winter operating season. According to the ROD, full implementation of the OSHA/ORMA evaluations is subject to available funding and additional compliance. The ROD goes on to say that "...full implementation of these techniques is subject to available funding and additional compliance," and further states that "...operational procedures will be continually reviewed and updates to ensure that day-to-day management meets all safety criteria."

The ROD will be challenged by the National Parks and Conservation Association.

AAA Professional Member Participation

Glacier National Park EIS Process

Stan Bones, Avalanche Expert – Interagency Team;
US Forest Service Process
Blase Reardon, USGS Science Technician – EIS Review / Consultation (Historic records)
Doug Abromeit – Director, USFS National Avalanche Center – EIS Review / Consultation
Don Bachman – Volunteer in Parks / Avalanche Specialist – EIS Review / Consultation
Dave Hamre – BNSF Consultant / Avalanche Specialist
Ted Steiner – BNSF Avalanche Safety Director (Forecasting & BNSF training / education)

Yellowstone National Park EIS (Sylvan Pass) Process

Bob Comey, PE – Consultant; Sylvan Pass Hazard and Mitigation Report and ORMA Panel
Karl Birkeland – USFS National Avalanche Center – ORMA Panel
Don Bachman – Volunteer in Parks / Avalanche Specialist – ORMA Panel ❄️

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Send us corrections, including your name, mailing address, work phone, home or cell phone, e-mail, and current employment or work title. You can update your info the following ways:

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We'll send out news about the new e-directory sometime this winter. Thanks!!!

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Canadian Avalanche Association News

Story by Mary Clayton

A wise person once said: "Change isn't necessary; survival isn't mandatory." Leaving the comfort zone is never easy but when the environment is shifting, it's wise to heed the signs. Major changes are coming at the operating environment of avalanche workers in Western Canada, and the Canadian Avalanche Association has been working with other stakeholders to ensure our industry doesn't just survive, but thrives.

Government regulations are at the heart of this change. WorkSafe BC (WSBC) is a provincial government body with the authority to impose regulatory changes on any industry in the province. In November 2006, WSBC proposed a new regulation specifying that a "qualified registered professional" must assess all avalanche-prone workplaces in BC. The implications were staggering for avalanche workers across the spectrum of our industry. A qualified registered professional means someone such as a professional forester or an engineer; a person with significant formal training in their field but potentially no experience with avalanches or snow safety.

Clearly, change was upon us. Societal expectations for worker and public safety have increased, and regulatory bodies such as the WSBC are demanding accountability. In Canada, just as in the US, anyone can call themselves an avalanche forecaster or an avalanche planner. We have no mechanism to differentiate someone with 30 years experience from a newly minted Level 2 graduate. And, in today's working environment, that's no longer good enough.

In preparation for public hearings on the proposed regulations, the CAA board of directors and members had intensive discussions, yielding four key strategies:

1. The CAA supports development of a well-crafted WSBC regulation that will be truly effective in improving the safety of workers in BC.
2. As the CAA membership and board represents the full scope of avalanche-related activities in Canada, the CAA should serve our membership and the avalanche community by brokering positions with WSBC that are supported by all key stakeholder organizations.
3. At the request of the members, the CAA board of directors will develop recommended qualifications and "scope of practice" guidance for active avalanche safety program planners, forecasters, technicians and entry-level avalanche workers.
4. The CAA agrees there is an important role for qualified registered professionals in avalanche protection programs, and that the CAA should work with the relevant professional associations to jointly develop role statements and scope of practice guidance for our respective memberships.

After much consultation and input from numerous organizations, a submission to the public hearings in the spring of 2007 was crafted. When CAA Executive Director Clair Israelson delivered the paper, the chairperson noted that a revision to the proposed regulation would likely be required. She asked if the CAA could help develop stakeholder consensus. Clair's response was, "That is what the CAA does."

In September 2007, we received word that the WSBC had withdrawn the original regulation proposal. We were successful on two fronts: we had blocked a poorly crafted regulation, and we had convinced WSBC that avalanche professionals are essential

to assessing avalanche terrain. And though regulations are still in our future, we now had the opportunity to work together to get it right.

In October, 29 senior CAA members from all sectors of the avalanche community gathered in Revelstoke to begin work on drafting a list of qualifications defining different levels of avalanche workers. The first draft from this "Senators Workshop" has since been reviewed and fine-tuned by stakeholders across the spectrum, to reflect the diverse needs of the entire industry. The final documents, entitled the Recommended Qualifications for Avalanche Workers, were ratified by the members at our AGM in May 2008 and delivered to WSBC in June.

Developing these recommended qualifications is just the first step. We don't believe a trade or technical certification for avalanche workers are viable options, nor is becoming a registered professional. But we do see the CAA moving forward in creating more formalized credentials for our members with increasingly transparent mechanisms. Currently, our board of directors is drafting a Code of Conduct, which will enable members to demonstrate a voluntary, personal commitment to delivering avalanche safety programs of the highest quality possible.

CAA President Steve Blake wrote, "I'm proud that our membership has been proactive, anticipating rising societal expectations for avalanche safety, and has responded by tasking the board to propose additional structures that will assist our members to publicly demonstrate their capacity for excellence in the important public safety work that they do." In our ever-changing regulatory and societal environment, the CAA will continue to serve society by offering programs, services and materials that enable others to deliver world-class avalanche-safety products.

Mary Clayton is communications director for the Canadian Avalanche Association. ❄️

Avalanche Control Blasting Seminar

The Washington Avalanche Control Council is putting on an Avalanche Control Blasting Seminar on October 25-26. Held in Darrington, WA, the cost is \$75 per day. A series of lectures and discussions will be held October 25 from 10am - 6pm. October 26 will include classroom time and helicopter ground training, followed by helicopter time (target shooting). The helicopter blasting session will apply as one mission toward a Washington State Aerial Blasting License. All proceeds will go toward expenses and an educational scholarship.

For more information contact Jon Andrews, jandrews@stevenspass.com ❄️

AIARE Education Forum at ISSW 2008

The American Institute for Avalanche Research and Education (AIARE) will host an educators' forum on Sunday, September 21, beginning at 2pm and ending at 5pm. The meeting will take place in the Wedgemount Auditorium located in the Telus Conference Centre at the base of Whistler. Speakers will include Dale Atkins, Colin Zacharias, and Margaret Wheeler. The topics discussed will have an avalanche-education focus. This event takes place the day before the official start of the ISSW and ends in time for the evening reception, also located in the Telus Conference Centre. There is no charge; seating is limited. ❄️

Start Planning Now for ISSW 2009 & 2010

Planning for the first European ISSW is well underway in Switzerland. This special "off year" Workshop will be held in the Congress Center in Davos, September 27 - October 2, 2009. The organizing committee has launched their Web site located at www.issw.ch with preliminary information.

ISSW 2010 has been scheduled for Squaw Valley in California. It will be held at the Resort at Squaw Creek, October 17-22, 2010. Russ Johnson is spearheading the organizing committee so far with some help from AAA. Many of the committee chairs have been selected and the Web site is hoped to be up by ISSW 2008. ❄️

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Driving Doctor Ed

Story & photos by Ron Matous



Clockwise from top left:
 Halfway from the pavement to McCarthy – only thirty miles to go!
 Ed and Meg's "backyard" – the Root Glacier
 The library doubles as a rain- and bear-proof kitchen (Ruth Valsing, co-pilot)
 The LaChapelle/Hunt residence in McCarthy

We were camped just about at treeline

opposite the Columbia Icefield in Banff National Park. Ruth and I had slept in the same exact spot 30 years earlier, and it was clear that the spirit of Ed LaChapelle, which was with us, was not going to be happy there. The glacier had lost several hundred feet in thickness in those 30 years, and Ed's long career in glaciology and snow science was losing its subject matter right before our eyes. Meanwhile, we leaned back against that career, all carefully packed in boxes in a U-Haul truck on a 3,300-mile drive, and watched the approaching snowstorm. At least by morning, late June or not, there would be a few new flakes on these mountains.

Though my acquaintance with Ed LaChapelle was more of a passing one than that of my many mentors who had actually worked with him, we did have a conversation at the Telluride ISSW on a subject that neither of us thought very highly of: the roof design of the new visitor center in Grand Teton National Park. In his last e-mail to me Ed suggested that I pick up his comments from the superintendent's office and that we discuss it further when he got back to his house in McCarthy, Alaska, where his notes on the subject were.

As readers of *The Avalanche Review* will know, Ed never made it back to McCarthy. His death in Colorado the following February left his partner of 25 years, Meg Hunt, not only bereaved but in possession of 2,000 pounds of notes, books, papers, and photos – a lifetime of work – at the end of a 60-mile gravel road in Wrangell-St. Elias National Park. More than a year later a plan was being hatched by Meg, Ed's son David, Don Bachman, and others to somehow collect all of Ed's contributions to glaciology and the avalanche world in a permanent archive in Silverton, CO, where David still lives. The biggest hitch was the remoteness of McCarthy and the roughness of that road, which despite some recent improvements still supported tire-repair shops at either end, but no post office.

Meg's boxing, labeling, and cataloging of all that material took many weeks and was undoubtedly the hardest stint of work in this volunteer effort. Smelling an opportunity very much dependent on a tight schedule, I got together with Rod Newcomb and calculated the cost of one-way tickets to Anchorage and a one-way U-Haul to Don Bachman's house in Bozeman. It seemed like the best option for moving this much weight. The question, and it would remain one, was whether the smallest U-Haul available could handle the McCarthy road. When we arrived, we would know the answer.

The McCarthy road is not included among Alaska's state highways, which stay in the single digits on the map. It is also off U-Haul's map, so that section (a 120-mile round trip) was driven very slowly. We called to warn Meg that we could not pick up the truck before lunch on the next day. The paved miles past the Matanuska glacier were only the beginning; it then took us four hours to drive the 60 miles from Chitna to McCarthy in an empty 10-foot truck whose springs threatened to offer our kidneys for sale. Meg's generosity extended to having us call her

whenever we got to McCarthy so she could ride her bike to unlock the bridge. It was always light, of course, so at least we were able to see three grizzly bears crossing the road in the miles before our midnight arrival. Our total roadside bear count by the Montana border would amount to five grizzlies and 14 black bears.

We did spend one spare day in McCarthy visiting Ed and Meg's backyard glacier, the Root, and looking at the icefall which feeds it, the Stairway. Meg was leaving for a family reunion the next day, and we would start out on what turned out to be ten 10-hour days of driving. Road construction season was in full swing.

Bachman had suggested driving home via the one-lane Cassiar highway, which had recently been mostly paved, rather than the standard Al-Can highway. Our miscalculations also showed it to be slightly shorter. Only later did he tell us that he had never actually made it to McCarthy, or down the Cassiar road, so I have to suspect that we were exploring by proxy. Potholes and frost heaves kept us to our 30mph average. At least there wasn't any traffic. It turned out later that this was another one of U-Haul's blacklisted roads, and it wasn't just because of the mosquitoes. We did stop to see the memorial to Al Evenchick and Al Munro, who had been killed while doing control work in 1999. The terrain, from an avalanche standpoint, was terrifying.

Camping alongside a 10-foot truck turns out to be a pretty pleasant way to go. Our technique consisted of pulling up near a tent site with the truck facing slightly uphill and into the wind, so that the frequent rains would run off harmlessly while we cranked up the stove and leaned back against the load. Closed, of course, it was as bear proof as could be. On only one night did we opt to stay in the old brothel in Stewart, BC, instead of a tent, since the mosquitoes would have been fatal. Stewart shares a miniscule border with Hyder, Alaska: perhaps 12 miles of

paved road. Nonetheless, our appearance with a U-Haul prompted the Canadian customs agent (there was no American one) to ask, "What's this all about?" Perhaps he thought we were escaping something. I had, of course, been telling questioning passersby the whole way along that it was full of guns, drugs, and money.

When we finally did make it to Don's garage in Bozeman, Karl Birkeland showed up to help us unload with the words, "Well, here's one old guy with a bad back." "Good," I said, "that's number three." But we managed.

And since then, in short order, Don has managed to coordinate the shipping of those 70 boxes on to Silverton, where their contents will be available to all snow researchers in perpetuity. The glaciers may be going, but Ed's work will be with us a while longer.



Silverton, at last

Ron Matous originally went to the Tetons to play in 1971 and returned in 1977 to finish out his life there. It's an ongoing project. This was his fifth trip to Alaska, but the first time he had to drive. Guiding, writing, and avalanche control and classes have counted among his many occupations; you don't want to hear about the others. ❄️



Left: John and Phoebe Montagne in the 1990s

Below: John and Phoebe in 1941. Doc and Phoebe were married in 1942, and celebrated 65 years of marriage in December 2007. They had two sons: Cliff was born in 1947, and Matt was born in 1950.

Both photos courtesy Montagne collection



This summer the avalanche community lost another of its giants. Pioneering avalanche educator and snow scientist Dr John Montagne passed away on June 15, 2008, after a short illness. He was 88 years old.

John grew up in White Plains, New York.

He received his first wood lathe when he was 13, and this began a lifelong love of turning wood, as evidenced by the many bowls and other beautiful works of art he created throughout his life. He studied geology at Dartmouth College and was a member of its famous Outing Club and president of the student body. During a geology field camp in Wyoming's Snowy Range, he met and fell in love with his future wife, Phoebe. Later, John and Phoebe married and honeymooned by skiing into a cabin in the Snowy Mountains.

When John's Dartmouth class was graduated six months early to accommodate WWII enlistment, John entered the 10th Mountain Division. He and Phoebe moved to Camp Hale where they shared a cabin with Charles and Maymie Bradley. Charles would later found the famous snow-studies program at MSU. The 10th trained in Colorado and on Mt Rainier. Eventually, John was sent to Italy, where the 10th battled their way through the Italian Alps in a number of famous battles, including Riva Ridge on Mt Belvedere, which blocked the Po River valley. John was awarded a Bronze Star. After the war ended, the 10th stayed in Europe for a while and John taught climbing to other soldiers in Austria. Back in the US, the troops from the 10th spread out all over the West and became pioneers in most things related to mountains, including snow and avalanche research, avalanche-control techniques, and ski-area development. John landed in Jackson Hole, Wyoming. The Tetons were a natural place for John and Phoebe since Phoebe was from Laramie.

In Jackson Hole, John surveyed the lift line at Snow King, taught high school science, and helped coach the ski team. He then became a ranger and naturalist for Grand Teton National Park and was among the park's first Climbing Rangers in 1947. After a couple years, John accepted an offer to work at Crater Lake National Park. However, in a move that shows John's character and his priorities, when his boss said he could not build a small fence around his yard to keep his young son Cliff from running into the road, he quit and left after only a couple days.

He moved back to Dartmouth, and was an admissions officer for one year before enrolling in graduate school at the University of Wyoming in Laramie. Completing his M.S. and PhD in geology by 1952, he took a job at Colorado School of Mines in 1953 and taught there until 1957. John then left for Montana State University where a geology department was just being formed.

Leaving a good job at an established institution was not easy, but a big draw was that his old Camp Hale roommate, Charles Bradley, was among the organizers of the department. Another was Bozeman's quality of life, which was more rural and close to Yellowstone National Park, Jackson Hole, more mountains, and snow.

Soon after John arrived, he became the head of the volunteer ski patrol at Bridger Bowl. This and his past experience all led to avalanche work. He saw a way he could solve practical problems with science, and he began the journey of merging theory and practice. John noticed the importance of cornices in triggering avalanches in the Bridgers and did research on cornices and cornice mitigation, including the use of jet-roofs. He became interested in snow metamorphism

and crystal photography. John loved to teach in the field. He developed the first university-level course in snow and avalanches in the US in 1963. The course included a half-day field trip every week and consistently had a long waiting list. This is one of John's proudest achievements.

By the early 1980s, there had been some North American snow-science meetings in Canada and Colorado. But the first to use the title, International Snow Science Workshop (ISSW) and trumpet the theme, *A Merging of Theory and Practice* was held in Bozeman in 1982. John chaired this meeting and was instrumental in the goal of bringing together scientists and practitioners. However, in his usual humble fashion, John would tell people that it was not really him that led to the success of the meeting, but rather his many able students and colleagues. Helping to launch the ISSW movement was another of John's proudest accomplishments, and in subsequent years he often marveled at the amazing success and growth of the meeting and its published proceedings.

John unselfishly gave to the avalanche community in many other ways as well. He served the American Avalanche Association in several capacities, including education chair, awards committee chair, treasurer, and from 1990 to 1994, president. He carved the wooden bowls used for the AAA's Bernie Kingery Award. He also served as ISSW secretary for 18 years, was a member of the organizing committee for ISSW 2000, and was in charge of International Protocol for that meeting.

In 1995 John was awarded the AAA's Honorary Membership, the organization's highest award and one that is bestowed on persons who have distinguished themselves by special achievement in the field of snow avalanches. The organizing committee for the 2000 ISSW had the honor of recognizing John's many contributions at the meeting's banquet.

Finally, John gave the avalanche community his students, who have gone out and filled the many corners of the avalanche business.

I first remember meeting John in 1987 at a National Avalanche School. His enthusiasm was infectious, and he encouraged me to come to Bozeman for graduate school even though he had recently retired. The following year I started at Montana State University, working with John as well as his colleagues in the Earth Sciences and Engineering Departments. To me, as important as John's accomplishments was the example he set for those around him. John was an amazingly nice person, in addition to being an avalanche pioneer. In the 20 years I knew John, I had the good fortune of many opportunities for long talks as we drove to an ISSW or met socially with our families. In all that time I don't think I ever heard him say a bad word about anyone. He carried himself with dignity and he treated everyone around him with the utmost kindness and respect. He was humble, and he delighted in sharing his accomplishments with those around him. He remained an active participant in the snow-avalanche community right up to the end, attending ISSWs and local snow seminars alike and sharing his knowledge and insight. We can only hope to be a bit more like John in our own lives. We'll sure miss him. —Karl Birkeland

John de la Montagne, John of the mountains. John Montagne. Always a mountaineer, a field man, a mentor, and a friend.

“The best things can’t be told.
The second best are misunderstood.
The third best are what we talk about.”

—Heinrich Zimmer

Those of us who were lucky enough to know Dr John Montagne can at least remember the things that can’t be told. But since he is no longer here, we have no choice but to do the second best: to read and misunderstand his writing, and the third best: to write about him and tell the stories, which is only a finger pointing at the moon and not the moon. But the moon is gone.

My own story of John Montagne began in 1964, when I was 10-years old. My father was a lifelong skier, a ski racer for the University of Montana and later a volunteer ski patroller. As such, he drove from our hometown of Missoula to Bozeman for a several-day avalanche course taught by the already-famous Dr John Montagne. When my father returned home, all he could talk about were avalanches and how avalanches work and how they formed and how to control them and on and on, until we were sick of hearing about it (Thus, I know how my wife feels.). My father tried to teach me about avalanches. I remembered most of it, but I also remember not being a particularly good student. And in these conversations, the name John Montagne came up over and over until I felt like I knew him. It was obvious that my father was mightily impressed with this fellow John Montagne.

After a ski racing career of my own, just “free skiing” – as we would call it – seemed so painfully dull in comparison, so my friends and I began venturing into the backcountry, ski touring on skinny wooden skis and leather boots that resembled tennis shoes. We went winter camping and mountaineering, always creeping into progressively more dangerous avalanche terrain. In this ignorance-is-bliss stage, my father kept warning me, “If you’re going into the backcountry, you really need to go to Bozeman and take an avalanche course from John Montagne.” So I did. I moved to Bozeman so I could go to graduate school in geology and study avalanches under one of my father’s old heroes.

Luckily, I landed a job right away on the Bridger Bowl ski patrol where I quickly learned about avalanches from the seasoned professionals and from countless mornings trudging along the ridge with a pack full of explosives. Then, a year later (there was always a very long waiting list requiring students to sign up at least a year in advance), I took the quarter-long course from Montagne, and my life has never been the same. Thus, the influence of a great man works its magical way through many fingers into the world.

Those were heady times, back in the late 1970s and early ‘80s, when a gang of graduate students all hung out together studying avalanches at Montana State University. The group consisted of Ed Adams, Rand Decker, Ron and Fay Johnson, Jim Woodmencey, Doug Richmond, Jimmy Dent, Ted Lang, Bob Brown, Randy Elliot, Duain Bowles, Rene Lang, myself, and several other more casual attendees, most of whom went on to become leaders in their respective fields in avalanche science. I should also mention other notables that came before and after us, including Bill Hotchkiss, Peter Lev, Onno Weirenga, Jim Kanzler, Dave Hamre, Jeff Freer, Bill St Lawrence, Karl Birkeland, Doug Chabot, Scott Schmidt, Doug Coombs, and Jim Conway, among others.

Under Montagne’s tutelage, we met every Wednesday evening to discuss various avalanche research problems on which we worked or discuss the latest paper published from Switzerland. We even began to write a how-to avalanche book for the general public, and although we all lost our gumption quickly in the face of the enormity of the project, I continued to putter around on it for the next 15 years until it eventually became *Staying Alive in Avalanche Terrain*.



At least 200 people attended John Montagne's memorial service in Bozeman, Montana.
Photo by Bruce Tremper

The second edition is due out this fall.

Montagne would often invite us up to his Hodgeman Canyon house – at the foot of the Gallatin Range – for dinner and apple cider (John and Phoebe never drank alcohol), and we would prompt him for stories. Our group, under Montagne’s direction, also organized the first International Snow Science Workshop in 1982, which became the model for all the future ISSWs, including the theme *A Merging of Theory and Practice*. You could say we were all Montagne groupies.

Although we were on a first-name basis with most of the other professors in the department, we all called him “Doc,” because it would be a travesty to call a man of such monumental stature and dignity anything less than “Doctor” Montagne. And as is often the case with great mentors, it was John Montagne, the man, who influenced me much more than the science he taught. The words most often used to describe him include: honest, dignified, humble, open-minded, hardworking, inspirational, intelligent. And with a rigid sense of fair play. But what made him such a great man was that he possessed all those qualities in at least an order of magnitude more abundant than anyone else I have ever met. The mark of a great mentor and teacher is one that inspires by example, and I spent the rest of my life trying to live up to standards of his character – mostly falling short – but striving nonetheless. Which, looking back on it, significantly changed the trajectory of my life. In fact, besides my parents, Doc probably influenced the course of my life and my character more than any other person. His ghost has always sat over my shoulder where I consult him regularly – where he will continue to sit for the rest of my life.

I remember when he took his graduate geomorphology class to the Tetons for a weekend field trip. We brought our tents and sleeping bags and camped on a beautiful piece of land he had bought many years earlier – an inholding in the park covered with aspens, in the shadow of the Teton Range. He said, “I would never build something on this land. It would be a travesty to ruin a beautiful spot like this. It’s enough to just know it’s here.”

We built a campfire, and as everyone gathered around after dinner, Ron Johnson and I continued to pepper him with questions about the old days when he hired and trained the original crew of climbing rangers for Grand Teton National Park, which included such notables as Paul Petzoldt and Glenn Exum, who went on to found NOLS and Exum Guides, respectively. He told stories of early rescues on the mountain, stories of what Jackson Hole valley used to be like in the old days, and even his fond memories of training the troops as a captain in the 10th Mountain Division during World War II on the Glockner Glacier in Austria, where they would yodel at night to get into the spirit of the place. I can still see everyone’s faces transfixed by those tales around the dancing campfire.

Montagne taught people *how* to think, not *what* to think. We were members of the “fellowship of learning,”

as he put it. He had an intense sense of fairness and open mindedness – to a fault, some would say. I remember on that same field trip to the Tetons, he posed a question to the students: how a certain geomorphic feature could have been formed. One student (no, not me) offered up a particularly lame-brained answer. The rest of us could hardly stifle our snickers, but Montagne answered slowly and patiently, “Well, yes, it COULD have happened that way. Yes, it’s possible.” And after a long, thoughtful pause, “Not likely, but possible.” That was as close as I ever heard him come to berating someone for a dumb idea.

The kind of students who memorize their way to a 4.0 average in college used to hate his classes. Since I was never one of those kinds of students – I liked to generously think of myself as a big-picture guy – I loved his classes. I remember the final exam for a graduate geomorphology class; he only asked several open-ended essay questions, such as, “From the geomorphologic thinkers you have studied this quarter, which one matches your philosophy of geomorphology and why?” Yes, I thought, finally a question I could get my hooks into. After the test, I ran into the most notorious of the memorize-your-way-to-an-A students stamping down the hall, complaining loudly, “He never discussed any of that in class. None of it was in our reading. How am I supposed to know the answer to THOSE questions?”

His memorial service in Bozeman was attended by at least 200 people, by my estimate, all of them teary-eyed. We should all be so lucky. And although he was a significant influence to countless avalanche students, there were even more in the fields of geology, environmental studies, wood workers, Teton rescue rangers, and 10th Mountain Division soldiers, and they were all represented at the service. Before I drove to Bozeman for the service, I had a fantasy of drawing one of those spider-web diagrams with Montagne’s name in the middle with lines branching outward to each person he significantly influenced in the avalanche field, then outward again to each person they influenced, and so on. But I realized quickly that the diagram would require a piece of paper too large to carry. After the service, I realized that the paper would need to be the size of a football field to contain all the names. In this way, one great person affected the lives of thousands.

Besides occasionally letting a swear word slip in his presence, my most embarrassing moment with Montagne occurred at the International Snow Science Workshop in Bigfork, Montana. Montagne was the featured speaker at the banquet. Bill Hotchkiss was supposed to introduce him, but he couldn’t attend at the last minute, so for some reason, they asked me. It was a Gettysburg Address kind of moment, as my introduction was perhaps twice as long as his speech. Always humble, always succinct, never one to toot his own horn, I should have seen it coming.

Speaking of which, I have already gone on too long, which “Doc” would not approve. —Bruce Tremper

From: avalpro@theglobal.net
 Subject: TAR submission
 Date: July 27, 2008
 To: lwolfe.avalanchereview@gmail.com

Hi Lynne,

I've attached two submissions.

The John Montagne tribute is perhaps a little short – certainly not the comprehensive history of John's mentorship which would be fitting for TAR. My association with John was more as a friend with common interest than as a beneficiary of his avalanche knowledge, thus this reflection. For instance on our drive to the ISSW '96, I received a college multi-credit-equivalent crash course in roadside geology from Bozeman to Banff in one long day (!), complete with a prepared tutorial to which John referred.

Don Bachman

Dr John Montagne: A Man of the Mountains

Dr John Montagne's very name expressed who he was, what he would become, and what he would teach us: a man of the mountains.

Though John was a structural geologist and hewed his academic career out of mountain-building orogeny, a process on geologic time scale, he became fascinated by the rapid development and event-driven wonder of avalanches.

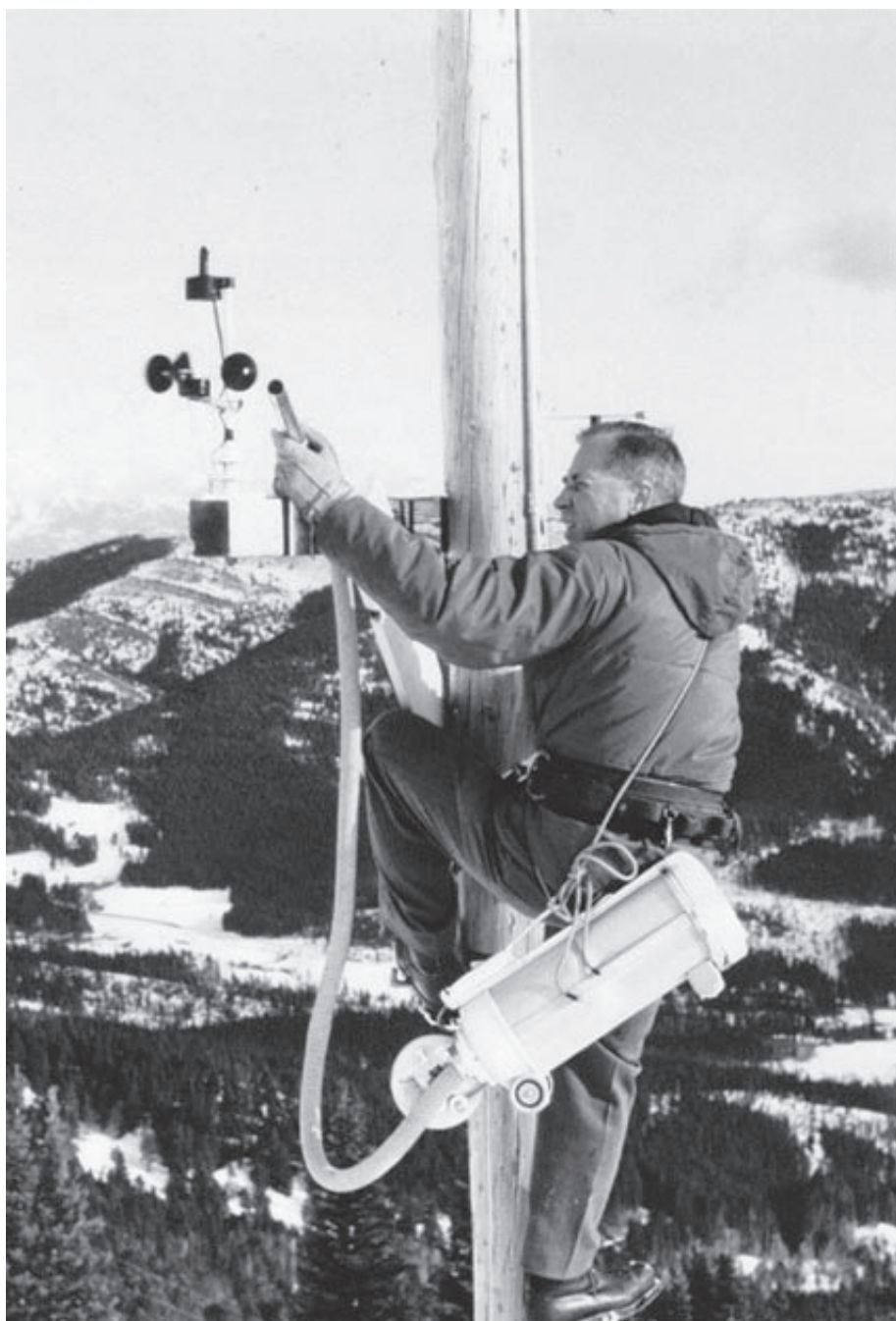
John's influence on snow and avalanche workers reached far beyond the program he and Dr Charles Bradley sustained at MSU. Dr Montagne and the Montana State University snow-study group organized a 1982 meeting of snow people in Bozeman that emphasized the importance of knowledge exchange between practitioners (ski patrollers, especially) and researchers from agencies and universities – his academic colleagues. He felt there was much to learn from those who were actually doing operational avalanche-safety work. The ISSW organizing team, in an ad-hoc meeting at the Hofbrau bar, took Doc's observation to heart and coined the theme: *A Merging of Theory and Practice*. Doctor Montagne's dedication of that principle emerged, and subsequent biannual International Snow Science Workshops (ISSWs) have grown in stature and attendance in the US and Canada.

In 2000, the ISSW again found leadership from MSU and convened at Big Sky with over 600 participants. John was proudly honored by the attendees and recognized as a leader in the merging of theory and practice. Dr Montagne was also an incorporating member of the American Avalanche Association in 1986 and served as its president from 1990 – 1994. He remained an active honorary member until his passing.

This man of the mountains was more than the sum of his academic accomplishments. The birthright of his name was a place of beauty, solitude, and refuge for man and beast. John and others recognized this concept and realized that human stewardship was a calling to be answered. John Montagne was a founding member of the Montana Wilderness Association in 1958 and the Greater Yellowstone Coalition in 1983. He was also instrumental in the preservation of the south arms of Yellowstone Lake as a place of quiet solitude to be explored only by canoe on the lake, with motor boats excluded, to complement the horse or foot travel on the shore.

John's influence in these fields of interest, research, and commitment will forever remain in his legacy of wilderness preservation and shared knowledge of snow and the phenomenon of avalanches.

—Don Bachman



One of John's early snow science projects with an anemometer in the Bridger Range in the mid-1960s.

Courtesy Montagne collection

A Passion for Learning

John Montagne and I taught together in the Earth Sciences Department from 1976 to 1982. John was one of my mentors. His excitement for snow was contagious.

When the department decided to continue to offer the Snow Dynamics course after John's retirement, he helped me acquire a love of snow and tutored me regarding his teaching philosophy. While concepts have changed, the structure of the course and the teaching methodologies remain his.

While I could go on about John and snow and teaching, there is another side of John's professional life that I would like to share. When he came to Montana State University in 1957, he was hired as a geologist. Over the years he taught mineralogy, petrology, economic geology, field geology, geomorphology (graduate and undergraduate), glacial geology, structural geology, quaternary environments (a graduate class), and introductory geology, as well as his beloved snow dynamics. He loved his students. Those students might be geologists on a field trip, students in one of his university classes, a graduate student he mentored, or lay people on a Museum of the Rockies field trip or a group from the Rotary Club (John was state president of the Rotary Club). John was always out to help interested people learn about geology, especially in the field. He continued to lead geologic field trips in southwest Montana nearly until his death.

John supervised 19 graduate students. Seventeen of these theses had titles like, *The environmental geology of the southeast margin of the Gallatin Valley, Gallatin County Montana*, or *Geologic setting and geomorphic analysis of Quaternary*

fault scarps along the Deep Creek Fault, upper Yellowstone Valley, South-central Montana, or Cenozoic geomorphic history relating to Lewis and Clark Caverns, Montana. Consistent with his love of field work, he published field guides for the Geological Society of America, American Association of Petroleum Geologists, the Wyoming Geological Association, and the Rocky Mountain Geological Association. He wrote about the geologic history of the Saratoga Valley in Colorado as well as the Yellowstone (Paradise) Valley, the Madison Valley, and the Big Sky areas in Montana. His geologic research focus was commonly about the geologic history or glacial history of a place he loved to study. He and his students often wrote about the interaction of people and their natural environment. But as many know, he was above all a teacher. I am sure he would say that his legacy is his students who went on to work for the US Geological Survey, the US Forest Service, North Dakota Geological Survey, Montana Bureau of Mines and Geology, petroleum companies, environmental consulting firms, and the Gallatin Avalanche Center.

My memories of John will always be related to teaching and learning in the field. In 1981 he started teaching me about snow. We stood in snow pits looking at depth hoar as he asked questions that forced me to see new things for the first time. He seized a teaching opportunity and took the snow-dynamics class down a cirque face to look at a crown line that had released the day before. One day he came to my office with an armored-tank antenna, excited about how much better it worked than conduit as an avalanche probe. He was always looking for new ways to collect data, assess the avalanche hazard, and make an informed decision or help with search and rescue when things went bad.

John always freely gave his time to others. On a field trip he organized to the Pine Creek moraine, he spoke passionately about student learning and guided discovery. One year he volunteered his time to help the field geology class see the stratigraphic section on Storm Castle Mountain. During his orientation he took me aside and said, "You walk too fast. Walk slowly and steadily. You will get to the top of the mountain only a few minutes later. When you get there, you will not be out of breath, and you will have thought more about what you saw." He was right. He was transferring knowledge he learned in the 10th Mountain Division.

John de la Montagne, John of the mountains. John Montagne. Always a mountaineer, a field man, and mentor and friend.

—Steve Custer, Associate Professor of Geology
 Head, Earth Sciences, Montana State University, Bozeman, MT

“Just Finish the Damn Thing”



Ron and Fay Johnson spoke at the memorial service.
Photo by Bruce Tremper

I met Dr John Montagne in autumn of 1979. I was beginning graduate school in the Earth Science Department at Montana State University, and he became my teacher and advisor. After 3.5 years taking courses in geology, engineering, and snow accumulation and dynamics; two summers of field work on the Cathedral Glacier near Atlin, British Columbia; numerous powder days at Bridger Bowl; and many ice-climbing excursions in Hyalite Canyon; my thesis was just about finished. I stopped by Dr Montagne's office to discuss concerns I had about interpreting crevasse patterns on the Cathedral Glacier. He listened to my problems and then told me to “just finish the damn thing.” Dr Montagne was a humble and polite individual and I had never heard him cuss, so “just finish the damn thing” certainly caught my attention, and within 2 months I was the proud recipient of a Master of Science degree. I realize now that “just finish the damn thing” was his way of telling me that I had become too comfortable in an

academic environment, and I needed to get out and pursue other endeavors. Thanks Doc.

Dr. Montagne was my mentor. He exerted a subtle and constant influence on my life. His popular course in snow accumulation and dynamics was one reason Fay Shultz decided to transfer to Montana State University. She and I met outside of Dr Montagne's office in Traphagen Hall. Twenty-six years ago, he and his wife Phoebe honored us by attending our wedding in Santa Fe, New Mexico. Dr Montagne is the primary reason Fay Johnson is my wife and the ski patrol director at Bridger Bowl. Thanks Doc.

After Dr Montagne was discharged from the 10th Mountain Division at the conclusion of World War II, he accepted an offer to become a ranger naturalist at Grand Teton National Park. An increase in mountain-climbing activity meant more folks were getting hurt in the hills, and the chief ranger asked Dr Montagne to gather a cadre of mountain climbers and train them to safely and efficiently perform search and rescue operations. In the summer of 1992, I moved from Denali National Park to Grand Teton National Park, where I continue to work during the summer as a climbing ranger. While the tools and techniques we use differ from those utilized 60 years ago by Dr Montagne and his colleagues, the purpose remains the same: to develop the skills required to move well in the mountains so we can safely and efficiently help those in peril. We also respectfully and without judgment deliver those who die in the mountains to their loved ones in the valley. Dr

Montagne instilled in me the principle that search and rescue operations require a thorough understanding of the mountain environment in addition to technical skills. So far, that principle has allowed my fellow climbing rangers and me to safely return to our loved ones after every rescue operation. Thanks Doc.

Dr Montagne was intrigued with the physical properties of snow and made a point during most of his lectures that the snowpack often contained the solid, liquid, and gaseous forms of water, thus making it a unique and dynamic material. He was an excellent observer of nature. His observations led to several theories about snow metamorphism, cornice development, and snow creep and glide. An interest in skiing and climbing fueled his desire to educate fellow outdoor enthusiasts about avalanche hazard, traveling in avalanche terrain, and rescue techniques. Under Dr Montagne's tutelage, I developed a keen interest in snow and avalanches. After working as a ski patroller for several years at Bridger Bowl, in 1991 I took a job at the Gallatin National Forest Avalanche Center where I continue the complex and interesting task of trying to understand snow, avalanches, and the minds of those who pursue their powerful passion for perfect powder. Thanks Doc.

Dr Montagne was an excellent teacher, meaningful mentor, and close friend. Because he told me to “finish the damn thing,” I have a wonderful wife, two of the best jobs in the world, and the desire to continue to live, work, and play in the mountains. I'll miss skiing with Doc. I'll miss hearing his stories. I'll miss hearing his deep voice and his loud chuckle. I'll miss eating oatmeal raisin cookies with him. However, his influence on my life means he is with me everyday. Thanks Doc.

—Ron Johnson, avalanche specialist,
Gallatin National Forest Avalanche Center



After a week of wintry weather, June 14, 2008, dawned clear. Mountain temperatures during the day reached 60° F and numerous large wet-snow avalanches released at Bridger Bowl. Shortly after midnight on June 15, 2008, Dr John Montagne peacefully passed away. Professionally, I have a good idea why the avalanche cycle occurred on June 14. However, I also have an image in my mind of Dr Montagne skiing along the ridge at Bridger Bowl, kicking cornices and ski cutting, just so he could see the snow slide one more time.
Photo and caption by Ron Johnson

End of an Era

With the passing of John Montagne, an era of avalanche education and research is over. Gone is the first generation of snow scientists and practitioners in this country: Monty Atwater, Dick Stillman, Norm Wilson, Ed LaChapelle, and now John. These gentlemen taught us a lot. John was living in Jackson before my time, but his name was still associated with skiing. I first met John when he was visiting Jackson in 1966 or '67, shortly after Jackson Hole Mountain Resort began operating. At the old high school, he showed his super-8 film showing the development of the cornice along the ridge at Bridger. Needless to say, as a budding snow worker, I was impressed. His time-lapse photography with lights over a 24-hour period was truly remarkable for its time.

Prior to 1982, the Canadians shouldered the workload and carried the ball on avalanche workshops and seminars for researchers and practitioners in North America. The closing remark from Peter Schaerer at the 1980 Whistler workshop was, “And now it is the responsibility of the US to organize the next workshop.” Fortunately, John and his graduate students picked up the ball. Ed Adams and his peers at Montana State University can tell the rest of that story, of how John and his grad students put together the present format of the International Snow Science Workshop, *A Merging of Theory and Practice*. The ISSW has turned out to be the largest gathering of snow and avalanche workers throughout the world. John's legacy as the founder of the current format of ISSW will live on for decades.

—Rod Newcomb



John in front of Gross Glockner (highest peak in Austria) 1945.
Courtesy Montagne collection



Above: Mementos from Doc's life displayed at his memorial service.
Photo by Bruce Tremper

Right: John and Phoebe Montagne with friends Mary Goodrich and Bob Pitman near the family cabin in the Snowy Range, 1942. Mary was a childhood friend of Phoebe's and Bob was a Dartmouth classmate of John's. Courtesy Montagne collection

Memories of John Montagne

Dr John Montagne probably had more to do with blazing my life's trail than any other single person. "Doc," as we called him, was a mentor to many people, especially to those of us who went through the Montana State University Earth Sciences Department back in the 1970s and 1980s.

There were a number of us during that time who developed a lifelong passion for avalanches after taking Doc's Snow Dynamics and Accumulation course. That was the University's description for what amounted to a 9-week avalanche class.

There is a long list of present-day avalanche professionals who cut their teeth in Doc's "Snow Class" over the years. In the class with me in 1980 were the likes of Bruce Tremper, Ron and Fay Johnson, and the late Doug Coombs, to name a few.

Doc was special, both in the classroom and out. He was not like most professors, some of whose classes you just dreaded attending. Doc's classes you looked forward to, because Doc had more to teach you than science alone. He taught you how to observe nature. Doc was first and foremost a field man, and his lab was Bridger Bowl in the winter.

During his lectures in the classroom, Doc would often pause to reflect upon a point he had just made and then sometimes forget where he was. Lost in thought recalling, perhaps, a time spent in the mountains on one of his research projects. Or maybe he was just gazing out the window and thinking about powder skiing through Bradley Meadow. Daydreaming during his own lecture!

With a shy and boyish grin, accompanied by that hearty lumberjack's chuckle of his – and always a bit red-faced – he'd snap back to reality and ask the class, somewhat sheepishly, "What was I talking about?"

Doc always put you at ease, never intimidated, and always seemed genuinely interested in what you were thinking, what you were doing, and how your life was going.

There was a small group of us during that era, from both the Earth Sciences and Engineering Departments, who were eager to learn more about snow. So Doc formed a snow-study group to discuss problems related to snow and to promote more research on avalanches. Which usually promoted more time skiing! This group, with Doc as the impetus, went on to organize and host the first International Snow Science

Workshop in 1982, with the motto, *A Merging of Theory and Practice*. And I haven't missed one since.

There were also a few of us during that time who Doc seemed to take under his wing, those who had a true passion for the mountains. A kindred spirit, if you will. Those whose hearts and minds were in the mountains, Doc quietly encouraged us to pursue those passions. Even after I graduated from MSU, Doc Montagne continued to influence my life, and I know that I would never have been able to make it here in Jackson Hole without his assistance early on.

The Jackson Hole Connection

In the spring of 1982 – when I was getting ready to graduate with my degree in meteorology – I only knew one thing, that I didn't want to go to work for the National Weather Service and be stuck at a desk job the rest of my life. So I accepted a seasonal ranger job with the Park Service in Grand Teton National Park. Only problem was, the Park didn't have any government housing to offer me. When I told Doc of my summer job and housing dilemma, he said, "Oh, I used to work in the Tetons as a ranger when I first got out of the Army." As humble a man as he was, I never knew that Doc was one of the original Jenny Lake Rescue Rangers in the Tetons in the late 1940s and early '50s. The very same job I would have for the next 14 summers.

Doc said he still knew some people down there and would make a few calls about a place to live. Within a week, Doc pulled me aside in Traphagen Hall and told me he knew a woman in Moose, Wyoming, who had a house near Park Headquarters. And that she was willing to let me stay in her guest cabin for as long as I needed to that summer. Rent free! When I arrived in Moose, I discovered that I was staying with Mardie Murie, famous conservationist. When I look back on that experience now, I am truly honored to have had that opportunity. Thanks, Doc.

Naturally, it was easy to fall in love with the Tetons, as Doc had done almost 35 years before. Unknowingly, at the time, I was about to adopt a philosophy Doc had lived his life by – that is, "place" and "happiness" were more important than your position or job advancement.

I managed to work part-time in the Park that first winter, and we moved into a real nice trailer for a



year before we were able to get into a summer cabin at Lupine Meadows with the rest of the Jenny Lake rescue crew. When summer ended, I found myself in need of housing for the winter in the town of Jackson. Which has always been a rather imposing and expensive proposition. Once again, it was Doc to my rescue. During a visit that summer I mentioned my newest housing dilemma, and he said, "I know some folks in Jackson who only stay at their house in the summer... I'll give them a call." Sure enough, that fall we moved into Dr. J.D. Love's house in town. Dr. Love was a famous geology professor from the University of Wyoming who basically wrote the book on the formation of the Tetons. I found out later that this house we were renting in the winter months was also the house that Doc and his wife Phoebe built when they lived in Jackson many years before. Which they in turn sold to the Loves when they left Jackson.

I went on to work a winter at the Alaska Avalanche Forecast Center with Bruce Tremper. Upon returning to Jackson, I began a 20-year career as a heli-ski guide and weather/avalanche forecaster for High Mountain Heli-Skiing. Rand Decker, a former snow-study group member from MSU, originally hired me for that job.

Now I work full-time as a meteorologist in Jackson Hole and teach avalanche courses for the American Avalanche Institute in the winter. Giving back some of the knowledge gained from Doc Montagne.

I think Doc beamed, knowing that some of the students he mentored had managed to carve out an existence living and working in the mountains. And I hope Doc is still smiling while he continues to watch over us from the Big Sky above.

Thank you, Doc. I will see you in the mountains.

—Jim Woodmency



John engrossed in snow science, photographing snow crystals.
Courtesy Montagne collection

Last of the True Field Scientists

The passing of John Montagne marks the end of a great era of Rocky Mountain geology. The last decade has seen the passing of many professional colleagues of his generation, including Charles Bradley, John David Love, Don Blackstone, Steve Oriel, and others – men who were great field geologists, educators, mentors, and builders of an enormous library of knowledge concerning the geologic history of the Rocky Mountains. Only one or two members of this generation of great Rocky Mountain geologists remain today. In many respects, they represent the last of the true field geologists. Their world has been replaced by virtual field trips on the Web, 3D animations, satellite imagery with meter-scale resolution, and a new generation of geoscientists who prefer to work from work stations rather than on the outcrop under the Big Sky.

John laid his undergraduate foundation in geology at Dartmouth College and the University of Wyoming Geology Field Camp in Laramie. Following his distinguished combat service during WWII with the US Army 10th Mountain Division in Italy, John returned to Wyoming for graduate school at the University of Wyoming. There, the great Wyoming geologist Samuel “Doc” Knight no doubt played a major role in shaping John’s view of geomorphology and Rocky Mountain landscape development, in addition to Brainerd Mears, JD Love, and Don Blackstone. His doctoral dissertation on the Cenozoic history of the Saratoga Valley, straddling the Wyoming-Colorado border between the Medicine Bow and Sierra Madre Mountains, was the first comprehensive study of this region since the Western Territorial Surveys of FV Hayden (in 1868) and Clarence King (in 1877). John was never quick to publish, but when he did publish his dissertation many years later in 1991 in *Contributions to Geology*, he produced an elegant and detailed geologic map that is a landmark contribution to Wyoming’s geology. His comprehensive study of Cenozoic stratigraphy, sediment distribution patterns in the Saratoga Valley, mammalian paleontology, geochronology, structural geology and tectonics, and geomorphology is a wonderful example of why this WWII generation produced so many outstanding geologists. For his generation, there were no shortcuts to a PhD, and your field boots and rock hammer had to be well-worn! The goal was to be a well-rounded, comprehensive field geologist, not a pigeon-holed specialist. In the acknowledgments section of his doctoral publication, John states, “My wife and two sons contributed in innumerable ways, particularly in fossil collecting, and in the smooth operation of many field camps.” I’m sure that two young boys with sharp eyes were well suited to the task of scrounging for fossils, and no doubt Phoebe made the smooth operation of camp possible.

Following graduate school, John joined his 10th Mountain Division colleague, Charlie Bradley, in building the Department of Earth Sciences at Montana State University (then called Montana State College). Other faculty also contributed to this effort at the time, but the legacy of John and Charlie is clear and unmistakable to this day and beyond. Their love of a mountain lifestyle, their training in the 10th Mountain Division, and their passion for field-based science culminated in the creation of a snow and avalanche science program at MSU that was unique

in North America and remains so today. The impact that this program has had on modern avalanche forecasting in North America cannot be overestimated.

Whether the topic was snow on the ridge at Bridger Bowl or Miocene erosion surfaces or structural geology in the Horseshoe Hills or the Hebgen Lake earthquake or glacial landforms of Paradise Valley, John took a hands-on approach to teaching and research. It’s almost cliché to say that Bozeman is surrounded by one of the best outdoor geological laboratories in the world, but it’s true! John was constantly taking his students on afternoon or longer field trips, always with chalkboard in hand, wearing his khaki shirt and Western felt hat, and carrying his battered leather-handle rock hammer. It takes time and energy to lead field trips, but in John’s view the value to students exceeded the personal effort.

When I came to MSU in 1980, John’s reputation was legendary for driving – at remarkable speed – the big yellow MSU school bus full of geology students through the Horseshoe Hills on “roads” that most sensible people would regard as impassable; but these sensible people were not veterans of the 10th Mountain Division! John’s reputation was also legendary for helping students both in and out of the classroom, mentoring young faculty like myself, and providing service to the university and the Bozeman community through the Rotary Club.

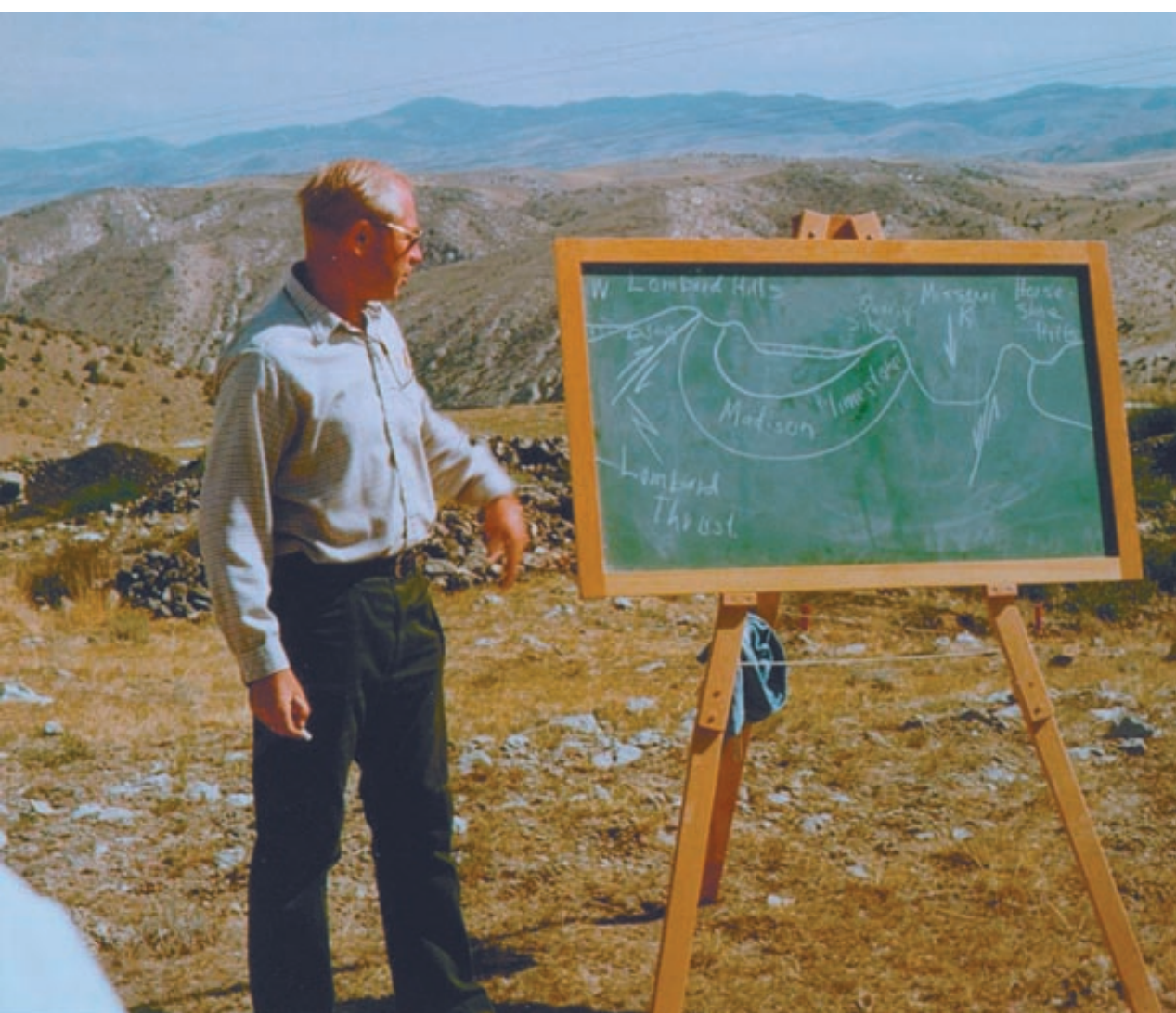
John was very proud that he could save money for the Department of Earth Sciences by being his own secretary. For example, rather than having Sara or Ann do his typing, John would type his own exams, letters, reports, and other manuscripts. John’s generation was thrifty and took pride in making the most of what you have – rather than complaining about what you don’t have.

I have had the honor of knowing John Montagne since the late 1970s when we co-led a field trip in the Jackson, Wyoming area with JD Love and others. As a newly minted PhD from the University of Wyoming in 1980, John hired me away from a faculty offer at the Colorado School of Mines, in effect repeating the path he followed in the 1950s after graduate school at Wyoming. I always think he took some subdued pleasure in that. I can’t begin to count the number of times or the number of ways in which John Montagne has influenced my life, both professionally and personally. John Montagne was the kind of man who made you want to be a better person. He was a humble man with an enormous presence. His life was based on integrity, honesty, respect for other people and the Earth, preservation of Greater Yellowstone, and a healthy mountain lifestyle.

From John McPhee’s classic book entitled *Basin and Range*—

Geologists...inhabit scenes that no one ever saw, scenes of global sweep, gone and gone again, including seas, mountains, rivers, forests, and archipelagoes of aching beauty rising in volcanic violence to settle down quietly and then forever disappear – almost disappear. If some fragment has remained in the crust somewhere and something has lifted the fragment to view, the geologist in his tweed cap goes out with his hammer and his sandwich, his magnifying glass and his imagination, and rebuilds the archipelago.

Today, I can well imagine that John and Charlie Bradley and John David Love are somewhere rebuilding the ancient geology of Greater Yellowstone and perhaps are thinking of taking time out for some glacier skiing down the Pinedale ice cap into Paradise Valley!
—Dave Lageson



Shown here leading a geology field trip in Montana during the 1980s, John enjoyed taking his students into the mountains for hands-on learning, chalkboard in hand.
Courtesy Montagne collection

Contributions to Bridger Bowl

In addition to all of John Montagne’s contributions to the snow and avalanche community, all of us at Bridger Bowl would like to recognize Doc’s contributions to the establishment and early operation of the ski area. In the early 1960s, he raised awareness of the avalanche dangers at Bridger Bowl, and as the volunteer patrol director, helped establish avalanche-safety policies. He also began the process of professionalizing the ski patrol. Doc was involved in building the original patrol rope tow to the ridge, which not only allowed access for daily avalanche work, but also provided access for his cornice and jet-roof research.

John served on the board of directors of Bridger Bowl from 1968-1971 and was president of the board for 16 months. He guided Bridger through turbulent times that involved serious budget issues and property ownership battles. He also helped establish long-range plans and helped create guidelines for the operational philosophy of Bridger Bowl.

Along with Dr Charlie Bradley, Doc started a Montana State University undergraduate course in snow science called Snow Accumulation and Dynamics, which was the foundation for snow-science research that continues today, with Bridger Bowl as a field laboratory.

He continued to ski at Bridger through 2006. We all felt very privileged to know him.

—Randy Elliott, Doug Richmond, and Fay Johnson ❄️



2007/08 Season Roundup

Winter winds on Mt Shasta continually stripped the upper mountain of its snow cover during the 2007/08 season. *Photo by Eric White, MSAC*

Forest Service National Avalanche Center

The Forest Service National Avalanche Center wants to once again salute all the US backcountry avalanche center employees and volunteers for their great products and their ardent dedication. This past winter was once again a hectic season for the centers as well as a very fruitful one as evidenced by increased hits to their advisories, increased numbers of people that attended their avalanche classes, and their updated and very cool Web sites. All of this was accomplished despite generally shrinking budgets and growing demands.

Avalanche center directors annually have to perform budget miracles similar to the biblical loaves and fishes. I urge all TAR readers to continue to support your local avalanche center.

This past fall the NAC hosted our annual backcountry avalanche centers rendezvous in Jackson Hole in conjunction with the NAC and AAA-sponsored Professional Development Seminar.

The annual avalanche center meeting provides a forum to discuss matters germane to all the centers, including budgets, data-gathering standards, advisory formats, and other pertinent topics.

All of you who attended the NAC/AAA Professional Development Seminar know it was an unqualified success, featuring a number of interesting presentations and lively follow-up discussions. The Professional Development Seminars occur on off-ISSW years so the next one will be in the fall of 2009.

The NAC and several avalanche center directors have been working closely with the Canadian Avalanche Association to revise the current Danger Scale Ratings. This is a very important international project that promises to have benefits for all backcountry users.

The NAC chaired the annual Avalanche Artillery Users of North America Committee meeting and worked closely with AAUNAC and with the Department of the Army to authorize new military artillery for avalanche control programs at Mount Hood Meadows and Telluride.

The NAC will unveil a new Web site of its own this coming winter that will include an avalanche awareness tutorial with video footage, an updated avalanche encyclopedia, and technical and science papers among other items.

Here's to all of you and to another great and safe winter out there in Avalanche World.

—Karl Birkeland & Doug Abromeit, directors

Crested Butte Avalanche Center

Each year the NAC Season Roundup tries to profile a newer or smaller, local avalanche center. The Crested Butte Avalanche Center has been in operation since 2001 and operates as a nonprofit organization. They stay in touch with the network of Forest Service and state-run avalanche centers, attend yearly US avalanche center meetings, and have adopted some of the danger symbols and avalanche problem icons for their advisories.

The center consists of two full-time forecasters: Alan Bernholtz and Steve Banks, plus three part-time forecasters: Billy Rankin, Jayson Simon-Jones, and Mike

Bromberg. These forecasters work under the jurisdiction of a five-member board of directors. The forecast area covers approximately 120 square miles surrounding the town of Crested Butte from Lake Irwin to the north and Gunnison to the south. The West Elk Wilderness and the Quartz Creek/Pitkin Valley form the west and east boundaries.

During a record-breaking 2007/08 season, avalanche forecasts and mountain weather information were issued daily from mid-November into early April with additional advisories posted in early November and into May. Web site postings, e-mail service, RSS feeds, and a daily local radio report meant a large number of people were able to get specific information about the backcountry conditions near Crested Butte and the Gunnison-Pitkin Valleys.

No accidents occurred in the forecast area. We thought we'd post some of the winter's activity reported by the CB Avalanche Center.

AVALANCHE CYCLES

Extreme Danger Cycles

January 6-7, 2008: Our first extreme cycle of the season. Town received 6.5" of water in 48 hours and 3' of new snow.

High Danger Cycles

December 1-2, 2007: Our mountains received 30-36" of snow and 50+ mph winds

December 8, 2007: We received 46" of snow in 48 hours.

January 28-30, 2007: Crested Butte received 2' of snow and 90mph winds.

February 4, 2008: Crested Butte received 20" of snow in 24 hours.

February 8, 2008: 10" and 50mph winds create unstable slabs Hwy 135/Gunnison area

Tuesday, January 29, 2008, and Wednesday, January 30, 2008: This avalanche cycle was unique to our area. We had reports of human-triggered avalanches south of Gunnison in open meadows. Any slope that was steeper than 30 degrees was sliding or suspect. In addition, State Highway 135 had a new avalanche path created during the summer of 2006. During this cycle we saw a natural avalanche cross the highway at 9pm. No one was injured or caught. We were unable to investigate the crown due to the weather and the terrain.

CLOSE CALLS

Two close calls were reported to the center on February 8 and 9. The weather during both the 2-8-08 and 2-9-08 slides was the warmest it had been all season, and the snowpack was in transition. From February 3-5, we received over 31" of snowfall and moderate to strong westerly winds. On February 6, we received a report from Billy Barr in the town of Gothic of a large natural avalanche on the east side of Gothic Mountain. On February 8 the danger rating was High.

Similar to the rest of Colorado, snowy conditions persisted in the high country and summer arrived late.

—Alan Bernholtz, director

Mt Shasta Avalanche Center

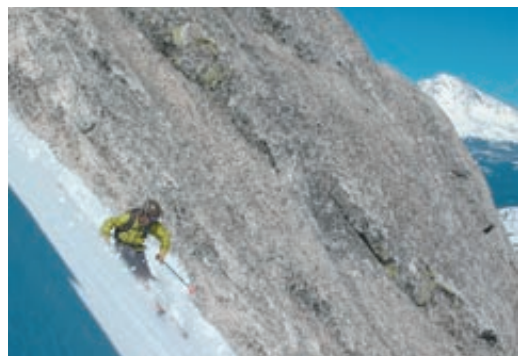
The 2007/08 winter season was the 10th and probably most challenging year for the Mt Shasta Avalanche Center (MSAC). Of all the factors that affected the MSAC this year, the biggest was a reduction in staffing.

For the first nine years, the MSAC had two full-time employees who provided daily advisories; it was considered a Type II Regional Avalanche Center. With only one position this last season, the MSAC became a Type III Avalanche Center which provided advisories four days a week. This change presented a big challenge since there is a growing interest and demand from the public for products, but fewer staff to meet their needs.

Weather during the 2007/08 season also had several effects on the MSAC. Most of the precipitation fell during three main weather events with extended cool high pressure between them. While some of these storm events produced deep snowpack at lower elevations, every event was followed by 18-24 hours of high winds that scoured areas above treeline and left no snow or thin snowpack above 8000'. These events produced so much snow at lower elevations that the backcountry access had to remain closed for weeks until the road crews could adequately clear the residential areas and highways. This limited access to the standard snow study areas. All of these weather events occurred in January and February and were followed by near-record dry weather in March and April. Our overall precipitation was around 70% of normal with snowpack in the springtime around 58% of normal.

Additionally, a lightning event damaged communication with our weather stations in November and kept these out of service until March. Many trips by foot, ski, and snowmobile, plus new equipment and phone assistance from Snowdog Engineering, finally solved this problem near the end of the season.

Although there were no avalanche fatalities in the MSAC forecast area, several close calls occurred with skiers, snowboarders, and snowmobilers. Due to the limited backcountry access in January and February, most of these human-caused avalanches occurred in late February, March, and April. Our biggest natural avalanche period was on February 24 where widespread avalanche activity occurred throughout the forecast area. These slides were all storm-snow avalanches following a period of very heavy snowfall, moderate to strong south and southeast winds, and rising snow levels. Although deep-slab instability was present through January, both natural and human-triggered avalanches occurred predominantly in storm-snow layers throughout the season.



Due to access closures and low-elevation snow, a lot of new terrain was explored, like this chute on Castle Spire in the Castle Crags Wilderness.

Photo by Chris Carr

Shasta Ski Park Pro Patrol, Brett Lutz and the National Weather Service, Doug Abromeit and Karl Birkeland from the National Avalanche Center. Most importantly, I would like to thank my wife and children for their patience and support throughout this challenging season. Thank you!

—Eric White, director & lead forecaster

Idaho Panhandle Avalanche Center

The avalanche season began with a bang in North Idaho this past year. Two preseason advisories were issued to warn the public of unusually hazardous avalanche danger due to heavy snow loading on a foot-thick weak layer of faceted snow. Our first avalanche cycle occurred around Thanksgiving when we had accumulated several feet of snow in the high country over a very weak base layer. Reports from Silver Mountain ski patrol alerted the IPNF-AC about very unstable conditions resulting in natural and human-triggered avalanches. On December 3, a warm front forced the freezing level to above 6,000' and formed a thick ice crust. This event was followed by a high-pressure system causing surface hoar to form on the crust. This scenario set up a very unstable situation for subsequent storm systems. Early avalanche fatalities in neighboring Washington State were a result of this layering. Weather patterns in January and February formed two more persistent weak layers (PWL) that became problematic. The early December PWL was still present in the snowpack but a lesser concern due to stabilization over time and being localized to areas of shallow snowpack or convex terrain features.

With all the early season concerns, we had numerous opportunities to reach a broader TV audience. Smiling for the camera to get exposure for the AC is easy, but getting the news media to communicate pertinent information to the public can be like pulling teeth. Light snow kept accumulating right up to the end of March, and it was enough for Oly, a long-time skier and native of North Idaho, to declare, "This is the best powder-skiing winter since 1963!" As of the writing of this report on April 24, the weather continues to be unseasonably cold, and snow is still accumulating in the high country. Snotel sites above 5,000' across North Idaho were all registering above average for SWE. Below 5,000' several sites were at 150% and greater.

The deeper-than-normal low-elevation snowpack lead to some uncommon avalanche issues. On January 28, a 300' wide avalanche ran 400 vertical feet and partially buried a vehicle on I-90 at Lookout Pass. The passengers in the



left: Eric White, Mt Shasta Avalanche Center director, working on one of the center's weather stations. *Photo by Nick Meyers*



right: Eric White gathering snowpit data. *Photo by Keith Potts*



Eric White manning the nerve central in the MSAC office.

Photo courtesy MSAC.

vehicle were recovered with no injuries. This avalanche occurred in an area that had never run before. This triggered the first avalanche-mitigation work ever performed on Lookout Pass. On February 5, two technicians on skis detonated numerous charges in an attempt to trigger windloaded snow on the slide bed surface. No further slides were initiated. Around the same time an avalanche that ran on buried surface hoar swept a semi tractor-trailer off Highway 12 and into the Lochsa River east of Orofino, Idaho. The entire truck ended up in the river, but the driver was rescued. Idaho DOT sent the Highway 21 avalanche crew from Lowman, Idaho (while 21 was closed), to forecast for the work crews trying to re-open the pass.

We surmise that the February 25 PWL was the likely culprit responsible for an avalanche fatality that occurred on Sheep Mountain, March 16, north of Orofino. Four snowmobilers highmarking in a clearcut triggered the avalanche, and all four were caught in the slide with two fully buried. Two of the riders were carried the full 1,100' of the slide. One was buried under 4' of debris and dug out with no injuries. The other rider was dug out shortly afterward but was unresponsive and later pronounced deceased. Several other riders in the group had been waiting below, and all went different directions to escape the slide. This accident occurred in a region where no former avalanche-related fatalities had ever occurred. This area of Clearwater County, east of the Idaho/Montana Bitterroot Mountain Divide had an above-average winter for snowpack.

In all, our free education efforts reached about 500 people in the surrounding communities – the biggest audience to date for the IPNF-AC. This winter we extended an extra effort to educate the members of the Sandpoint Winter Riders Snowmobile Club. Kevin Davis was nominated as their safety chairperson. He accepted the role with the caveat that he would work with them to educate the club on safe winter-travel practices and safety gear but would try to groom a member of their club to eventually perform the duty. "It really is in the best interest of the snowmobile community to adopt safety chairpersons directly involved in the club or organization," Davis emphasized. The IPNF-AC continues to work with Idaho State Parks and Recreation (IDPR) in promoting avalanche awareness, particularly to snowmobilers. IDPR sponsored the weekly avalanche advisory for the 2007/08 season with a contribution of \$5,000. IDPR also generously donated two Polaris 600 RMK sleds that proved invaluable in accessing the high country in the deep snow this winter and improving our "cred." Two snowmobile avalanche-awareness classes were held in Sandpoint and Couer d' Alene with good attendance. These classes were co-conducted by IDPR and the IPNF-AC. At Lookout Pass Ski & Recreation Area, a slick and informative avalanche-awareness display was placed in a high-traffic area easily viewed by the public.

We hope to add two more forecasters/educators next year to the Priest Lake area on the west side of the Selkirk Crest where snowmobile action is hot. We regularly received pit data for the weekly avalanche advisory from Silver Mountain, Lookout Pass, and Schweitzer Mountain.

Overall, the season was a good one for the IPNF-AC. We provided avalanche awareness to more public and various agencies than ever before, thanks to increased availability and visibility with public displays, more personnel, and more agency and business contacts. Our weekly avalanche advisory e-mail list to agencies and individuals continues to grow. Additionally, the response from the public is positive and our opportunities for cooperation and education continually expand.

—Kevin Davis, director

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NAC 2007/08 ROUNDUP

continued from previous page



Sierra-Tahoe forecaster Brandon Schwartz on Mt Tallac.

Photo by Andy Anderson

Sierra Avalanche Center – Tahoe National Forest

The winter of 2007/08 marked another year of growth and success. The Sierra Avalanche Center continues to function as a 501(c)(3) not-for-profit organization. It is a partnership between the Tahoe National Forest and a volunteer board of directors. Some of the many accomplishments this past winter include an increase in annual fundraising, the creation of two paid field-observer positions, a decrease in the size of the forecast area, and the addition of snowmobiles to the forecasters' arsenal of tools for gathering weather, snowpack, and avalanche observations from the field. From December through April, the forecasters issued 123 daily avalanche advisories for a season that included one of the wettest Januarys and one of the driest Marches on record.

The fundraising model used by the board of directors raised 84% of the budget necessary for the operations of the Sierra Avalanche Center. The Tahoe National Forest provided the remaining 16% as infrastructure support. The board of directors gathered a mix of donations from corporations and private individuals. These donations included 2,300 lift tickets from Alpine Meadows, Heavenly, Homewood, Kirkwood, Mt Rose, Northstar, and Sugarbowl ski areas. The tickets were sold online at half price through the donated services of SnowBomb.com. All proceeds went to benefit the avalanche center. Cash, goods, and services were received from local business including Porters Tahoe, Panoptx Eyewear, and Thin Air Motorsports. Community organizations – including the Heavenly Professional Ski Patrol and the Truckee Rotary Foundation – gave generous donations. Numerous individuals from the backcountry community made smaller cash donations. Other smaller donations of single-day snowcat ski trips, outdoor gear, and gift certificates were used to raise additional funds as raffle prizes. With these funds, the board of directors provided the salaries for two full-time forecasters, some equipment needs, continuing education expenses, and salaries for two part-time observers.

Beginning in January, two part-time field observers were added to the field-observation program. Steve Reynaud added additional observations from the northern half of the forecast area and Bill Jaskar contributed additional observations from the southern half of the forecast area. This gave the forecasters the ability to gather more observations from areas of their selection. The Sierra Avalanche Center continued to receive observations from local ski areas, guide services, and the all-important backcountry traveling public.

The decision to reduce the overall size of the forecast area was made in March. In the past, it had been difficult to cover the far southern portion of the forecast area. The Sonora Pass zone is a two-and-a-half-hour drive to the trailhead, and then snowmobiles were needed to access the main avalanche terrain about 14 miles from the end of the plowed road. This presented a field observation challenge that was not easily accomplished in the time constraint of a single day. Working with the Eastern Sierra Avalanche Center, both avalanche centers agreed that the local snowpack conditions

in this region are more closely associated with the ESAC advisory area and could be transferred to the Eastern Sierra Avalanche Center. The Sierra Avalanche Center moved its southern boundary one highway pass to the north. The forecast area is now bound by Highway 49 at Yuba Pass on the north and Highway 4 at Ebbetts Pass on the south. This change allows easy coverage of any single zone of the forecast area in a day trip from the forecaster's Truckee, CA office.

The board of directors worked with Thin Air Motorsports to establish sponsorship of the avalanche center by Bombardier Recreation Products. Two brand-new Ski-Doo Summit Everest 800R 154 snowmobiles were loaned to the avalanche center for the entire operating season. The Tahoe National Forest covered the cost of fuel and fluids, the board of directors covered the cost of parts, and Thin Air Motorsports covered all labor costs for service. With these snowmobiles, the forecasters were able to make observations in high-use portions of the forecast area where they previously did not have access. Additionally, the forecasters were able to complete a cross-country route between Carson Pass and Ebbetts Pass, allowing them to make field observations in both areas in a single day.

With forecasters Brandon Schwartz and Andy Anderson working as employees of the Tahoe National Forest and a very supportive board of directors, the Sierra Avalanche Center continues to grow and create a locally well-respected advisory product. The fundraising success and ability to obtain even more observations from the forecast area continues to build the foundations of long-term success for the Sierra Avalanche Center. The center hopes to continue to grow its fundraising and field observation program during winter 2008/09 and is looking forward to it with much excitement.

—Brandon Schwartz, forecaster

Payette Avalanche Center

The 2007/08 season was no disappointment, and the deep powder days of January were enough to tire out even the hardcore snow junkies. By the end of April, the West Central Mountains of Idaho had accumulated approximately 430" inches of snow and our seasonal snow water equivalent in the McCall area sat between 115% and 125% above average. Temperatures remained below normal this winter allowing average precipitation amounts to fall in the form of lighter density snow than the McCall area normally sees.

Below-average temperatures also hindered any mid-winter rain events which, combined with constant snowfall, kept our snowpack in great powder-like condition for much of the winter. Clear skies and high pressure moved back into our area in late February through early March. Temperatures warmed, but the transition was gradual, and overall stability remained good. Our area had no avalanche fatalities this season; unfortunately however, one skier died in-bounds in a NARSID or tree-well suffocation accident. While 430" is closer to half of what some ranges received, it felt bottomless for much of the season and the weather seemed to offer what people like to think of as winter. Enough dry and light snow fell to wipe away the memories of recent lackluster seasons.

The Payette Avalanche Center issued 35 advisories this winter beginning in late November and ending in early April. We offer an advisory on Monday, Wednesday, and Friday and issue Avalanche Warnings as needed. This year we issued two High Avalanche Warnings, one in cooperation with the National Weather Service out of Boise. We offered four basic avalanche courses, two avalanche-awareness talks, and co-instructed one snowmobile-specific basic class in conjunction with Idaho Department of Parks and Recreation. McCall is a small town of roughly 2,000-3,000 residents which jumps to 10,000-12,000 people on busy holiday weekends.

In an effort to reach out to the people who recreate on the nearby forests but do not live here, we offered three of our four basic classes in Boise in partnership with Boise State University. This turned out to be a successful venture and was well received, much to the credit of BSU and their outdoor program manager Jesse Sears, who offered classroom space, advertising, and loaner rescue equipment to all the students involved with the class.

Also in an effort to offer more local avalanche-information resources, we started two library sections at the local high school and public library, which consist of up-to-date books and DVDs. Volunteers and partners continued to support the Avalanche Center this season, and we absolutely could not offer the services that we provide without their help. In particular the Idaho Department of Parks and Recreation upped their monetary support for the center from \$3,000 to \$5,000 annually and supplied us with two new loaner sleds which will be replaced on a four-year rotation. Volunteers supplied over 300 hours of support this winter, and we look forward to working with these dedicated people again next season.

—John Groom

Bridger-Teton Avalanche Center

This past winter was one of our snowiest ever with 700" of total snowfall. After a slow October and November, snowfall totals in the Teton Range were 134%, 168%, 144%, and 231% of normal in December, January, February, and March. From December 1 to April 6, an average of 3.7" of snow fell per day. During this 128-day period there were only 21 days when it did not snow. The lack of a significant thaw and huge amounts of snow made this one of the best seasons ever for powder skiing.

Instability associated with early season buried weaknesses was replaced by storm cycle and new-snow instabilities as the season progressed. Several avalanche warnings were issued in December, and one of the deepest avalanches ever triggered at the Jackson Hole Mountain Resort occurred on January 14, 2008.

There were four avalanche fatalities. On January 2, 2008, a snowmobiler died in a slide in the Snowy Range. On January 12, a huge avalanche in the Cottonwood Creek drainage of the Salt River Range killed three snowmobilers.

Daily afternoon forecasts and morning nowcasts were issued by the center from November to April. For the second season weekly snowpack summaries were posted on our Web site beginning in late September and ending in May. A



Remote trigger on Mt Judah.

Photo by Andy Anderson



Two new RMK 600 snowmobiles, provided by a grant, were a huge hit with BTNF forecasters last season.

BTNF forecaster Mike Rheam shows his skills on one of the new RMKs.
Photo courtesy Bridger-Teton Avalanche Center

new addition to the Web site for this season was access to historical snowfall and temperature data back to 1974. Avalanche bulletin contacts were up 20%. Our Web site experienced over a million visits.

Our enclosed snowmobile trailer was a huge hit this winter. The exterior images and the avalanche center logo attracted lots of attention at area trailheads and at the Snow King Hill Climb. Two new RMK 600 snowmobiles provided by a State Trails grant were a huge hit with our forecasters. In March, Swiss avalanche forecaster Beni Zweifel spent several weeks at the center while he was on an exchange from the Swiss Federal Institute for Snow and Avalanche Research in Davos, Switzerland.

Increased funding is allowing us to work all summer. The results of our efforts to map avalanche hazards along a thousand miles of western Wyoming snowmobile trails are now available on our Web site. Generous donations from a variety of sources will enable the center to greatly expand our scope of services next season.

—Bob Comey, director



In a snowy year, Ketchum's hills make for considerable urban avalanche danger. The backyard, vehicle, and driveway of this house in Eagle Creek were hit but not damaged on January 28, 2008.

Photo courtesy Sawtooth NF Avalanche Center

Sawtooth National Forest Avalanche Center

During the winter of 2007/08, avalanches were no longer a backcountry phenomenon; they were in our backyards. Two urban avalanche cycles in the Wood River Valley brought slides down upon or behind a number of homes around Ketchum and Hailey and into the back service road of an elementary school. Several roads were blocked in different locations, including Highway 75 just north of Ketchum.

Due to avalanches damming the river and creeks, flooding persisted in some areas for more than 24 hours. The Big Wood River flooded an entire neighborhood in Hailey. Warm Springs Creek, west of Ketchum city limits, surrounded a house and ran through its basement.

Ironically, the second series of avalanches in the urban interface occurred on the first day of Avalanche Awareness Week. Both slide cycles consisted of cold, light-density snowfall accompanied by increasing temperatures and strong winds. A few slides broke down into weaker, faceted snow, but fortunately most slides were simply storm-related snow.

One garage was destroyed and a county plow partially buried, but no residents or backcountry travelers were injured or caught during these cycles. Some close calls were reported out of bounds at Sun Valley's Bald Mountain ski area. A small soft slab completely buried a 13-year-old boy in-bounds. A rapid patrol response, an avalanche-aware witness, and a very small visual clue – a piece of the boy's ski base – led a patroller to the conscious and unharmed victim who was yelling from beneath the snow. Avalanche forecasters joined up with the city and county to respond to an incredible mix of 911 avalanche calls.

Before, during, and after these two avalanche cycles, we helped educate the public through media releases, radio interviews, and personal contacts. Of interest, the 2007 Castle Rock Fire had left a number of slopes adjacent to the ski area and above some homes severely burned. The lack of cover and vegetation may have added to the scope of some of the avalanches but were certainly not the cause of the slides. We experienced similar avalanches on non-burned slopes throughout the area at the same time.

The SNFAC forecasts general conditions for the backcountry and does not specifically forecast for slopes above local homes. However, we do partner with the city and county and confer with them when we feel the avalanche danger is increasing in areas around the communities of Bellevue, Hailey, and Ketchum. National Weather Service Avalanche Warnings issued by the SNFAC are now sent

county-wide through the EMS paging system to all the emergency workers, similar to fire weather warnings. Avalanches are not new to the Wood River Valley, and urban avalanche cycles are not unprecedented, but we certainly do not see slides running into town every winter.

The SNFAC provides yearly training and educational programs for area safety personnel such as fire departments, police officers, and Idaho Power linemen.



Huffman Drive is notable: the garage was destroyed January 5, the same site of a house destroyed in an avalanche in 1969. The 1969 owner had gone to Twin Falls for the day; he was the snow ranger's plumber and was advised to vacate his house that day. The 2008 house was built with a reinforced wall, so the only damage was to the upstairs deck.

Photo courtesy Sawtooth NF Avalanche Center

Groups we hope to reach are the Intermountain Gas Company workers and all the snow-removal services. A number of avalanche-engineered homes had vulnerable gas lines exposed to avalanche debris flow and subsequent settlement. No main shut-off valves exist to separate out the avalanche-zoned neighborhoods. We are urging the city to update their building codes for gas and power placements in any avalanche zone. For several years we had partnered with the city and offered a bilingual 20-minute avalanche-awareness program for snow-removal crews in the area. Extremely poor participation led to dropping the program, but we may be able to revive it with more success after last winter's avalanches. Not all the city and county officials are familiar with avalanche activity, so these cycles were timely reminders in the face of new developments being proposed beneath steep slopes throughout our narrow valley.

Urban avalanches aside, we experienced a fairly average year. A weak and faceted early season snowpack created significant concerns until mid-February when even shallow-seeming areas consolidated and brought us into a spell of relatively low avalanche danger. Overall the winter seemed to consist of cooler temperatures and numerous wind events. Some dry spells, one or two warm spells, and wind produced a couple mid-winter weeks of marginal surface conditions for skiers but good conditions for snowmobilers. Small storms the latter part of the winter brought excellent and supportive powder conditions alternating with good corn snow into April, May, and even June.

Our regular crew was on with Matt Lutz returning on a nearly full-time basis mid-winter, part time earlier and later. Chris Lundy and Janet Kellam worked full time. We revamped our class and field format and produced several more educational programs, offered classes through the local snowmobile shop, and

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assisted Idaho Parks and Rec with their snowmobile program. A greater portion of our class time is now spent helping people to learn how to use the avalanche advisories. The SNFAC avalanche safety brochure was adopted by all the US Avalanche Centers and reprinted to steer all users to www.avalanche.org to make it easy to find all the avalanche advisories. YouTube video clips, podcasts, early morning weekday radio reports, and graphical e-mail advisories help keep us visible and user-friendly.

The SNFAC hosted a one-day professional-development seminar with Ian McCammon. We invited all the regional avalanche professionals and had a mix of over 40 avalanche workers with 573 years of combined experience. Ian's workshop on intuition and decision-making had us all thinking outside of the norm and proved to be a great success.

We continue to strengthen our partnerships, seek new ones, and thank our lucky stars for the local Friends of the Sawtooth NF Avalanche Center for all their contributions of time, financial donations, and enthusiasm.

—Janet Kellam, director

Northwest Montana – Glacier Country Avalanche Center

Northwestern Montana's above-average snowpack is still accumulating even as this report is written in mid-April. Snow-water equivalent in the Kootenai River drainage currently registers at 15% above average, the Flathead River drainage at 6% above average. Between mid-March and mid-April, air temperatures have been cooler than normal, delaying the typical spring thaw. Downhill ski areas have all enjoyed good skier numbers.

The early-season snowpack was hardened by rain events in November and was accompanied by a buried persistent weak layer that became the trigger for several early-season incidents. Between late-January and mid-February our region generally experiences a significant mid-winter thaw. This year's thaw failed to materialize. In the latter part of February, however, we experienced a dry period with cold, clear nights. The subsequent surface hoar became our next persisting weak layer and was gradually buried by the increasing snows of March and April, becoming the cause of a rash of near-miss incidents towards mid-March.

The first serious incident of the season occurred on Wednesday, December 12, 2007. Three male snowmobilers were riding the groomed snowmobile trail in the Canyon Creek drainage of the Whitefish Range, north of Whitefish, Montana. This is just northeast of the summit of the Whitefish Mountain Resort. While high-marking on a south-facing avalanche chute called Fiberglass Hill, a 19-year-old male rider triggered a 12-14" deep slab avalanche that carried him and his machine approximately 300'. His companions were able to quickly locate the partially buried victim. He had sustained a broken femur in a collision with trees. While one companion remained with the victim, the other rode to the summit of the ski area and alerted the Whitefish Mountain ski patrol. They responded and transported the victim by snowmobile sled back to the ski area, where he was picked up by a medical-evac helicopter. Snowpack investigations revealed the slide to have released upon a 1-3cm thick layer of faceted grains.

The next day a lone snowmobiler was riding in the same area after significant new snowfall overnight. In late-morning the rider was struggling to free his mired snowmobile from deep snow alongside the road. He had removed his jacket, gloves, and helmet and was digging to free the machine when a wide expanse of south-facing slope reportedly released above him. Turning to run, he realized his escape route was cut off by moving snow. Standing his ground, he watched the snow wash around him, deflected by up-slope trees. When the slide stopped, he realized that his snowmobile, clothing, and gear were all covered. After an exhaustive search, he gave up hope and began walking out. He was eventually found and given a ride back to the trailhead by a group of passing snowmobilers. Snowpack investigations found that the slab avalanche failed upon the same buried layer of faceted grains involved in the previous day's avalanche.

On Sunday, January 13, 2008, numerous downhill skiers from the Whitefish Mountain Resort were out of bounds, yo-yo skiing in the same Fiberglass Hill area of the two December incidents. Around noon a lone male skier, after boot-hiking a steep south-

facing slope, triggered a 1-4' deep slab while skiing down. A witness watched the avalanche release on the 19-year-old skier's second ski turn. The victim was swept through trees and partially buried near the bottom of the draw. The witness quickly responded to the site of the victim and, with others, uncovered him. Initially alive, the victim died shortly after of massive trauma.

The witness also saw the burial of two other skiers, brothers-in-law who were walking up the groomed snowmobile trail carrying their skis. In the avalanche one of these skiers was only partially buried and able to partly free himself. A passing snowmobiler quickly uncovered him uninjured. The other brother-in-law, however, was totally buried. A tremendous search effort was initiated by volunteer skiers and snowboarders from the ski area, passing-by backcountry skiers and snowmobilers, Forest Service law-enforcement officers, and the Whitefish Mountain ski patrol. The remaining 36-year-old skier was found by an organized probe line after being buried 4.5 hours under approximately 3' of snow. He was pronounced dead at the scene. None of the three victims was wearing a transceiver.

At the time of the avalanche, two snowmobilers parked on the groomed trail just outside the avalanche area were adamant that they saw two other skiers buried by the avalanche along its eastern edge. These skiers were the focus of an extensive three-day search involving numerous search and rescue organizations, several search dog teams, and hundreds of volunteers. After that exhaustive effort, plus a thorough investigation of the numerous possible missing-persons reports, the Flathead County Sheriff suspended the search for any further victims on Wednesday, January 16. To this date there is still no credible report of two missing people. The scene will be monitored during spring and early summer as the snow melts.

Between February 16 and March 20, the avalanche center received eight reports of human-initiated slab avalanches releasing upon the mid-February buried surface-hoar layer. All these were on steep slopes on cold, north aspects with some degree of tree cover. Amazingly in all these incidents of triggered avalanches, no one was seriously injured.

Glacier Country Avalanche Center continued an expanded education program this year with a new seasonal employee, Leah Taylor. Transceiver and avalanche-awareness sessions were given to 10 public groups, 12 school groups, and four private groups with a total attendance of 541. One public session – Avalanche Days at the Whitefish Mountain Resort – gave skiers, snowboarders, and snowmobilers day-long access to educators, equipment manufacturers, and field exercises. Backcountry enthusiasts attended two separate Level I awareness classes offered by the Flathead National Forest at no cost. The first session in January was tailored for skiers, snowboarders, and mountaineers, while the second session in February was tailored to snowmobilers. This year the Forest Service received another grant from the Montana Department of Fish, Wildlife, & Parks Trails Program for avalanche education.

Glacier Country Avalanche Center, Inc, the local Friends Group, received a Flathead Electric Coop grant for the purchase of equipment for an avalanche-transceiver training park which was installed at the summit of Whitefish Mountain Resort in March. The beacon park received very positive TV and newspaper coverage.

Our twice-weekly avalanche advisories were posted on the GCAC Web page and offered via e-mail and message phone. The Web page not only provides access to our advisories, but also offers a forum for backcountry observation reports. Our plans for next season involve maintaining our programs and serving our area users.

—Tony Willits & Stan Bones, avalanche & snow specialists



Fiberglass Avalanche, 1/13/08, Flathead National Forest. Upper probe line is searching for the second, confirmed victim. Lower probe line searching for two other reported, unconfirmed victims. It was later resolved there were only two fatalities and no additional victims.

Photo by Stan Bones
Flathead National Forest

West Central Montana Avalanche Center

A moderate to strong La Niña characterized by above-normal snowfall amounts and cooler overall temperatures influenced weather in western Montana this winter (2007/08). Also noteworthy were the seemingly constant high wind speeds at the higher elevations and the persistence of weak layers that formed in early December and late January. These weaknesses were responsible for several avalanche cycles that occurred during and after passage of significant storm systems in the area. We issued a total of 19 avalanche advisories this season and four special avalanche warnings for high avalanche danger. There were at least six known close calls within our advisory area, all during periods when the posted avalanche danger was at high or considerable.

AVALANCHE INCIDENTS—

1 complete burial and live recovery in the Rattlesnake – backcountry skier
 2 separate incidents on Sheep Mountain – backcountry skiers
 2 separate incidents in the Rattlesnake – backcountry skiers
 1 close call in the southern Bitterroot – backcountry skiers
 1 caught but not buried near Lolo Pass (Crystal Theater) – backcountry skier
 1 highway closure for several hours (I-90) due to road cut avalanche on Lookout Pass. A later closure for avalanche control was implemented. There were no results during AC work.

There were two significant events that occurred adjacent to but well outside our advisory area in the Clearwater Mountains of Idaho west of Missoula. A series of avalanches forced a two-week closure of Highway 12 due to avalanches blocking the highway 35 miles west of Lolo Pass. A semi-truck was pushed into the Lochsa River and almost completely buried during this event. The driver was able to escape with assistance from other drivers at the scene. On March 16, one snowmobiler died (four caught, one injured, one killed) in an avalanche on Sheep Mountain, north of Orofino, ID, 175 miles west of Missoula.

Use of the Web site missoulaavalanche.org continues to increase. The host Web counter recorded 312,009 hits for the period of November through March. January alone recorded 102,957 hits. This compares with last year's season total of 195,532 hits. The year-to-date total is at 381,530 hits as of March 31, 2008 (4/1/07-4/1/08).

Local radio station, The Trail 103.3 FM, broadcast a one-minute avalanche update every Friday and Saturday and ran a 30-second avalanche-awareness promo all winter several times a day. Estimates are over 30,000 listeners every day. A local backcountry-gear shop, The Trail Head, sponsored this broadcast.

An avalanche-warning system was added to the Missoula NOAA WX Web site in the form of a color-coded map with short warning text and a link to missoulaavalanche.org. The daily NWS WX Backcountry Weather Forecast is the most visited Web page for NWS locally.

The West Central Montana Avalanche Foundation, (the local friends group), co-sponsored a benefit with Big Sky Brewery. The Burning Dog/Pray for Snow outdoor event was a success with over 800 in attendance on a rainy, windy October evening. Several other benefits were sponsored by a variety of local organizations in support of the avalanche center's activities. REI donated proceeds from the Warren Miller film at the Wilma, and a local DJ donated proceeds from her event as well. These events and other donations and promotions raised approximately \$10,000 for the foundation this year. Another benefit, AVALAUNCH Music and Film Festival, was a bust; however, 75 people attended a free avalanche class the center provided at the Wilma. Significant partnerships and support came from the University of Montana, Montana Fish, Wildlife & Parks, the National Weather Service in Missoula as well as the Lolo, Bitterroot, and Clearwater National Forests. The University of Montana Campus Recreation program again contributed the time of one of their employees (Dudley Improt) to conduct field assessments, help write the advisory, and teach several avalanche-safety classes in the community.

We also started posting short videos on YouTube to help illustrate stability test results. This proved to be a very popular and educational addition to the advisory.

The Avalanche Center, in partnership with the University of Montana and the foundation, sponsored 28 classes ranging from a number of one-hour basic awareness programs to two 20-hour Level 1 classes. Approximately 800 individuals attended these sessions. Classes were provided for Forest Service personnel, Life-Flight crews, Wilderness EMT candidates, Search & Rescue teams, snowmobile guides, and backcountry snowmobilers, skiers and snowboarders. Carole Johnson taught nine avalanche-safety classes in the Superior, MT area attended by 181 individuals. Eighteen avalanche-safety programs were presented at the 7-12 grade level in several local schools in which 355 students attended. Four of these were field sessions.

We were contacted several times by local news-media outlets seeking information regarding avalanche accidents, local avalanche conditions, or detailed background information about avalanches in general. A number of live and recorded interviews with both television and radio news reporters resulted. The *Missoulian* covered us extensively with a front-page story then a later feature article for the Sunday *Missoulian* on the work and training the avalanche center performs. *Missoulian* editorial staff also gave a strong endorsement of public support of the avalanche center through their *Opinion* page early in the winter. We were contacted and interviewed by the *Montana Kaimin*, *Montana Quarterly*, *Missoulian*, KPAX, KECL, KUFM, and we also gave short interviews to many local writers working as stringers for a number of magazines and newspapers in western Montana who were seeking information for research papers or future stories.

With generous support from the local community through our Friends group, we are planning to add an additional advisory day and increase our education effort in western Montana next season.

—Steve Karkanen, co-director & forecaster

Gallatin National Forest Avalanche Center

It was a wonderful snowy season. The snow-water equivalent (SWE) at the end of March at five SNOTEL sites scattered throughout southwest Montana was 100-120% compared to the average SWE for the period from 1971-2000. Snow consistently accumulated during the season. A seven-day period in mid-February was the longest dry spell. There were no prolonged cold or warm periods. Abundant snowfall, seasonal temperatures, and excellent skiing, snowboarding, and snowmobiling conditions spawned fond memories of winter 2007/08.

One fatal avalanche tarnished the season. A backcountry skier caught in an avalanche north of Big Sky died from injuries sustained when he struck a tree. There were 44 other human-triggered avalanches reported in southwest Montana. Four people were fully buried and 12 were partially buried. Two people were injured. Avalanches in December and January fractured on faceted crystals near the ground. Thin layers of small-grained faceted crystals often mixed with surface hoar buried 1-3' deep were primarily responsible for avalanches in February and March.

The Gallatin National Forest Avalanche Center produced 125 daily avalanche advisories. The first included the only avalanche warning of the season, which was issued December 4, 2007. The final advisory of the season, on April 6, 2008, mentioned 20" of new snow at Bridger Bowl. The advisories were accessed an average of 2,695 times a day, which is a 12% increase over last year. This was the second year that links to YouTube videos were included in the advisories. Seventeen were produced this season. They were viewed 36,500 times.

Our avalanche-education program has expanded over the last two seasons with the help of the Friends of the Avalanche Center. We gave a record 96 lectures, seminars, and field sessions to 3,927 people. That's 30% more talks than last year.

A local motorsports shop, Team Bozeman, worked with Yamaha and the Friends of the Avalanche Center for the eighth year in a row to loan us snowmobiles. This year we were given two powerful 2008 Yamaha Nytro MTX 4-stroke sleds to ride. We held on tight and by the end of the season we shredded over 1,300 miles on each one.

At the end of March, Benjamin Zweifel, a forecaster with the SLF in Davos, Switzerland came to visit. We put him in the field all seven of his days. We were the anchor leg of his one-month journey visiting avalanche centers across the West. We made sure he got on the plane tired, especially his poor right thumb since he fell in love with snowmobiling.

The Gallatin National Forest Avalanche Center had some personnel changes this year. Ron "Mangled Meniscus" Johnson started the season fresh out of knee surgery. Although he couldn't do field work, he was able to work steady office hours and teach classes. In December, Mark Staples was hired part time to cover Ron's field days. The Friends of the Avalanche Center funded this extra position. Scott Schmidt started the season knowing he might not finish since he was applying for another job. At the end of March, Scott ended his 10-year avalanche-forecasting career and is now operating remote controlled submarines beneath the seven seas. Although Doug Chabot, director of the avalanche center, was caught in the paper avalanche associated with these changes, he adeptly managed to escape unscathed.

—Doug Chabot, director

Southeast Alaska Avalanche Center

After stringing the decision-making process out until well after the avalanche season was underway in December 2007, the City and Borough of Juneau, Alaska completely dropped the ball, funding only an unworkable one-third of the cost of the Southeast Alaska Avalanche Center's community-based nonprofit urban avalanche forecast, leading to its cancellation.

At the time, Director Bill Glude noted, "The entire program would have cost the equivalent one \$5.20 burger per year to save lives in a town whose urban avalanche situation is the worst potential avalanche disaster in North America, at the same time that the city is spending tens of millions on a new parking garage, swimming pool, major road reconstruction, and a cruise-ship dock."

Though the forecast program was suspended, the center provided its full range of educational services through the season.

The status of the forecast program this winter is still uncertain, but a new City Emergency Manager is finally responding to 12 years of center efforts to establish cooperative in-kind, grant, and funding support.

—Bill Glude, director

Chugach National Forest Avalanche Information Center

The Chugach National Forest Avalanche Information Center (CNFAIC) kicked off the season with an avalanche-awareness workshop in Anchorage, AK. This weekend event brought together professional instructors from around the state. It was a milestone in avalanche awareness in Alaska. Never before has there been a cadre from Alaska under the same roof sharing their knowledge with the public. Instructors from Alyeska Resort, AK Avalanche School, H2O Guides heli-ski, NAOI, Southeast AK Avi Center, Snow Dynamics, BART, Alaska State Troopers, and Alaska SAR all led informational talks. This networking paid off when the CNFAIC and the Alaska State Troopers put out their first joint avalanche warning on February 14 for south-central Alaska.

The center hosted the annual Fireside Chats again last November. This series of free avalanche-awareness lectures serves as a refresher or an introduction to backcountry travelers. In addition to these classes, over 500 individuals attended six awareness talks in Anchorage. The center also hosted three Level 1 workshops.

Staffing for the 2007/08 season was challenging with a reduced budget. The forecasting staff consisted of Lisa Portune, Matt Murphy, and Carl Skustad. Glacier Ranger District employee Dan Keeler was instrumental in field observations as

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were many volunteers. The CNFAIC posted another 105 advisories for the 2007/08 season and the Web site once again showed increased visitation with 8500 hits in February alone.

The season proved to be media frenzy with two major local news channels doing segments about avalanche safety in the backcountry. Both Murphy and Skustad got quite comfortable with the media and finished the winter with the Discovery Channel cameras and Les Stroud from *Survivorman*.

A total of four avalanche fatalities occurred this season. Two snowmachiners were killed at Turnagain Pass on February 15, one skier on March 3 at Cordova, and one snowmachine access boarder on March 9 at Thompson Pass. The snowmachiners at Turnagain Pass were professional riders and had been featured in snowmachining films. A seven-day storm with wind over 100mph and 8' of storm snow hampered recovery. During the recovery another very large class-5 avalanche broke free on the opposite side of the pass (*see story on cover & page 10*). It buried a single skier 4' deep for 30 minutes before searchers dug him out alive. This rescue was led by forecaster Matt Murphy who was skiing off-duty in the vicinity. The skier took a 1500' ride before being found by an amazing recovery and rescue: nice work Murphy! The second fatality at Cordova hit us all close to home. Avalanche-expert Mike O'Leary was collecting observations on the backside of Mt Eyak when the snow under him carried him into the trees in a very large slide (*In Memoriam to appear in TAR 27/2*). On April 7, the fourth Alaskan avalanche fatality of the year occurred when a Valdez snowboarder was swept away after accessing the steeps with his snowmachine.

Another cool winter allowed for limited rainfall and abundant snow. Turnagain Pass's snowpack was 139% of normal and Alyeska's was 127% of normal. Snowmachining was still great through Memorial Day weekend. Most of south-central Alaska's snowpack developed six layers of intact, buried surface hoar. These layers were responsible for all four fatalities and numerous other close calls.

The center was very fortunate to once again have the support of the Friends Group. The 5th Annual Jeff Nissman Telepalooza at Alyeska Resort was again the best fundraiser of the year. The Friends group was active in maintaining our weather station network and also added a mountaintop camera which is accessible on the internet.

—Carl Skustad, director

Kachina Peaks Avalanche Center and Northern New Mexico Avalanche Center

Despite the mild La Niña conditions in the equatorial Pacific, most high-elevation localities in US Forest Service Region Three received close-to-average snowfall based on a 30-year mean. A number of cut-off mid-latitude low-pressure systems dug south crossing the region and delivered production precipitation.

Ski Santa Fe received a total of 199" of snowfall (88.5% of mean), Taos Ski Valley received 310" (102% of mean), and Arizona Snowbowl received 240" (96% of mean). In Arizona, snow densities were typically above normal, and temperatures were near normal when averaged over the entire winter season. Above-average early-season temperatures were balanced by cooler-than-average temperatures starting in January and lasting through the end of the ski season.

Storm and post-storm winds were a highlight of the season. The Arizona Snowbowl had a record number of lift closures due to dangerous crosswinds. Wind speeds between 60-85mph were not unusual at the top of Agassiz lift at 11,400'. Both Taos Ski Valley and Ski Santa Fe reported a few unusual wind events that caused lift closures. However, overall wind speeds in New Mexico were reported at near-normal velocities.

On the San Francisco Peaks, above tree-line avalanche hazards were mostly eliminated by loss of snow due to wind-transported sublimation. Except in the early season, most of the high-altitude starting zones were stripped free of snow by post-storm winds. There were several reports of hard wind-slab development in remote southern and southeastern starting zones of the inner basin and south-side slopes, but conditions in the high country were generally quite stable due to the lack of accumulated snow. The exception occurred during an early January storm that dropped 2-4' of snow and was accompanied by significant wind. This event laid down lots of slab on top of a weak faceted snowpack and created some instability. On this particular occasion, the Coconino's Sheriff's Department sent out a press release concerning potentially hazardous conditions after consulting with members of the Kachina Peaks Avalanche Center (KPAC). The press release was given to local media sources, sports shops, and posted on the KPAC Web site.

Backcountry conditions generated lots of excitement and recreational use within Kachina Peaks Wilderness. The Coconino National Forest issued a record-breaking 633 winter backcountry permits. This permit system has been a local feature since 1995, when our first and only avalanche fatality occurred. The primary purpose of the permits (issued to individuals for the entire season) is to disseminate educational information on the seriousness of winter backcountry travel. With an open-boundary policy, the Arizona Snowbowl resort's leased land is the primary gateway into the backcountry. Unfortunately, this and other factors contribute in attracting many who are relatively uninformed and inexperienced in terms of avalanche safety and awareness. This notion is supported by at least six search and rescue missions launched by the Coconino County Sheriff's Department during this winter. Searches and rescues involved 15 individuals who could be described as mainly lost or confused out-of-bounds snowboarders, most of whom reported their own predicaments via cell phone. There were no reported avalanche accidents in the southwest region during the 2007/08 winter seasons.

Snow-safety issues in the Southwest Region of the Forest Service are relatively tame in comparison to other Western regions. However, avalanches do occur within several specific mountain ranges, and in these localities snow avalanches pose a significant risk to backcountry users. The seriousness of the issue is exacerbated by the unparalleled growth in the Phoenix area (the fastest-growing metropolitan area in the country), and also in Albuquerque, NM (currently the sixth-fastest growing city in the US). Many users from these areas demonstrate (and self report) low levels of awareness and/or experience with winter backcountry safety. Practices such as carrying transceivers, shovels, and probes are relatively rare (<50%) among Southwestern backcountry skiers, snowboarders, snowshoers, and snowmobile users.

The big unknown is climate change. Winter conditions in the region currently show high variability, and this is unlikely to stabilize in the near future. It is recommended that the US Forest Service in our region monitor changing environmental and demographic conditions relevant to snow recreation and use the data to advise future management decisions. In the past, little Forest Service funding has been allocated toward winter backcountry safety or education. This may need to change.

—David W. Lovejoy, secretary

Eastern Sierra Avalanche Center

The Eastern Sierra Avalanche Center issued the last advisory of the 2007/08 season on May 28, 2008. Despite another dry year for snowfall, March and April were unseasonably cool and windy; spring snowmelt was delayed by several weeks. Skiers and riders enjoyed spring conditions into mid-June and even over the July Fourth holiday.

The 2007/08 season will be remembered for the late start to the ski season, a cold snowy January, cold unrelenting wind, and a promising snow season that switched off at the end of February. Almost 50% of the season's snowfall came in three storms, resulting in three large and destructive avalanche cycles – a typical pattern for the eastern Sierra. Though the cool and windy spring weather was not favorable for the legendary true corn snow to form, a variety of mostly skiable spring conditions were enjoyed by many skiers and riders through the middle of June.

With relative humidity in the single digits in March and April and unusually windy conditions, conditions were favorable for the formation of *nieve penitentes*. These dagger-like formations occasionally form on high-elevation plateau terrain in the high Sierra, but this year was unusual because *nieves* formed in the low to mid elevations and did not form at all in the Tioga Pass area. During the first part of April, colder-than-normal temperatures kept the *nieve penitentes* in a daily frozen state, making for some interesting adaptations to ski technique to prevent getting ski tips caught between the ridge-like fins.

With a moderate strength La Niña in place across the tropical Pacific, the more northerly storm tracks typical of the La Niña pattern left the Sierra high and dry but resulted in huge snowpacks in the Pacific Northwest and British Columbia. While storm after storm hit Oregon and Washington, steep pressure gradients resulted in severe wind events in the Sierra. High-elevation terrain was wind stripped over the entire range, and avalanche-starting zones were found much lower than normal on slopes.

Highlights of the ESAC 2007/08 season include:

- A 20% increase in the number of advisories over previous seasons, providing avalanche information an average of four days a week. The Web site received over 2-million hits with 29,000 people accessing the advisories. Though this number is small compared to the big centers in Utah, Montana, and Washington, over the course of a snow season the majority of backcountry use comes from large population centers several-hundred miles away. Locals comprise about 25-35% of the seasonal use. One curious Web site statistic is that 65-75% of visits are 30 seconds or less in duration.
- The avalanche-education program expanded from five to 11 presentations. The small (population 300 each) east-side communities of Lee Vining and June Lake were included this winter. The enthusiastic turnout comprised about 10-15% of the communities. Attendance at these events was in startling contrast to the one or two people who showed up for the Mammoth presentations. Several hundred people viewed the powerful avalanche video, *A Dozen More Turns*.

This season, Tim Villanueva, AMGA- and AIARE-certified instructor and local ski guide with an international guiding resume, joined Sue Burak as a co-host for several avalanche-awareness presentations. Eric Diem, the director of the June Mountain ski patrol; UIAMGA guide Neil Satterfield; and Jeff Pierce, avalanche specialist from the Southern California area joined Sue Burak for a timely educational evening in the community of June Lake.

The avalanche-training facilities in town and at the Mammoth Mountain ski area were used by search and rescue, guide services, local ski clubs, and many individuals this year.

Due to good mid-winter snowfall and internet sites like Splitboard.com and Telemarktips.com, many areas that had previously escaped attention were visited by backcountry parties with dogs, creating some concern for potential



Sierra-size sunball.

Photo by SP Parker



impacts to endangered Sierra Nevada bighorn sheep in their winter range and during spring lambing activities.

Despite a dry March and April, spring backcountry use increased with the greatest numbers visiting the southern Sierra. It became clear that avalanche services are needed for the Mt Whitney area.

Though all avalanche forecasters strive to provide the necessary information to make safe decisions in the backcountry, people still get in trouble. This year it seemed people were trying to make up for the lousy ski conditions of last year, and many people triggered and were caught in small slab avalanches, especially around the Mammoth area. Snowmobile use in easily accessible avalanche terrain also increased with a few close calls but fortunately no injuries.

—Sue Burak, director (at left, in snowpit)

Colorado Avalanche Information Center

The CAIC opened for forecasts in November with the same staff as last year. As across most of the country, snow was slow to come. The dry weather allowed for staff to ease into what turned out to be a big year for snowfall, avalanches, and hours worked. Several storms in October left plenty of snow in the alpine which, true to form, turned to depth hoar and would haunt the first half of our season.

NOVEMBER— High pressure and little or no snow marked November until Thanksgiving week. Even with so little snow, there were two avalanche incidents for the month. The first on November 14 caught two skiers near Jones Pass in the Front Range zone. One person had skied the slope and stopped at the bottom to watch their partner. They were partially buried by a hard slab triggered by the second skier. The second incident occurred on November 24 in the Vail/Summit County zone; a hiker was buried to the waist in a soft slab. For the month only six avalanches were reported.

DECEMBER— Winter finally started with cold temperatures and abundant wind. Several ski areas approached or set snowfall records including Snowmass, who reported 119", surpassing their 28-year record by 2". The Wolf Creek Pass CDOT weather station was 462% of average! The equation of big snows plus early season depth hoar produced lots of avalanches. There was one avalanche fatality on December 2 near Cameron Pass west of Fort Collins when a hiker carrying his snowboard was caught and buried at the bottom of an avalanche path locally known as Hot Dog Bowl. A group of three people was heading across the runout zone a little way above the lower trimline when they triggered the sizable soft slab. The other two party members were able to quickly locate the victim, but he died several days later in hospital. A very close call on Colorado's second highest peak, 14,421' Mt Massive, happened on December 30 while two skiers were climbing uphill. Both were blasted off a cliff with one man sustaining a broken leg. For the month, 556 avalanches were reported with 11 people caught, five injured, and one person killed.



Acres of nieve penitentes, Tyndall Plateau, eastern Sierras, April 2008. Photo courtesy ESAC

JANUARY— For the second straight month, Snowmass set a snowfall record with 89" of measurable snowfall. There were 15 days of measurable precipitation in the northern San Juan with several avalanche cycles that closed major passes. Red Mountain Pass was closed from January 5-10, and all major passes across the northern San Juan were closed for several days at the end of the month after a large snow and wind event brought on a significant natural-avalanche cycle. On Wolf Creek Pass, 100" of snowfall was recorded by our CDOT forecaster. It was the fourth-snowiest January on record for his forecasting history. By the end of the month, Mark Mueller had already seen more avalanches than any previous season since highway forecasting started in 1993. Two snowboarders from New Mexico disappeared outside the Wolf Creek Ski Area on January 4. As of early summer, there was still no sign of them. If these two were killed in an avalanche, Colorado would be above average for the number of annual fatalities.

Statewide, January was a big month for avalanches and incidents. For the month, 773 avalanches were reported to the center. In all, 25 people were caught in slides, three people were killed, two were injured. Near Ophir, a parked Chevy Suburban was destroyed when the St Louis slide path ran to the valley floor on January 8.

FEBRUARY— After an active December and January, forecasters were fairly gun-shy and suffering from a serious lack of sleep when an avalanche fatality occurred on February 1. A snowmobiler at the end of a day in the Flattops was caught and killed in a small slide that involved a terrain trap. Unfortunately his two friends were some distance ahead and did not know that he had been caught until some time later. As difficult as it has been to believe, the last avalanche fatality of the season was the accident on the February 1 (as of the writing of this report on May 2). Still, it was a busy month for avalanches. Across the state, 538 avalanches were reported, and 21 people were caught in those slides, but only two people were injured. One vehicle was hit by a slide on Red Mountain Pass on Valentine's Day.

MARCH— Snowfall across Colorado continued its onslaught into the spring. The town of Breckenridge, with records going back to the 1800s, was having its eighth-biggest winter with another 34" of snow and 2.6" of water. For the winter, Breckenridge was 39% above the historical average. In the central portion of the state, McClure Pass had measurable snowfall on 16 of the 31 days, totaling 37", which was 145% of the Snotel average. Conditions had reversed in the southern portion of the state where, after a huge early season start, the Wolf Creek Pass CDOT weather plot was 29% of the 14-year average for March with only 16" of new snow reported. For the most part, worries about persistent weak layers had faded away. March had only one reported avalanche incident on the 27th when one skier was caught and swept onto US Highway 550/Red Mountain Pass. Only 172 avalanches were reported to the center, a little more than half what would typically be reported in April.

APRIL— April continued to hammer the northern and central portions of the state. Across the southern mountains, spring had sprung with little in the way of new snowfall. The CDOT weather site on Red Mountain Pass did pick up an extra 42.5" of snow out of the 11 days of measurable snowfall. But Wolf Creek Pass had only 13" of new snow, 28% of average. With the big early winter, Wolf Creek still ended up at 138% of average. Up north it was a different story. The town of Breckenridge was celebrating its seventh-snowiest year on record with 207 total inches of snow in town. There were two people caught in avalanches during the month. Both slides ran on April 27, when avalanches were generally hard to come by. The first was a large sluff that caught a backcountry skier from behind in a steep southeast-facing couloir off East Partner Peak in the Gore Range. The second incident caught a rider near Rollins Pass west of Boulder. He was almost able to ride it out but sustained a serious shoulder injury requiring evacuation by a search and rescue team. April still totaled out as the fourth biggest month for avalanches with 317 being reported across the state.

MAY— The CAIC remains open well into May for CDOT forecasting on Independence Pass and a general backcountry forecast for the state. As we wrap this up, trailheads are packed, especially on Fridays and weekends. This promises to be one of the best backcountry riding springs in memory. Several of Colorado's ski areas set winter snowfall records, including Aspen/Snowmass with 450", Beaver Creek with 430", Crested Butte with 422", Monarch with 482", Powderhorn with 482", Silverton Mountain at 550", Steamboat with 489" and finally Telluride with 353". Telluride still had a 104" base at Patrol HQ on April 10.

—Scott Toepfer, forecaster

Northwest Weather and Avalanche Center

THE GOOD: Strong La Niña and Heavy Snowfall

Our start to winter occurred rapidly during a major storm and avalanche cycle in early December. Sites near the Cascade crest in the Washington Cascades received about 3' of snow in two days, on December 2-3. This came with a major warming trend, changing the heavy snow to heavy rain on December 3. The increasing wet snow and rain accumulated on crust layers from November. This cycle is indicated in the chart by the spike in snow depths in early December. Five avalanche deaths in only two accidents occurred in the Cascades during this avalanche cycle.

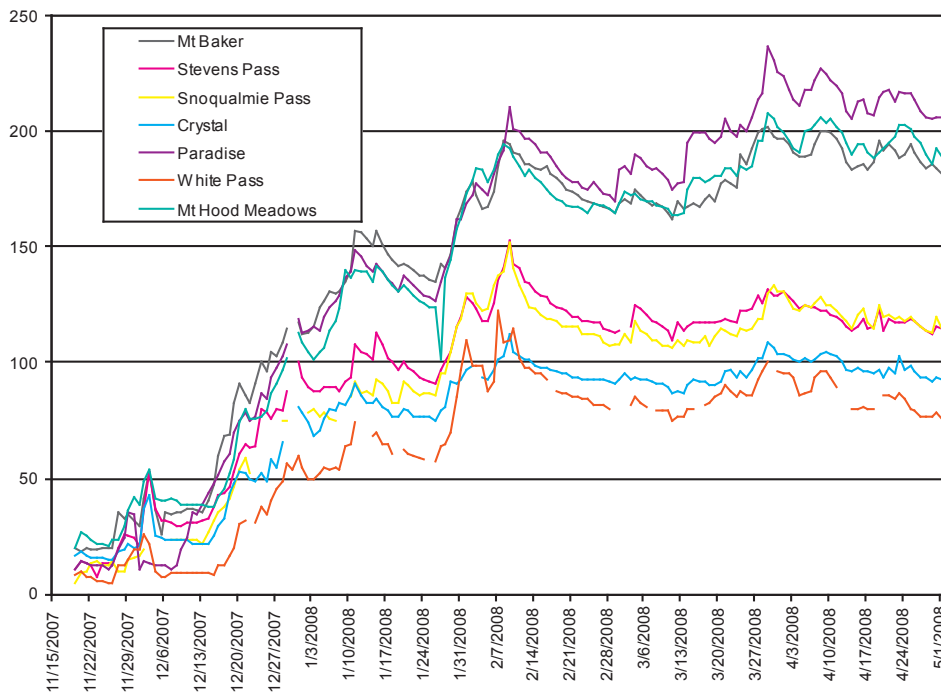
The next extended storm cycle was seen from mid-December to mid-January. Hurricane Ridge and sites near and west of the Cascade crest accumulated 17-24' of snow during this one-month period, while freezing levels remained quite low in elevation. Many sites had several days or more, sometimes consecutive days, of a foot or more of snowfall. Snowfall was especially heavy at Mt Hood. Three more avalanche accidents, on December 18, New Year's Day, and January 4, claimed the lives of four more people.

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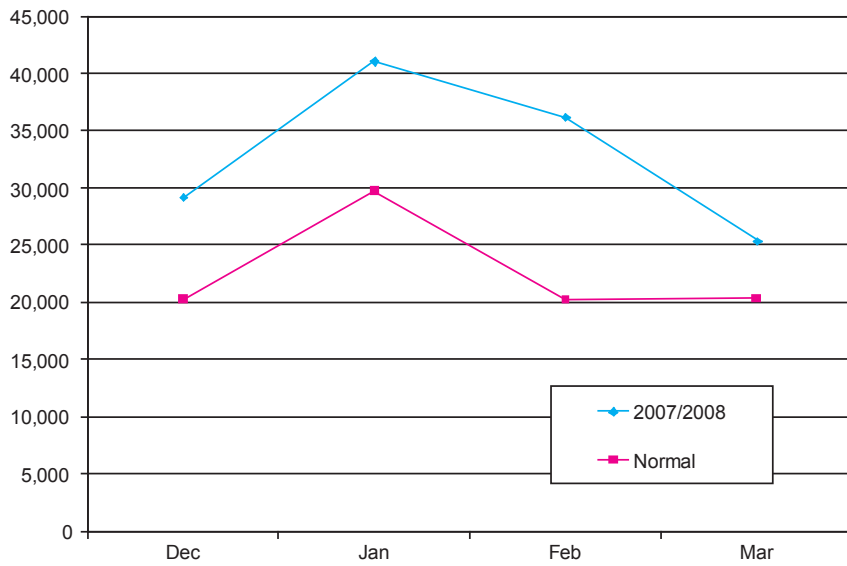
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2007/08 Cascade Snowdepths



Internet Visits to NWAC Avalanche Forecast



The next storm cycle began the last few days of January and continued through the first half of February. Sites near and west of the Cascade crest picked up about 10-15' of snowfall during this two-week period. All three major Cascade pass highways (Stevens, Snoqualmie, White Passes) had extended closures during this period. The most snowfall was seen at Paradise and White Pass, which averaged over a foot a day for two weeks! I distinctly remember the tired voices each morning when talking to snow-safety crews. The public was paying more attention to the avalanche forecasts, and perhaps this is partly why there were no more avalanche deaths during this time. Either that or people were unable to get to the Cascades due to closed roads.

The Northwest experienced a very unusual cold spring with snow continuing to accumulate in the Olympics and Cascades in April. This led to record total snow depths in the south Cascades at White Pass and Mt Hood Meadows by May 1.

THE BAD: Nine Avalanche Deaths in about a Month Early in the Season

Nine avalanche deaths in a season is a modern-day record in Washington; all occurred within the period of about a month from December 2 – January 4. I noticed that historically fewer people read avalanche forecasts in December according to counts on the NWAC Web site (see diagram above). I wonder if the combination of a major early season avalanche cycle and relatively less attention to forecasts early in the season helped lead to the high number of fatalities?

THE \$\$\$: We knew since last fall that the NWAC operating budget was short \$58,000 for this season and \$73,000 for next season. The Friends of the Avalanche Center and our State Senator Jacobson went to work on this issue last fall and this winter. As a result, these funds for each season were allocated to the NWAC via the Washington State supplemental budget this spring.



Asa Mueller lends some scale to a natural avalanche crown in White River Canyon on Mt Hood, OR, on February 8, 2008. Photo by Tighe Stoyanoff

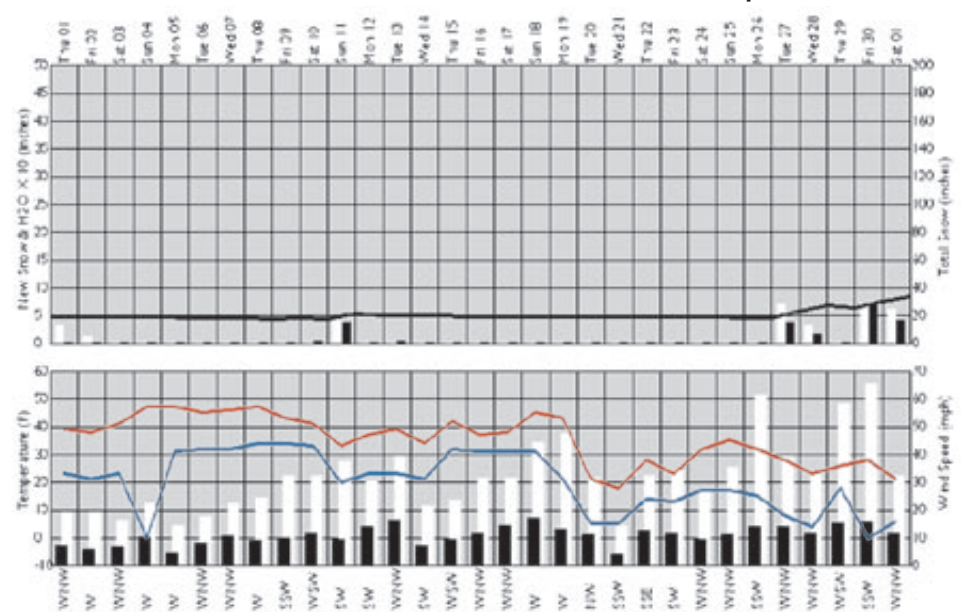
On a related note, Knox Williams finished his report last December to the Washington State Parks and Recreation Commission regarding the potential for future administrative scenarios for the NWAC. His strongest recommendation is that the NWAC remain administered by the Forest Service. He also suggested that partners commit to five-year funding plans and include cost of living increases. Other recommendations for sustainable avalanche centers included: many committed partners, community awareness, respected and well-spoken staff, timely concise products, a business plan, an innovative strategy, and an exciting Web site. —Garth Ferber, forecaster

Utah Avalanche Center – Wasatch & Uintas

Cries of “Viva La Niña” rang out in October with early season storms...and despite most of us sitting around with the crickets chirping in November, the Wasatch again hit the jackpot with season totals of 600-700" of snow in the Park City and Salt Lake mountains. After an unusually dry Indian summer in November, few would have guessed that the Wasatch would have had such a snowy winter, much less reach 500" total the fourth earliest in recorded history. A wet and stormy October got most of us licking our chops, but November's drought flat-lined the snowpack as well as our enthusiasm and set up a good foundation of depth hoar that plagued us once the snow started to fly in December. With this dicey initial snowpack, 29 of our recorded 81 unintentionally triggered avalanches occurred in December. The storms of January and February healed and strengthened the snowpack. By the end of January, the new incidents involved storm-snow avalanches or persistent slabs that were quick to settle out. By our numbers, which are far from comprehensive as not all incidents get reported, 42 backcountry recreationists were caught resulting in 15 full or partial burials, nine sustained injuries, and three fatalities: one skier and two snowmobilers. Many of the storms hammered the lower-elevation valleys as well. It made for plenty of shoveling for the townies, but the mid- and low-elevation coverage was the best in years.

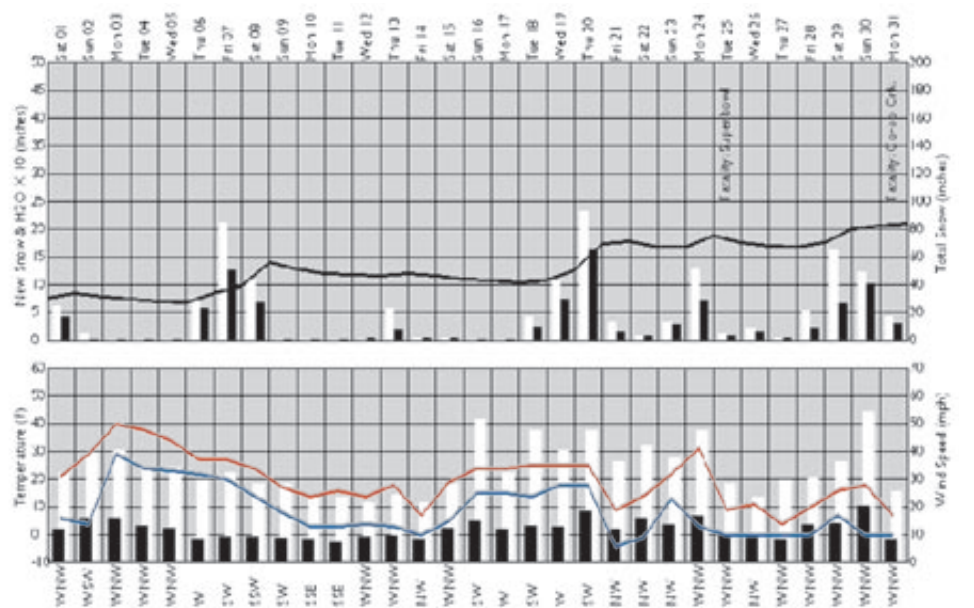
October (53"/5.09")— Nearly every weekend brought rain to the valleys and snow to the mountains. By month's end, Alta recorded 53" of snow with 5.09" of snow-water equivalent. Southerly aspects remained thin, but the high northerly aspects provided mid-winter powder conditions for those anxious to pull their gear out of the closets and garages.

November (21.5"/1.58")— Flat-lined enthusiasm and snowpack

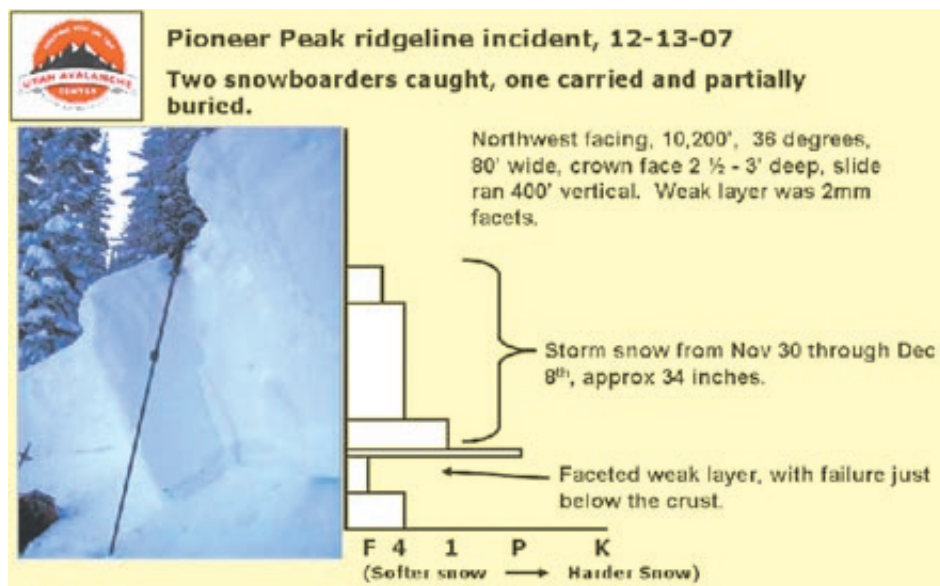


With only a couple of trace days and a 4" storm on November 11, we were on the verge of breaking the record for the driest November, set in 1976/77. Late-month disturbances brought enough precipitation to avoid a new drought record. But it was little more than dust on crust and depth hoar on the north-facing slopes and dust on dirt on the sunny slopes. Early season hopes and anticipations were dashed, and we at the forecast center looked upon the pre-existing snow with dread as October's base of 35-40" rotted down to less than 20" of unsupportable weak, sugary, faceted snow. The next significant snow storms would trigger the first avalanche cycles of the year.

December (147"/9.44")—



With this set-up, it's not surprising that more than a third of our unintentionally triggered avalanches and all of our fatalities occurred during this month. It finally started to snow, bringing precipitation 21 of 31 days in the month. This only provided the missing ingredient – a slab – for natural and human-triggered avalanches. Even the cagey pros were walking on eggshells in the high northerly



terrain. Evelyn's crown line profile from an accident site (above) reflects the upside-down, strong-over-weak structure that was ultimately responsible for much of the slide activity and the three fatalities the last week of the month.

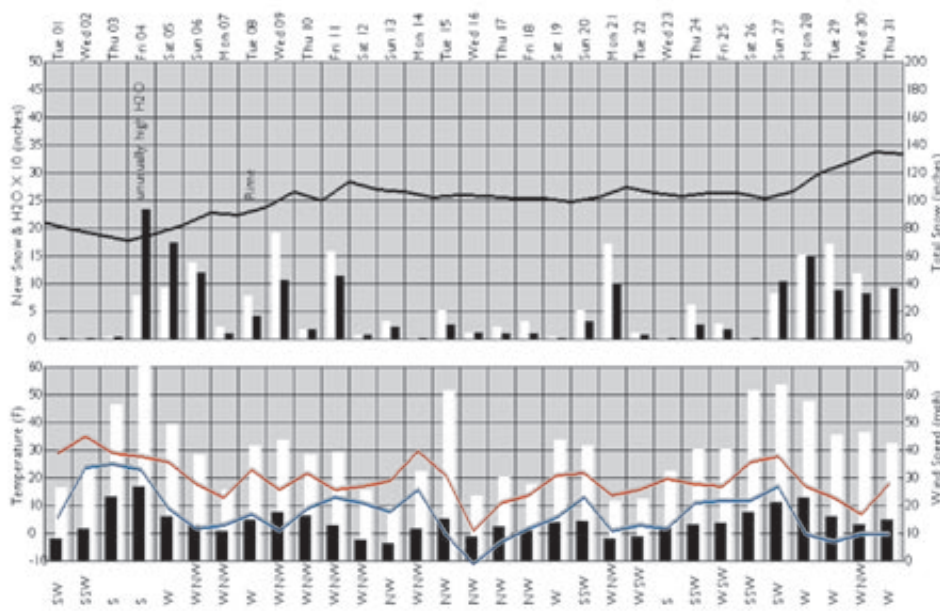
The first fatality occurred on December 23, in-bounds at The Canyons Resort. The story line may be one of the more dramatic and emotional events that we've seen



Western Uintas site of the tragic Christmas Day fatality of a snowmobiler.

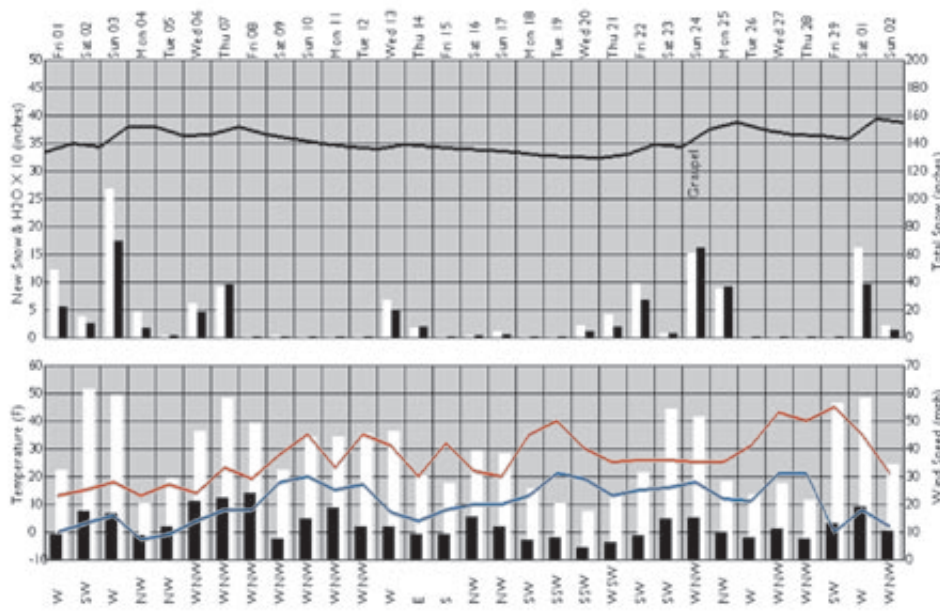
in a few years. What started with a tragic death of a man in his late 20s ended with the startling and miraculous recovery of a pulseless 11-year-old boy completely buried in the runout zone. More details on these fatalities can be found in our *Avalanche Incidents and Accidents* section on the Web. Two other men recreationally snowmobiling lost their lives in tragic accidents in the western Uintas: the first on Christmas Day, the next on New Year's Eve.

January (178.5"/15.43")—



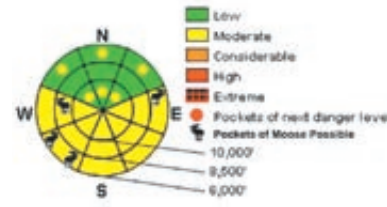
January was the second-snowiest January on record, compared to 1994/95's trace-shy of 200". It snowed on all but six days for the month. The dreaded January high-pressure inversion never had a chance, and we more than made up for our weak November precipitation. By this time, enough snow had fallen to strengthen our weak basal snow, and except for a few isolated "repeaters" from early season, accidents and near misses were mostly in new-snow-only instabilities. From here on out, the avalanche problems would spike like an EKG monitor – in perfect lockstep with each storm, then settle out as quickly as it had arrived. This was not the case in the western Uintas – a cold, windy high-mountainous region that receives much less snow than the central Wasatch. Like their high, laccolithic cousins to the south – the La Sals and the Abajos – they are almost like a part of Colorado in appearance and elevation and congenitally weak with a poor snowpack structure.

February (116"/8.67")—

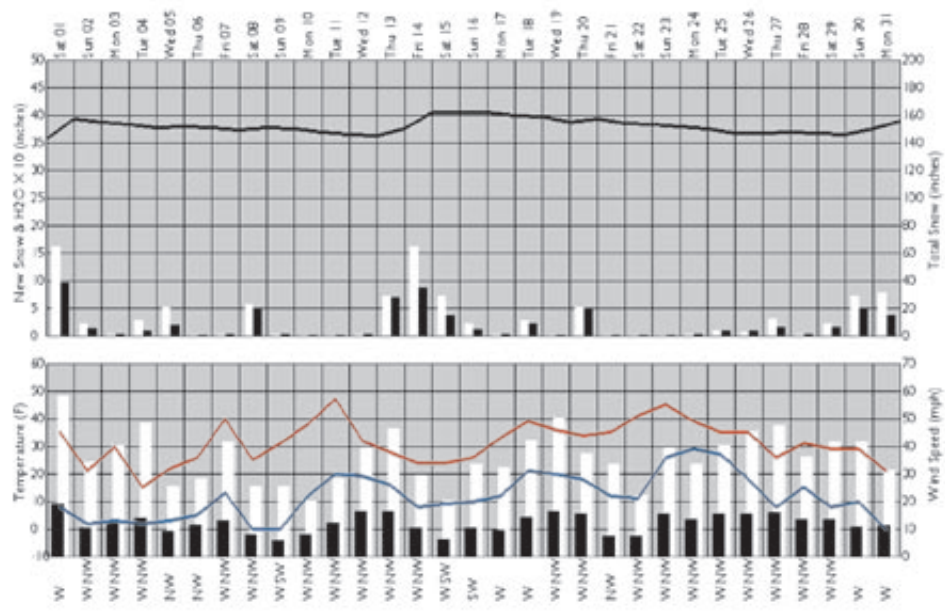


Storms raking the central and southern Wasatch the first week of February kicked off an impressive avalanche cycle with many natural and explosive-triggered

avalanches crossing the closed canyon roads. Mid-month saw some slowing in the deluge, but a 15" dump on the 24th pushed the season total past 500" for the year, the fourth earliest in recorded history. Not everyone or everything was exactly thrilled with all the new snow, particularly at the lower elevations. Many of the deer, elk, and moose became even more stressed by the cold and snow and often retreated to even lower elevations or onto the trails, leading to "negative encounters" with the skiing and riding public. We at the UAC would encourage folks to give the animals a wide berth when encountering them, with the reminder that the ungulates and critters don't get to "go home" at the end of the day. One prankster sent us an updated danger rose to include moose. A higher sun angle and a few warmer days at the end of the month brought the first few wet avalanches into play on the steep sun-exposed slopes.

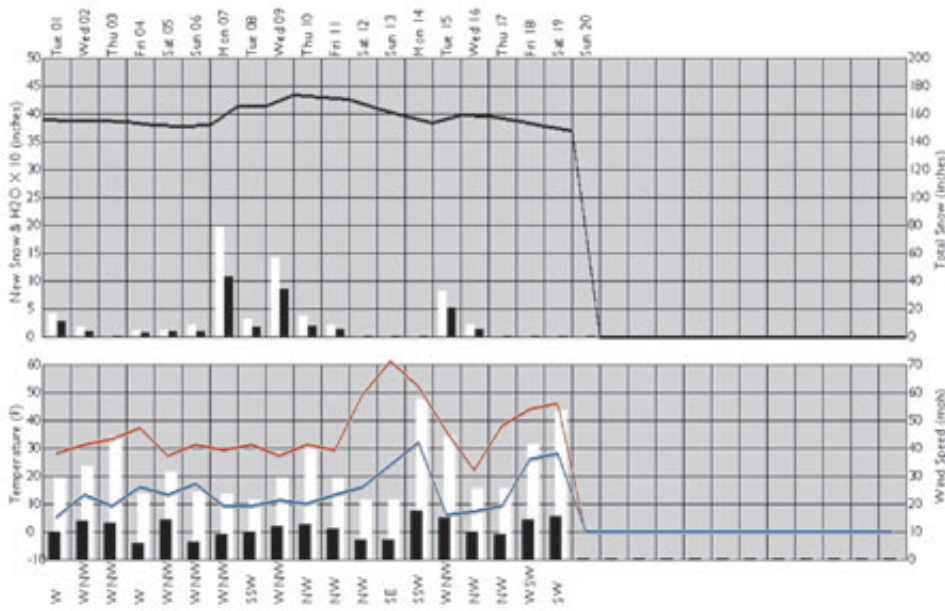


March (93"/5.72")—



In last year's March report, I wrote, "This dry and radically warm March effectively placed an iron stake into the average backcountry enthusiast's heart." It was a far cry from the previous year's rapid transition from winter to summer, which had few nights below freezing and many daytime highs in the 60s in the mountains. Snowfall continued into March, although by comparison it was a dry month. Periods of high pressure allowed for the development of some surface-hoar layers and faceting at and just below the surface of the snow. Four significant slides were triggered on this layering between the 14th and the 17th after nearly 2' of snow fell on this tenuous but short-lived layer. Two of the slides were triggered remotely by very experienced ski tourers, with one athlete in her mid-50s taking a 50' ride. Temperatures remained cool through the month, and we saw little of the wet activity from the year before.

April Fool's Day through the 16th: (61"/3.65")—



Spring finally came by about mid-April. The warming was not excessive nor did we have much of what we call a "layered snowpack" ripe for wet avalanching. Similar to our dry-snow avalanching, the wet sluffs and the few wet slabs were confined to just new-snow layering. By mid-month, a few nights of above-freezing temperatures conspired with warm winds and balmy daytime highs to dampen and avalanche-out many of the mid- and low-elevation northerly slopes. At this writing in late April, the upper-elevation northerly slopes still held some good recrystallized powder. The sunny aspects have been slow to develop a well-baked corn cycle. Perhaps May will bring true corn conditions. —Drew Hardesty, forecaster

Utah Avalanche Center – Manti-La Sal

The 2007/08 season in Southern Utah will go down as a memorable one. Throughout the month of November, balmy temperatures melted snow off all but the shadiest of north-facing slopes. A hike to fix the Pre-Laurel Weather Station at 11,700' on November 24 was accomplished with running shoes. To accommodate the new Backcountry Access Beacon Training Park, posts were placed at the Big Drift parking lot during the week of November 26, and the ground was not frozen. A chill started to descend on Moab during the night of November 29. The Friends of the Manti-La Sal Avalanche Center's fundraiser, the Telluride Mountain Film Festival, was held in the newly renovated Star

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Hall. One problem: the heat did not work. The cold viewing conditions foreshadowed what was to come.

On Saturday, December 1, the community of Moab celebrated the Winter Sun Festival. The winter gods awoke, thanks to the high-spirited festival, and on the morning of the 2nd, the first coat of snow blanketed the mountainsides. This was not an ordinary coat of snow. The 12" of snow contained almost 2" of water equivalent and coated half of the ground hazards, making skiing possible on some smooth slopes. The snow stakes that were put on dry ground on November 30 had a job to do. The season really started when on the night of December 6: 10" of snow fell at 9,600' with 1.5" of water equivalent. By mid-December, the season was on. Snowkiters, snowmobilers, and skiers put wintersport on the front burner and forgot about the extended autumn.

The 2007/08 winter season was highlighted by growth. We taught classes in new communities, skied new mountain ranges, added a part-time observer to our rolls, and made our avalanche center more visible.

In partnership with Backcountry Access, a beacon training park was installed at the new Big Drift South parking lot on the Manti-Skyline, a convenient spot for snowmobilers, snowkiters, and skiers who frequent the Manti-Skyline and access avalanche terrain to ski or ride. Through partnerships with the Skyline Snoriders, Yamaha, Big Pine Sports, and the Utah Snowmobile Association, the MLSAC was able to use a new 2008 4-stroke Yamaha Nytro MTX snowmobile. The new machine allowed the forecasters to be on equal footing with all the recreational riders and increased access possibilities. A one-year grant from the Utah Division of Parks and Recreation made it possible to design and place avalanche center and forest service logos on an enclosed snowmobile trailer.

The MLSAC taught 15 classes this year, reaching a total of 374 students. Classes were held in key towns such as Mt Pleasant, Moab, Price, Richfield, La Sal, Monticello, Ephraim, and Cedar City. The classes had a wide variety of user groups and course content. Classes included basic avalanche awareness, snowmobile use, group rescue, beacon practices, and a three-day Level I accredited AIARE course. The largest audience was in Richfield, Utah, where 70 attendees packed a room so full, the class had to be moved to a new location. The most-experienced program was for the Brian Head ski patrol, focussing on snow-pit analysis.

Dave Medara and Max Forgensi put out three separate studies during the 2007/08 season. The forecasters traveled to southwestern Utah for rural education outreach and to produce a feasibility study of an avalanche center down in the southwest corner of the state, currently the only region in Utah not covered by an avalanche center. Although it appears funding is drying up for the 2008/09 year, the MLSAC hopes, at a bare minimum, to continue education efforts in the southwest corner of Utah. The two other studies pertained to avalanche hazard. Due to an abnormal snow year, avalanches repeatedly hit State Highway 31 on the Skyline Drive. Dave Medara submitted a report to the UDOT supervisor for a better understanding on what weather conditions support the build-up and release of these avalanche paths. The third report was for a private landholder in the La Sals whose property could be impacted by a large 100+ year avalanche cycle.

Overall, the 2007/08 season was highlighted by incredible storm cycles and some great skiing/snowmobiling. We issued weekend and holiday advisories for the Manti Skyline throughout the season and three to four advisories a week for the La Sal Mountains. The avalanche center closed its doors early but did issue spring advisories from April 1 into the middle of the month. Excellent skiing and snowmobiling continued into June this year.

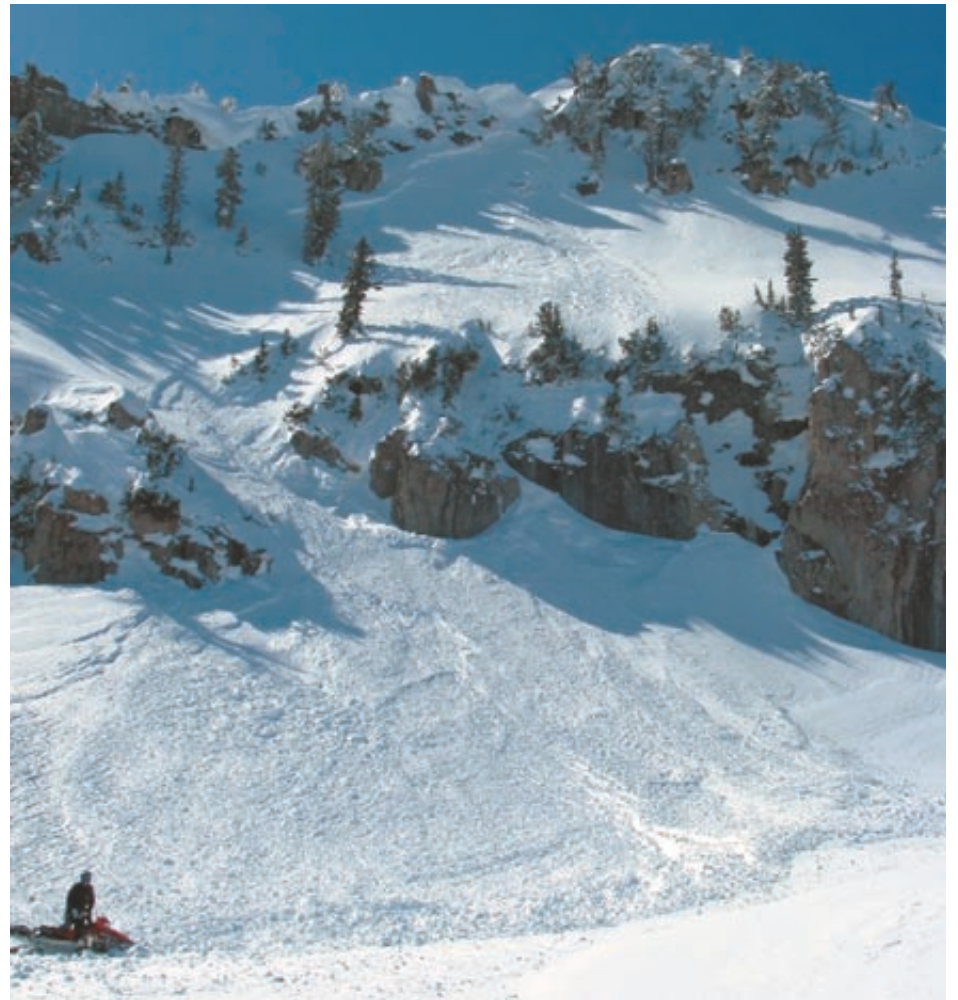
—Max Forgensi, director

Utah Avalanche Center – Logan

With exception of the beginning, the winter of 2007/08 turned out to be an excellent powder year in the mountains around Logan. A deep and generally stable snowpack characterized the season accompanied by relatively few large slab avalanches in the backcountry. The snow season started slowly, with shallow accumulations and riding only possible on a few smooth slopes at upper elevations through November and well into December. The much-anticipated snowfall began in earnest the week before Christmas, and productive storms continued regularly throughout the remainder of the season. Even as I write this in the beginning of May, snow is falling and a few inches of fluff are already on my lawn in town at 4500' in elevation. For May, we've got fantastic coverage and great accessibility from numerous trailheads across the region.

The slow start to the powder season, with very little snow on the ground in November and December, was reflected in poor attendance at my first few free avalanche-awareness talks and caused the cancellation or rescheduling of a couple classes. But, thanks to help from Paige Pagnucco, who was contracted by the Friends of the Utah Avalanche Center in late January, we made great progress with our outreach and education efforts in the second half of this season. We presented several well-attended awareness talks and classes. We also tried a slightly more direct outreach approach, reaching hundreds of the most targeted community by keeping a presence at popular snowmobile trailheads at busy times, directly contacting riders as they departed for or returned from ventures into avalanche terrain. Our new, snazzy 14' logo-covered trailer helped to draw attention, and we were able to both preach avalanche safety and attain valuable backcountry avalanche observations. To assist in this approach, we designed business-card-size awareness cards to hand out to people contacted in the field or at the trailheads.

While Paige took the reins on the outreach and business end of things, I was freed up to concentrate on in-the-field snowpack evaluation and avalanche forecasting. Throughout the season, in addition to updating the danger rating daily, I issued morning advisories on Mondays, Wednesdays, Fridays, and Saturdays with additional updates when I felt conditions warranted.



A good lesson for Jade on the second field day of our Avalanche Fundamentals Class, 3/22/08. To satisfy our curiosity and gain as much knowledge as possible, we made our way to a safe area with a view of the large debris pile. While the rest of the class watched, I sent each, one at a time, to survey the slide by riding their sleds up onto the toe. In learning about avalanche safety, there is no substitute for direct experience. *Photo by Toby Weed*

The early season shallow snowpack and faceting led up to the most dangerous conditions of the season and some significant natural avalanches at upper elevations. Slabs began forming with a windy storm on December 18, and by the 20th nearly 3" of water accumulated at the Tony Grove Snotel. Clearing on the morning of December 21 revealed evidence of several large natural hard-slab releases at upper elevations in the central Bear River Range. In early January, our trailhead outreach efforts paid off with direct, although late, reports of large triggered avalanches. Twice, several days after the events, folks I approached as they loaded their custom sleds into spacious trailers told scary tales of near-misses and triggering huge hard-slab avalanches in the popular Rodeo Grounds and Cornice Ridge areas in the days just before and after Christmas.

Snowfall continued steadily through January, piling up deeply on slopes that had no previous snow cover and compressed the faceted snow on slopes that did. My worries of deep-slab releases diminished as the snow piled up deeper and deeper, and by the third week in January mid-elevation pits to the ground were 6-8' deep. Avalanche activity picked up again at the end of the month, with a few near-surface or upper mid-pack weak layers and windy storms. Unintentional human-triggered slides occurred on January 24, 26, 27 and then widespread naturals on the 31st.

Thin upper-pack weaknesses led to perilous backcountry conditions in early February, with significant skier-triggered avalanches on February 1 above the mouth of Green Canyon and on February 2 in the popular Garden City/Swan Flats area. Spread over the next few days, large naturals occurred on the eastern slopes of the Wellsville Range, with several major paths producing large slides running full-length. Strong winds created slab-avalanche problems at lower elevations in mid-February, and someone probably triggered a large hard slab on the bench above the town of Richmond around the 9th, stacking large chunks of debris into the town's irrigation canal. On the 13th, a Cache County Sheriff reported that the path above the mouth of Green Canyon naturally repeated, running around 1100' and carrying woody debris to the flats within a few feet of the popular trailhead-access road.

With just a few exceptions, the remainder of February and the first half of March were fairly quiet. March brought regular storms and a few near-surface weak layers that formed at the interface between warm, old snow and wind-drifted new. Most avalanches involved a layer of graupel. Traveling on snowmobiles on the last field day with a small Avalanche Fundamentals class on March 22, we viewed evidence of one such nice, fresh, natural wind slab on the east side of Naomi Peak. A few minutes after examining that, we encountered another recently triggered and unreported avalanche in the vicinity with fresh snowmobile tracks nearby and old tracks in the bed surface.

Spring held off through much of April, with new storms and good powder every few days. Regular avalanche cycles became fairly predictable: wind slabs in the later stages and right after storms, but sometimes lingering, and then loose wet avalanches when solar heating warmed the fresh snow. On April 15, strong south winds stirred up desert dust and wildland fire ash and deposited it across the region, turning the mountain snow a strange brownish color. A storm on the 24th dropped more than a foot of snow at upper elevations, and I issued my last weekend advisory on the 25th stating, "It's always good to respect and avoid steep slopes with saturated new snow, as wet avalanches can entrain lots of heavy snow quickly." The very next day on April 26, a 32-year-old mother of three on a snowboard triggered a small wet slide on the very steep slopes on the west side of Tony Grove Lake and was then carried into trees below and injured.

—Toby Weed, director ❄️



Story by Matt Murphy and
Lisa Portune of the Chugach
National Forest Avalanche
Information Center, from AAA
Avalanche Incident Report form

This photo was taken by Mark McKinney, one of many spectators to the avalanche. Regarding this image, Lisa Portune comments, "It sends shivers up my spine every time I look at it because I ski that line more than any other at Turnagain Pass. It is 1500' of perfect 38-40° planar bliss."

On February 23, 2008, eight skiers met at Turnagain Pass with the intention of skiing lower-angle tree runs on Tincan. All of the skiers in the party read the avalanche advisory that morning and knew the danger was considerable. They noticed recent avalanche activity on their way to the Pass. It was the first sunny day after a 12-day storm that deposited 7' of snow and 10" SWE accompanied by gale to storm-force winds. The party noticed other folks skiing and riding steep lines above treeline and decided to drive to the Sunburst pullout and check out that mountain. Here they also saw numerous ski tracks and no avalanche activity, so they decided to skin up Sunburst. All of the skiers except Ian Wilson were familiar with the area and had skied there before.

They skinned up the main ridge approximately 3000' just past two sets of ski tracks and dug a pit at the top of the run they intended to ski. There were no tracks yet on this run or further up valley. They noticed no other signs of instability like shooting cracks or whumphing during their climb. Their snowpit was located on a SW aspect at about 3700'. They dug down 5' and got no fractures (CTN \times 2) during their shovel compression tests. The first skier to descend went between the snowpit and a rock outcrop located 75' below and to the skier's left. The second, third, fourth, and fifth skiers descended one at a time between the rock outcrop and a rocky rib to the skier's left of the first track. The sixth skier (Ian) made approx four turns and dropped off the rock outcrop. Ian most likely triggered the avalanche when he landed below the rock. The seventh and eighth members of the party were still on the ridge on top of Sunburst while the first five skiers were located at the bottom slightly down valley of Ian's fall line.

After the slab began to descend to the lower party's location, all five skiers had to quickly ski to get out of the way. Sean Macmanamy was blown over by the powder blast and partially buried. He was able to dig himself out uninjured. Ian was able to stay upright and on top of the moving slab for 1500' all the way to the bottom until the transition zone/gulley at the bottom of the valley. The debris traveled across the gully and 100' up the NE face of Magnum before coming to rest. This avalanche triggered a sympathetic avalanche on the NE face of Magnum that was approx 50' wide with a crown face 10-12' deep. Ian was buried past the gully on the Magnum side of the drainage between Sunburst and Magnum. He was using skis with Fritschi AT bindings, and when he was uncovered, rescuers discovered one ski had popped off during the avalanche.

RESCUE NARRATIVE

The party of the victim (Ian Wilson) estimated the avalanche occurred at 1420. Five skiers in the party had to scramble out of the path of the avalanche, and one of them (Sean McManamy) was knocked over by the powder blast, but was able to dig himself out. This lower party began a beacon search. There were two members of the party still on top of the ridge who began a safe descent on the bed surface to join the lower search party. One member skied to the road to report avalanche to Alaska State Troopers.

There were over 20 people on Sunburst and Magnum that day, and people began responding to the original search party to help with the rescue. This large response of people caused some confusion for the victim's party because some of the new rescuers showed up on scene with their beacons in transmit mode. This gave the victim's search party false beacon signals and difficulty managing resources. This large group of rescuers began searching the first part of the debris pile which was still in the track of the avalanche on the southwestern aspect of Sunburst.

At the time of the avalanche, a separate group of four skiers was skinning up the lower ramp about 1/4 mile away from the avalanche on the western aspect of Sunburst at about 2000'. One member of this group saw part of the powder blast in the air after the avalanche ran over to the north side of the adjacent mountain to the south named Magnum. Two skiers from this group decided to continue to skin up the valley towards the avalanche in case people were caught. This group noted 11 skiers on Sunburst Ridge while they were hiking up from the parking lot, so they figured at least one person was buried. These two separate rescuers began beacon searching a gully underneath the last point seen while the original search party continued working down the upper part of the debris pile. Within about 5 minutes, another group of separate rescuers showed up to help these other two lower rescuers. At this time the first two acquired a beacon signal. One of the searchers was able to track a flux line into a pinpoint search and began instructing other rescuers to get their probes and shovels ready. After drawing a box in the snow during the pinpoint search, another rescuer began probing. Within two to three attempts, the probe struck the buried victim about 3-4' deep. Rescuers began shoveling immediately.



American Avalanche Association
Forest Service National Avalanche Center
Avalanche Incident Report: Long Form



Please send to: CAIC; 325 Broadway WS1; Boulder CO 80305; caic@qwest.net; Fax (303) 499-9618
and to the nearest Avalanche Center.

Occurrence Date: 02-23-08 Time: 1420

Report Author(s)

Name: M. Murphy, L. Portune

Affiliation: Chugach National Forest Avalanche
Information Center

Address: Po Box 129 Girdwood, AK 99587

Phone: 907-754-2346

Fax: 907-783-2094

Email: eskustad@fs.fed.us

Location:

State: AK County: Anchorage Forest: Chugach
Peak, Mtn Pass, or Drainage: Sunburst Ridge, Turnagain Pass, Kenai Mountains
Site Name: SW aspect "Indicator Run"
Lat/Lon or UTM: N 60.78 W149.18

Summary	Caught	Partially Buried Not Critical	Partially Buried Critical	Completely Buried	Injured	Killed	Vehicles Damaged	Structures Damaged
Number	2	1	0	1	0	0	0	0

Weather						
Fill in the weather chart of the five days prior to the accident. Use 24 hr trends for wind speed and direction.						
Weather station location(s):	Center Ridge/Sunburst Mtn	Lat/Lon or UTM: N60.78 W149.18	Elevation: 1800/3800			
Date	2/18/2008	2/19/2008	2/20/2008	2/21/2008	2/22/2008	2/23/2008
Tmax	34	31	30	34	36	41
Tmin	29	33	33	28	26	15
HN24	2	15	10	11	4	0
HN24W	.2	2.3	1.5	1.7	.2	0
Wind Speed	30-50	30-75	25-30	25-40	20-30	0-10
Wind Dir	NE	NE	NE	NE	ENE	NE

Avalanche Characteristics

Type: HS Trigger: skier Size: R4 \ D4
Aspect: SW Elevation: 3700 m / ft
Sliding surface (check one): In new New/old In old Ground

Dimensions

	Average	Maximum
Height of Crown Face	5	10
Width of Fracture	1500	1500
Vertical Fall	1300	1300

Snow

Slab	Hardness	Grain Type	Grain Size (mm)
Weak Layer	F	RG	
Bed Surface	P	RG/CR	

Thickness of weak layer: 1-12 mm / cm / in

Start Zone

Elevation: 3700 m / ft
Average Slope Angle: 35°
Maximum Slope Angle: 42°
Aspect: SW
Ground Cover: Smooth Rocky Glacier Dense Forest Open Forest Unknown
Location of Crown Face: Ridge Cornice Mid-Slope Convex Roll Rocks Unknown
Snow Moisture: Dry Moist Wet
Vegetation: NONE

Track

Open Slope Average Slope Angle: 32°
 Confined Aspect: SW
 Gully
Snow Moisture: Dry Moist Wet

Runout

Elevation: 2400 m / ft
Average Slope Angle: 5°
Aspect: W
Ground Cover: Smooth Rocky Glacier Dense Forest Open Forest Unknown
Snow Moisture: Dry Moist Wet
Debris Type: Fine Blocks Hard Soft Rocks Trees
 α_1 : °
 α_2 : °
Debris Density: kg m⁻³
Terrain Trap? no yes
Terrain Trap Type: gully

Shovelers dug in shifts and switched out as they got tired. Within about five minutes, the buried victim's backpack was uncovered, and a couple rescuers began using their hands to dig towards his face. Ian Wilson was face down in the snow, and the back of his ears and neck looked blue and waxy. It was determined that his airway was an immediate life threat, so the rescuers disregarded spinal precautions in order to pull the victim's upper body out of the snow. This was a difficult process; most of his body was still encased in concrete snow. With more digging, there was just enough room to expose his face, which looked blue and waxy.

Corey Aist of ASARD arrived on scene via AST helicopter with the first load of dog teams and AMRG rescuers and took command of the scene. When he contacted the rescuers in the hole, they informed him that Ian was unresponsive and not breathing. The rescuers continued holding Ian by his backpack to keep his face out of the snow, while they continued to dig under his face to clear enough room for rescue breaths. Corey Aist recalls two to three minutes before the rescuers called out that Ian was breathing on his own. Soon afterwards, Ian began answering questions appropriately. His chief complaint at this time was that he was cold and uncomfortable. Ian was then loaded on the AST helicopter and flown to an ambulance waiting for him in the Western Turnagain Pass parking lot.

Conservative estimates: 24-27 MINUTES OF BURIAL TIME

26-30 MINUTES BEFORE IAN'S FIRST BREATH

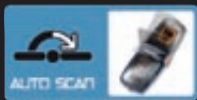




Robbie Hilliard. Photo by Joe Foyer.

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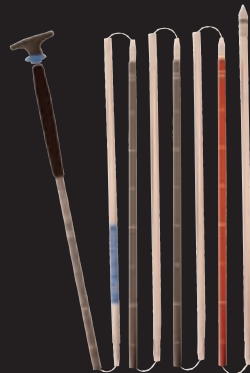
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