COLORADO DEPARTMENT OF NATURAL RESOURCES

A Newsletter for Friends of the CAIC

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THE Beacon

THE Powder Stash

by Scott Toepfer, Editor

What a difference one year can make. Last winter the San Juan Mountains of southern Colorado saw one of their biggest snowfalls in years while the central and northern mountains struggled to reach average. This year the northern mountains of Colorado are on a pace to see one of their best winters in decades, while the San Juan's are struggling to rise above 80% of normal. We all know the fickle nature of weather so we don't want to count on a banner spring season up north just yet. Although that can be hard, especially as the snow piles up by the foot in my front yard just south of Breckenridge. Today, I am basking in the glow of a wonderful day of light powder snow found on the north aspect of Baldy. The stash remains a secret as there are easily a dozen Baldy mountains in Colorado.

Our prime mission at the CAIC is to reduce the impact of avalanches on the people of Colorado. Our goal each year is to record a season with no avalanche fatalities. Of course the easiest way to do that would be to have no snow. That opens a window to the nightmare of drought, so there has to be a balance of wishes, needs and wants. Water is the lifeblood of our state. Across the west, no snow means zero avalanches accidents, but it also means no water. So we get through the blizzards, deal with snarled traffic, and enjoy the recreational opportunities our state enjoys. The big snows signal another summer with water in our reservoirs, that's a very good thing. Unfortunately it also means avalanches, and so far, that has been a bad thing.

I've had some trouble getting this Powder Stash onto paper. Our first avalanche fatality of the season occurred on November 6th. Serious early season avalanche accidents are not uncommon in Colorado. The excitement of a new winter tied together with the lure of early season snows often lead to powder vision. At first I thought I'd lead the Powder Stash with a review of that accident. Then, just before Christmas, December 22nd, two climbers turning back from Grays Peak, a fourteener on the Continental Divide in northern Colorado, were caught in a natural slide on the east side of Kelso Peak. An 18 year old was killed. This one was hard, two young men made the right decision to turn back in deteriorating weather conditions. If they were five minutes faster or slower on their descent, it would have been nothing more than a close call. Fatalities are always hard on our staff, but especially over a holiday. The new-year did not start on a good note. Two more people were killed in a hard slab avalanche near Cameron Pass, west of Fort Collins. Four fatalities in our first two months of operations, was there something extraordinarily dangerous about this year's snowpack? Do the odds stack up against us if we keep putting more people into the mountains? Are there better ways for us to get our product out to the people using the backcountry? These are all questions we've been asking ourselves this winter. At all of our staff meetings, we've been reviewing the what, how, when and where of our avalanche forecasts. We've looked at what other forecast centers are doing across the west, and even in Europe, where avalanche accidents are much more common. As the CAIC continues, we will strive to find answers to the questions that snow and avalanches bring to Colorado. So expect a better CAIC as time goes on.

We're just like every other business in Colorado; there are constraints on the program. There's the limited budget, if we open in October, we'll have to close in March. Early season weather and snowpack data can be fairly limited too, as most ski areas are still closed, and our remote weather stations are not up and running yet. Then there's Mother Nature, lightning has a way of imploding expensive weather instrumentation perched on exposed ridges during late fall thunder storms. Trying to determine when winter will arrive is at best an educated guess. What happens if we schedule our opening

continued on page two

Powder Stash

continued from page one

on December first, and we get an early start like we did this year? Until we find a way to work our budget to support the full season, we'll be faced with this conundrum. Let's hope this rash of accidents has run its course. Otherwise, it will be a long winter.

So on to better news, let's turn to this issue of *The Beacon*. Included in this second issue of the season, are the usual wide variety of articles. We're always looking for field data. We often get e:mail reports from friends and other backcountry travelers about what they saw on their days tour. We encourage these reports, you are our eyes and ears in the mountains of Colorado. Andy Gleason has written a short piece on things that we really look for in these reports. Timing is everything, if you can get us good information asap, we'll put out a better product. It's as simple as that.

Last year the San Juan Mountains saw a couple of back to back storm and avalanche cycles of near historical impact. Our Silverton intern, Susan Hale was there and has written a personal account of the experience. It's a hard article to put down. We've also included a short bio on our newest forecaster (from last year), Spencer Logan. He's got a pretty impressive resume, and even though he's not that old in years, there's a chance he's shoveled more snowpits than all of us combined.

Finally, Knox submitted a remembrance of a woman I had the good luck to have met on a couple of occasions, Sue Ferguson. Sue died last December from cancer. She lost her long fight with this terrible disease, and even though we all knew she faced a very difficult battle, we were all greatly saddened by her passing. Both Sue and I shared a great love of glaciers, and fortunately, she left a legacy of avalanche research and glacier knowledge that we will always be able to review. So put those snow shovels away for a bit, sit down and take a load off, and enjoy your *Beacon*. ❄

Backcountry Observations

by Andy Gleason, Forecaster, CAIC-Boulder

In Colorado, we issue avalanche forecasts from a central location in Boulder. We rely on accurate and timely observations from a network of backcountry and ski area observers. We integrate the observations that come into the Boulder office to produce an avalanche forecast for the entire state of Colorado. If you, as a backcountry user, can send us observations about the snowpack and weather in your area, it can only help us create a better forecast and help to prevent avalanche accidents. Folks have asked us if we want observations from "Lay-skiers". The answer is an enthusiastic YES! The more observations we receive, the better information we can include in the forecasts. Don't worry if your particular observation is not on the hotline, rest assured it was still used to create the forecast.

The best way to send in your information is via email at caic@qwest.net. You can also call in your observations at 303-499-9650. The following are a few guidelines for observations that will help us make better forecasts.

Avalanche Observations

These are observations of recent avalanches that you have seen or triggered. Timing is everything. Old avalanche data helps fill our data base, but it's the recent activity we need to broadcast. If you see activity, let us know as soon as you can. The key points in avalanche reports are location, aspect, elevation, and slope angle. If there are multiple avalanches, estimate the number you've seen. The size of the fracture line, and width and length of the avalanches help us out, but are difficult to estimate from long distances. If you are familiar with avalanche classification, you can send us a coded avalanche observation. If you would like to learn more about how to describe avalanches check out the new Snow, Weather, and Avalanches: Observational Guidelines (SWAG) for Avalanche Programs in the United States, a publication of the American Avalanche Association (AAA). You can read the SWAG on the AAA website at http://www.avalanche.org/~research/guidelines/.

Snowpack Observations

These include snow observations that help a forecaster sitting in Boulder to get a clear picture of how the snowpack is reacting in your area. Things to include: shooting cracks, collapses, whumphs, ski or foot penetration, wind slabs, wind loading and wet snow. Please also include the location, aspect, elevation, and slope angle of where you were.

Snow pits should be representative of avalanche starting zones in the area, but should be dug in safe areas. Snow pits are great, but if you didn't write up a formal pit, let us know how deep it is to a specific weak layer. If you notice a prominent and persistent weak layer, report the depth from the surface, the type of snow above it and the aerial extent. What are the snow surface conditions? They may not be contributing to the hazard now, but how will new snow bond to the surface snow? Is the surface wet, dry, faceted, wind slab, ice-crust, or low-density powder?

Any observations you make such as shooting cracks, collapses, whumpfs etc… should include the location of these observations with aspect, elevation and slope angle. Include pertinent negatives such as no cracking or no movement on steep slopes too. If you report a stability test, be sure to include what kind of test you conducted, the aspect, elevation and slope angle. You can also include shear quality information.

Here's an example of a good concise report:

Jill Outabounds, 12-21-05, 11:30 am. It is 22 degrees F with a SW wind at 10–20 mph. It has been snowing moderately (S1) for 2 hours. I saw a HS-N-R2-D2-S on a NE, 32-degree slope at 12,400′ in the San Juan range on Mt. Abrams. Fracture line 2–4 ft deep, width 300′, vertical fall 1200′. The slope was wind loaded with about 2 feet of new snow. We had shooting cracks and whumpfing on NE to NW slopes between 10,000 and 11,500′. South facing slopes were wind scoured. A hasty pit on a NE, 27 degree slope at 11,000′ showed surface hoar at a depth of 15″ below new wind loaded snow. A compression test had CT-11 at 15″, Q-1. No other failures in a snowpack 5′ deep. We skied lower angle slopes on a north aspect and had good riding with snowboard penetration of about 1 foot.

If you want, feel free to tell us just how good the riding really was. We promise not to get too jealous. ❄

Avalanches and Monkey Business

by Susan Hale, Intern, CAIC-Silverton

There was tension in the voices heard over the crackle of the radio—between forecasters and the highway's regional CDOT teams. Then, Jerry's succinct words, "we're in *full conditions* here, boys and girls…," gave the first hint that we might be witnessing a once-in-a-lifetime storm. It was 11:00 pm January 8th, 2005, and it would be an understatement to say it was a stormy night. Forecaster Mark Rikkers was in one truck racing south towards Molas Pass, while lead forecaster, Jerry Roberts, and his visiting side-kick, Tim Lane, were headed the opposite direction up Red Mountain Pass. Both teams were checking on the rapidly deteriorating road conditions and increasing avalanche hazards threatening U.S. Highway 550, the north/south life-line of southwestern Colorado.

That night after an already long day of shooting, I was allowed to stay behind and supposedly catch up on much needed sleep. The night was sleepless nonetheless. Around here we make a habit of snuggling with our Motorolas, as no avalanche forecaster worth their Pisco Sours would be sleeping when it's dumping nearly 3 inches per hour on a continental snowpack. So there I lay, wide awake, eavesdropping.

Using radio call names, Jerry Roberts anxiously tried to reach Mark Rikkers.

Jerry: 3 Mary 5-1 this is 3 Mary 5-0 what's your 20?

Mark: Hey Jer. This is 3 Mary 5-1. I finally made it to Molas Pass—really bad visibility. What's happening your direction?

Jerry: Mark, I'm with a crazy woman stuck in a snow bank near the Muleshoe turn (below a particularly nasty avalanche path). We'll need help getting her out so we can shut this highway down. Can't reach the Red Mountain plow driver. Can you try radioing from your location and send him our way?

Mark: 10-4. I'll give it a try.

I can hear that Mark is also having trouble reaching a plow driver. The radio reception is sketchy at both locations. So, trolling for something to do, I ventured an earnest call to Jerry, knowing it was probably a mistake.

Susan: Uhh, 3 Mary 5-0, this is 3 Mary 5-2, is there anything I can do from here?

Jerry pauses, and with the whole world listening and a storm puking 3 inches an hour, replies.

Jerry: Thanks 5-2. Uhh yea. When we get this lady out we'll be escorting her back to Silverton for the night, but she might not be able to find a place to stay. She doesn't speak very good English. I think she's Romanian. You think she could camp on your sofa for the night?

I paused suspiciously.

Susan: Uhh, yea, sure, I guess so.

Jerry: Great! There is one other thing. I think she's from the circus, and I think she has a monkey with her.

A long pause preceded my bewildered response.

Susan: Did you say MONKEY?

Jerry, with Tim tittering in the background: Yea, I think it's a monkey. Will your dog be OK with that?

Of course, the Romanian Circus Woman and her monkey never materialized, having been created, or so I thought, on behalf of my rookie status and over-enthusiasm. Shortly thereafter, both roads out of Silverton were closed. Eventually Red Mountain Pass made national news, remaining closed for seven long days.

That night marked the apex of what would be the biggest storm cycle that most Silvertonians could remember. Snowfall rates, storm snow and water amounts, and avalanche numbers pushed the record-books to new extremes for the month of January. Late in the evening, Highway 550 over Red Mountain and Coal Bank Passes was eventually cleared of all traffic. The CAIC-Silverton Forecast Office posted the avalanche hazard level at a very rare EXTREME. No one, neither forecaster nor plow driver, was allowed on the road. Mother Nature had finally forced the road to close so she could rage privately; avalanches don't like people watching.

THE BEGINNING

An avalanche cycle doesn't occur just because a large amount of snow falls in a short amount of time. Our continental snowpack and any resulting avalanches are shaped by a season of weather events. As the winter progresses, each weather event is tracked, recorded and catalogued by weather and avalanche forecasters. By watching the snow and weather each day, avalanche forecasters can recognize the potential for a big avalanche cycle. However, predicting the duration and intensity of an individual snow storm or avalanche cycle remains hazardous to the ego. Memories can be short and many years of drought can cloud one's judgment. One thing remains constant; Mother Nature can bring the unexpected.

continued on page four

One of our backcountry observers, Scott Messina, was honored this past summer with the Greg Mace Award. Each year this award is given to individuals for their outstanding service to the Aspen community. Scott, a Denver native, moved to Aspen in 1986 where he landed a job as a caretaker for the 10th Mountain Division hut system. This job entailed hiking or skiing to all of the 10th Mountain huts both summer and winter to do basic maintenance. Along with housing, he was paid 30 dollars per week. Some people would say that 30 dollars per week is not going to get you far in Aspen, but Scott said "Life is good". Scott also joined Mountain Rescue Aspen (MRA) that same year after being practically ordered to by then MRA (Mountain Rescue Aspen) director Jim Ward. Scott still leads training for MRA, and still does hut work for the 10th Mountain huts. Greg Mace co-founded MRA with Jim Ward. "Greg's grandfather settled in the Upper Castle Creek Drainage in 1947" said Amos Mace, Greg's nephew. "It's quite an honor that 20 years after Greg's death, the community still presents this award to an esteemed volunteer." Greg died in a climbing accident on the Maroon Bells in July 1986.

Scott owns Aspen Alpine Guides which leads clients into the backcountry. "Scott gives back more than he takes from the mountains…" said a statement released by the award committee. Former award winners include such Aspen icons as Fritz Benedict in 1987, Fred Braun in 1986, Eve Homeyer in 1989 and Claire Sanderson in 1993.

After the award presentation Scott said "Holy cow—it's pretty overwhelming to receive this award. And it's incredibly overwhelming when you look at the names of the people preceding me up there. It's a very humbling honor." The staff at the CAIC extends large congratulations to Scott for this award. Scott, I have one follow-up question. Did you ever find the pine marten? ❄

Monkey Business

continued from page three

Powder cloud from East Riverside path reaches Highway 550. (Photo: Gary King)

STORM 1

Our big weather/avalanche cycle consisted of three distinct storms. The first arrived on December 29th, at the end of a long stretch of snow-weakening cold and mostly dry weather. These conditions help weak layers to form near the surface of the snowpack. The result is a rotten foundation for future snows to land upon.

The first in this series of southwesterly storms arrived fast and furious and set the pace for the first half of January. It began with a bully layer of slippery graupel (a precipitation particle that looks like a small Styrofoam ball) that was soon topped with heavy wet snow. This was accompanied by sustained wind averages in the 30's and gusts reaching a whopping 90+ mph. As the storm unfolded, we anticipated that 1.5 to 2 inches of water would kick off a natural avalanche cycle, and it did. By late that Wednesday afternoon, we had received 2 inches of snow water equivalent in less than 24-hours. That led to four natural and seven mitigated avalanches hitting the road over Red Mountain Pass. The Molas/Coal Bank side of Highway 550 saw four natural and three mitigated avalanches reach the highway centerline. Spot road closures for avalanche mitigation and cleanup finally evolved to a full closure of the passes. Mother Nature's wrath of high winds, high precipitation rates and approaching darkness declared, "You are not the boss of me!" The road remained closed until 4 pm the next day. The storm dumped the most snow on Molas Pass. We measured 21 inches of snowfall and 2.85 inches of water in just over 24-hours.

STORM 2

With only a few days to catch up, a second strong Pacific storm arrived late on January 3rd. Once again the wind averaged 30 mph with gusts reaching into the mid 70's. These were perfect conditions for transporting large amounts of snow into our avalanche start zones. Temperatures were warm and thus the snow was heavy. As the snowfall reached 2 inches an hour, there was another natural avalanche cycle and Red Mountain Pass closed again. It didn't open for another 43-hours. Natural and mitigated avalanches put as much as 15 feet of snow on the road. This time the Coal Bank study plot won the "most snowfall" prize, with 35 inches of snow and over 3 inches of snow water equivalent. With large amounts of new snow and water, high winds and a weak underlying snowpack, we had all the ingredients for an avalanche cycle. Once we got back on the road we saw the remains of natural avalanches on all aspects. However, much to our dismay the snow in many of our larger paths remained intact. We had hoped that more of the avalanche paths would "clean out." The current weather pattern was forecast to continue, and as the load on our weak snowpack continued to climb, we could feel the pressure of the situation build.

BIG STORM

The weather pattern did continue. Two days later, a superstorm moved into the San Juan Mountains from the southwest. The last storm of our record breaking cycle began Friday January 7th, and battering the region through the following Wednesday. This last storm came crashing down upon us, snowing an inch an hour or more for six days. The initial wave of snow was low in density, but as the storm continued the snow became wet and heavy. This is a classic "upside-down" snow storm and a textbook scenario for an avalanche cycle. Strong southwest winds, gusting into the 60's, compounded the situation. In the wee hours of January 8th, our most reliable performer, the Blue Point avalanche path, put three feet of snow across 40 feet of the centerline. Soon afterward, an avalanche in the East Riverside path released. Dragging the snow from adjacent paths in its wake, the avalanche rumbled down into the Ironton Gorge. These slides covered the road with four feet of snow. Later in the storm, these paths would avalanche again and actually pack the only avalanche shed covering the highway with three feet of snow.

On the Coal Bank side, an avalanche in the Henry Brown path covered the road with some of the other paths quickly joining the fray. With darkness nipping at our heals, wind and snowfall quickly moved snow back into the start zones as we completed the avalanche mitigation work. Dangerous travel conditions and sanity finally won out, and by 11:00 pm the north and south sections of Highway 550 out of Silverton were closed. As the mother of all storms continued, the monstrous avalanche paths flowing down from peaks high above Red Mountain Pass and County Rd 110 defied all "control". The roads remained closed for seven long days.

Our next day of work began early on the morning of January 9th. While conducting avalanche hazard mitigation we used both the Avalauncher (an explosive delivery system designed for avalanche work), and brought out our WWII era artillery, a 105 mm Howitzer. We concentrated our efforts on the passes south of Silverton, hoping to open one escape route from the town. But in spite of all the fire-power, frustration became the theme of the day with only a few avalanches releasing. While weather and snowpack conditions certainly validated the previous night's decision to close the roads, we still expected big "results" to validate our forecast. Unfortunately, the most action was caused by a frightened big-horn sheep that kicked off a series of small slides in the East Lime Creek path while we were shooting West Lime.

We eventually worked our way back to Silverton, tails tucked between our legs. We had managed to get the Coal Bank side of Highway 550 open. I was happy because this meant my husband could high-tail it home from Durango and help shovel snow. There was enough daylight for one attempt to open Red Mountain Pass. Disappointed with our progress, we geared up for one set of Howitzer shots on the Red Mountain side.

It was late in the day, everyone was tired, cold and grumpy. After little action on Coal Bank Pass, there were no expectations of seeing significant results from the final shoot of the day. So off we went, CDOT crew and forecasters dragging the Howitzer and an entourage of bored observers from the newspaper and Prescott College students. Our plan was to shoot the Battleship, one of the most notorious slide paths leading up towards Red Mountain Pass from Silverton.

At 12,400 feet, the wind-loaded, 35 degree start zones of the Battleship rise nearly 3000 feet above the Mineral Creek Gorge. Between the bottom of the path and the highway are a gorge and 300 feet of elevation gain. One might surmise that a 300 foot rise and a river gorge would adequately buffer the highway from the runout of an avalanche. Like many assumptions, this one would too prove to be wrong. The forces and speeds involved in a full-path release in the Battleship are so great that the avalanche can climb up the opposite side and deposit as much as five feet of snow on the road. The wind blast alone can cause severe damage, hurling large trees across the pavement. While a number of folks in the crew had seen the Battleship run, few were prepared for what they were about to witness. We lobed one lonely Howitzer round into one of the Battleship's start zones. The shot shattered the enormous slab and sent a full depth, full path, Tasmanian Devil racing down the mountainside. After the dust settled, our guests giggled in amazement and we made our way home satisfied that our perception of the avalanche danger had been correct.

Battleship reaches full throttle (Photo: Ann Melick)

In this business, we like to say that "close calls are not acceptable." I can still recall, upon my initial arrival into Silverton, Jerry's litany of dos and don'ts on the topic of "being safe out there" and "drama" avoidance: who to ski with, who not to ski with, who to talk to, who not to talk to, and even who to drink with! Whether this was "sage" advice or flat-out gossip, it was never taken lightly. But then there are extraordinary situations, extraordinary storms, and that's when extraordinary things happen, in spite of our conservative mantra.

And so it snowed, and snowed and snowed, inches per hour.

While the Red Mountain side of Highway 550 was locked down by massive avalanches, the Coal Bank/Molas side was kept open even though it actually received the most snowfall from this southern storm (between January 8th and the morning of January 11th the Coal Bank Study Site had already received 63 inches of snow that equaled 6.5 inches of water). Highway 550 south of Silverton has fewer massive paths that threaten the road. For this reason there was a valiant effort by all (CDOT crew and the CAIC forecasters) to keep this artery into Silverton open as long as possible. At this time there had already been one health related emergency evacuation.

By January 11th, seemingly endless avalanche mitigation measures had become dangerously mundane. Nearly 100 rounds of explosives were used on the Molas/Coal Bank side of Highway 550. Would it ever stop? Would we ever sleep? As the day grew long, visibility became poor and the race was on to get one last set of avalauncher shots off at the paths closest to town, the Jenny Parkers and Peacock. Vehicles, including one fully loaded fuel tanker bound for the one Silverton gas station, backed up on the road waiting to be cleared to drive down into town. While the forecasters, Jerry and Mark, and the CDOT crew were setting up. CDOT managers, Dennis McCoy and Paul DeJulio, made a last minute decision to escort that group of vehicles carefully down into Silverton before our shoot. Once they were moved to safety, Dennis turned around to make one last pass up the road to insure that the road was indeed clear. Driving on instinct in near zero visibility, Dennis got "up-close and personal" with an avalanche coming out of the Harley Short path. With one hand on the wheel and the other on the radio, Dennis had the presence of mind to call out "Guys, I think it's time to shut her down!" Dennis made his way back up to Molas Pass before he realized his truck was over-heating. He cautiously crossed over Coal Bank Pass. There he was able to coast downhill to the Cascade CDOT Barn where he discovered a broken fan-belt caused by dense snow packed into his radiator and engine compartment.

After Dennis' close call, the avalauncher team also decided it was time to cut their losses and bail off the mountain. Heading back toward town, they found themselves trapped between two paths that ran in rapid succession. Blocked to the south by slides from the Peacock and Jenny Parker paths, they turned to find the road to safety and Silverton blocked by the Gladstone Twins. The "twins" are two narrow paths that drop on to Highway 550 just south of Silverton. After years with few avalanches, large trees had grown in the paths. Although they were still listed as avalanche paths, they were no longer considered much of a threat. That day 100 year old trees were splintered, and several nervous hours were passed while a CDOT crew used heavy equipment to clear a path through the debris and allow the group to return to Silverton. This series of events began the longest closure of Coal Bank and Molas Passes during this stormy period. They were closed for 51 hours, and we finally got a little sleep.

Already blanketed with 6–7 feet of snow, the town of Silverton was abuzz with activity. Plows piled enormous rows of goop down the center of Greene Street obscuring buildings on either side. Residents frantically shoveled roofs to prevent collapse or a creep/glide incident that could break out windows or worse, kill people or pets. It had probably been 50 years since anyone had worried about the Naked Lady path off Kendall Mountain. The town's Visitor Center and a few houses stood in the runout zone and could be destroyed if a large avalanche came roaring down the path. There had been evacuations toward Eureka, where San Juan County plow driver and two snowmobilers had close calls with the white beasts.

When we crawled out from under our beds on January 15th, we discovered large avalanches in paths that had not run full track

continued on page six

Dozer works to clean up debris on Highway 550 at the East Riverside snowshed. (Photo: Susan Hale)

Monkey Business

continued from page five

Working to clean up avalanche debris on Colorado 110 (Photo: Susan Hale)

or affected the road in decades. Many had taken destroyed stands of mature timber. On Coal Bank Pass, a new building that housed cellular phone equipment was completely destroyed and buried under six feet of avalanche debris. County road 110 toward Silverton Mountain Ski Area had been struck by fifteen avalanches. Power lines that feed the ski area had been ripped out. On Highway 550, 42 natural avalanches and 32 mitigated avalanches hit the road. West Riverside put 30 feet of snow on the highway, and in all over 11,000 feet of roadway was affected by debris. Coal Bank tipped the scale again with a grand total of 91 inches of snowfall and nearly 10 inches of water. By months end we calculated that this was the wettest January on record!

And so ends the storm story. Silverton continued digging out for days. Record snowfall was the talk of the county and made national news. Once the roads were opened, rat-trapped locals and visitors alike lined up, anxious to make the mass exodus out of town and escape a week of isolation. When the gate was opened, we pulled our CDOT truck over to watch the parade. To my surprise and disbelief, the last vehicle to move through the barrier was a loaded down, tired, old rambler, driven by a dark, mysterious-looking woman. In the seat next to her was a small, gangly, round eyed creature. The MONKEY? Naah! ❄

Spencer Logan, Avalanche Forecaster

by Scott Toepfer, Forecaster, CAIC-Boulder

Spencer Logan after a good day of snowpits and turns. (Photo: Spencer Logan collection)

Last year the CAIC hired its first new forecaster in more than 10 years. Knox knew he was retiring and felt it would be a good idea to bring in a new employee so they'd be comfortable with the job, and hopefully take a little pressure off the new director. Spencer has fit in to our little office much better than expected. He's brought a great 'outside the box' view to our daily office routine.

Spencer comes to us with a strong background in snow and traveling about the backcountry. His first backcountry experience was at around 11 years old, skiing off of Trail Ridge Road in Rocky Mountain National Park. He attended the National Avalanche School while a senior in high school, which might make him the youngest student to have gone through the program. At the NAS Knox was his first instructor on the broader points of mountain weather, and orographics became one of his favorite words. Spencer is now able to ponder the mysteries of forecasting orographic snowfalls every week in our Boulder office.

Early on in his life he triggered his first avalanche when a cornice broke off right at his toes. He remembers thinking "This stuff is pretty cool!" His second close encounter got him caught up in a moving avalanche, which he didn't find so cool, as he fought and struggled to stay at the top of the debris. With a sore knee and an angry conversation with himself the only injuries, he considered himself extremely lucky. He also knew he had to learn more about the science of slabs over weak layers.

Spencer spent his early years in the Fort Collins/La Porte area of northern Colorado. His parents were keen on skiing so Spencer learned the life style at the old Hidden Valley ski area near Rocky Mountain National Park. Since his dad, Jesse, works as a research scientist with the US Forest Service, Spencer, his mother Bronwyn, a librarian, and his one brother Tyler, traveled to places like New Zealand and Virginia following his Dad's career. Education and research seem to run in his family. With research and books playing an important part in his upbringing, an advanced education just seemed like the thing to do.

His snow education continued with an undergrad degree from Utah State University, with a senior thesis compiling an avalanche atlas of high use backcountry areas. Spencer recently wrapped up his masters degree from Montana State University, his thesis there was titled *Temporal Change in Spatial Variability of Shear Strength and Stability over Uniform Slopes*. In the process of his masters Spencer told me "I had to dig way too many snowpits, and pulled more than 1000 shear frames. That's a lot of time with your head buried in the snow." What he came away with were some really scary spatial variability statistics. This background has contributed valuable knowledge, which is an added help while writing out the daily forecast at the CAIC.

One of the best ways to learn about the art and science of snow is to work as an avalanche forecaster. After putting in many volunteer hours at the Bear River Avalanche Forecast Office in Logan, Utah, he finally got hired on as a fulltime forecaster, and spent three years rating avalanche danger for a popular backcountry area of Utah. Now he feels he has finally grown out of the high-risk years, and can get on with the life of a professional avalanche forecaster.

Spencer tied the knot with his wife Brandy not long ago. Brandy, following in the Logan footsteps, is close to finishing her masters degree in fluvial geomorphology, the study of how rivers are shaped, and how that affects fish habitat.

In twenty years Spencer can see himself skiing waist deep powder in an undisclosed location. I suspect he'll do so wisely. ❄

Sue Ferguson, 1953–2005: Grand Dame of American Avalanche Pros

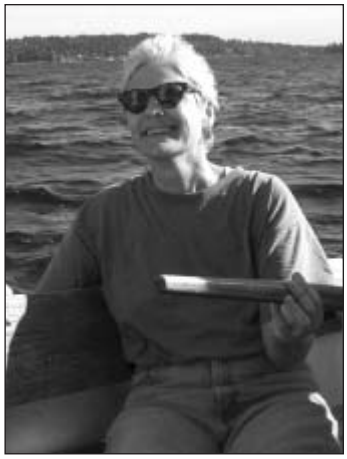
by Knox Williams, CAIC Avalanche Forecaster Emeritus

Sue Ferguson died on December 18, 2005, after a long battle with breast cancer. Sue was widely known and admired in professional circles, but I imagine most Friends of the CAIC did not know her. So let me tell you about this remarkable woman, and why her death so saddened avalanche professionals and all who knew her.

A native of the Seattle area, Sue was an accomplished athlete. Her playing career included the University of Oregon ski team and the University of Massachusetts rowing team, and while at the University of Washington, she led her intramural teams to championships in softball, track, football, and rowing. Apparently she had time for classes as well, as she got her PhD in Geophysics and Atmospheric Sciences from the University of Washington.

Her avalanche career spanned a short 13 years from 1980 to 1992, but in that time she left her indelible impression on the American and international avalanche communities. As a researcher, she worked with snow scientists throughout the US and Europe. She dug and graphed so many snowpits she earned the nickname Susie Snowpit. She worked as an avalanche forecaster in Alaska, at the Northwest Avalanche Center in Seattle, and as Director of the Utah Avalanche Center.

But Sue's greatest impact came from two other endeavors. In 1982 she created *The Avalanche Review*. This was a monthly newspaper of timely avalanche content that showed the world Sue's knowledge, humor, creativity, and artistry. We avalanche professionals read the *Review* for its articles, but we loved Sue's cartoons. Check out the one we've included with this remembrance.

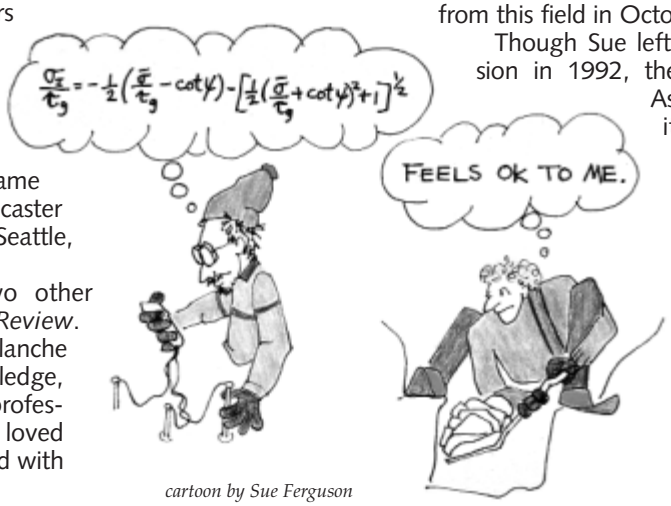


Sue Ferguson

Her second lasting impact was the American Avalanche Association. Before 1986, avalanche scientists, forecasters, educators, and practitioners in America existed as a loose, unorganized network of pros, semi-pros, and amateurs. In 1986, Sue presented the idea of a professional organization, and within a few months the American Association of Avalanche Professionals was incorporated. The organization exists today as the American Avalanche Association, and it has provided an identity to its hundreds of members who work in the snow and avalanche business. After being the editor and publisher (aka, heart and soul) of *The Avalanche Review* for years, Sue turned it over to the AAA, and *TAR* has now been the official publication of the AAA for 24 years.

Sue left the avalanche business in 1992 when she was stolen from us by an offer she could not refuse in fire research. In this field, she proved to be a highly skilled scientist who developed models and forecast products that are widely used by fire managers and researchers. She recently won the National Fire Plan's Excellence in Research award. Sue's illness forced her to retire from this field in October.

Though Sue left the avalanche profession in 1992, the American Avalanche Association awarded her its highest award—Honorary Membership Award—in 1998 for her snow and avalanche contributions and her innovation and leadership. If there were awards for being energetic, witty, and smiling, she would have gotten those as well. ❄



cartoon by Sue Ferguson

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