

Snow and Avalanches in Utah

Utah Avalanche Forecast Center Annual Report

1993-1994



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The Utah Avalanche Forecast Center

The UAFC has three charters:

- * Issue twice-daily, backcountry avalanche advisories and warnings to the public via a network of avalanche hotlines.
- * Issue twice-daily mountain weather forecasts for both the public and the cooperators in the UAFC information network, which includes ski areas, the Utah Department of Transportation, and any other agencies in need of accurate mountain weather information.
- * Provide avalanche education to the public, through avalanche awareness multimedia lectures and short field courses. The UAFC also provides avalanche information to any interested party, including many requests from the local and national media.

The UAFC is operationally separated into two entities—the Wasatch Mountains of northern Utah and the La Sal Mountains of southeastern Utah.

In northern Utah, the forecast area includes the northern Wasatch Mountains from the Utah-Idaho border to Spanish Fork Canyon south of Provo. This northern section is part of the Wasatch-Cache National Forest, under the administration of the Salt Lake District. The UAFC exists in partnership with the National Weather Service who offers in-kind support of office space, mail, long-distance telephones, and weather forecasting services. About half of the UAFC funding comes from Salt Lake County, the Uinta National Forest and the Friends of the Utah Avalanche Forecast Center, a tax-exempt, non-profit fundraising group. Offices are co-located with the National Weather Service at the Executive Terminal Building at the Salt Lake Airport. The staff for the northern area includes Director Bruce Tremper and forecasters Tom Kimbrough, Evelyn Lees and Seth Shaw. On weekends, Mike Jenkins and Kevin Kobe record the avalanche advisories for the Logan area mountains.

The second forecast area is the La Sal Mountains near Moab, which is funded both by the Manti-La Sal National Forest and the Friends of the Utah Avalanche Forecast Center. Since the Moab area sees much less use than northern Utah, only one forecaster, Dave Medara covers the La Sal Mountains with one other part-time assistant, Brian Murry.

The public accesses these forecasts via recorded telephone messages in the following locations:

Salt Lake City 3-minute forecast (9 lines)	364-1581
Salt Lake City 5-minute forecast (2 lines)	364-1591
Park City (one line)	649-2250
Logan (one line)	752-4146
Ogden (one line)	621-2362
Provo (one line)	374-9770
Moab (one line)	258-7669

Season Highlights

This is the 14th year of operation for the Utah Avalanche Forecast Center. Noteworthy events include:

- * There were 74 reported encounters between people and avalanches in the backcountry. Of these, a record number of 42 people were caught, 5 were partially buried, 3 were completely buried and 1 was killed.
- * Most of Utah experienced a less than average snowfall. Although the Cottonwood Canyons and the La Sal Mountains received an average snowfall, most of the rest of Utah's mountains received only 50-70 percent of average.
- * Because of below average snowfall and long time periods between storms, the number of calls to our recorded avalanche advisory was down compared to the very snowy 1992-93 season. The Salt Lake area experienced a 7 percent drop from last season while Logan, Ogden, Park City and Provo experienced a 17 to 64 percent drop. In contrast, the La Sal Mountains which had average snowfall experienced a five percent increase in calls.
- * We were able to set up a more diversified funding source for the Utah Avalanche Forecast Center (UAFC). In the past the Wasatch section of the UAFC was funded almost entirely by the Wasatch-Cache National Forest. This season, Salt Lake County, the Uinta National Forest and private donations funded nearly 50 percent of the budget and next season the State of Utah will fund another third of the budget. For the La Sal section of the UAFC, private donations funded 27 percent of the budget.
- * We gave 38 avalanche talks this season which directly reached a record 4100 people. These talks range from one-hour avalanche awareness talks to three day intensive workshops.
- * We were interviewed by the local and national media on at least 22 occasions. These interviews range from national media contacts such as Outside Magazine, Horizon Magazine the Associated Press and Rescue 911 to regular interviews with local television, radio and newspapers.

Season History - Northern Utah

Seven out of the past eight seasons have been drought years in northern Utah. The only exception—an exception with a vengeance—was the winter of 92-93 which was the third snowiest winter in the 49 year history of accurate record keeping at Alta. Then the following summer, last summer, was the coldest and wettest on record for Salt Lake City. So it was no wonder this past fall when everyone naturally expected the cold, wet weather to continue, perhaps driven by nothing more than the heft of its own momentum. It didn't happen.

For most of the winter we all watched on the evening news as storm after storm pounded the eastern U.S.. Since that is where most of the major news media live, we here in the West have grown accustomed to the strong eastern bias. But after awhile it was hard to take. The TV commentators talked endlessly about the "winter of 94" while each day we looked out our windows into a sunny sky. *USA Today* even reported that "storms pounded most of the U.S. once again," and they failed to notice that the entire western half of the country lay high and dry and had for some months. But the East the West are precisely half a wavelength out of phase in the scheme of global atmospheric circulation. In other words, wet in the east means dry in the west and visa versa.

At the end of the winter, the Bear River drainage had only 78 percent of average, the Weber River 68 percent and the Jordan River 70 percent. The automated SNOTEL site at Mt. Timpanogos had only 61 percent of average. Ben Lomond Peak by Ogden only had 55 percent and a low elevation station at Smith and Morehouse in the Uinta mountains had only 20 percent. But everyone who has lived in Utah for very long knows that God regularly smiles on the Cottonwood Canyons, the amount increasing the closer one gets to Alta. The Cottonwoods always seem to do well even in a dry year and this year was no exception. Alta totaled 490.3 inches of snowfall by the end of April which is just a couple snowflakes below their average. Other areas in the Cottonwood Canyons were close to average as well with Brighton at 99 percent and Mill D North at 102 percent. But everywhere outside the Cottonwoods it was the same story--drought, drought and more drought.

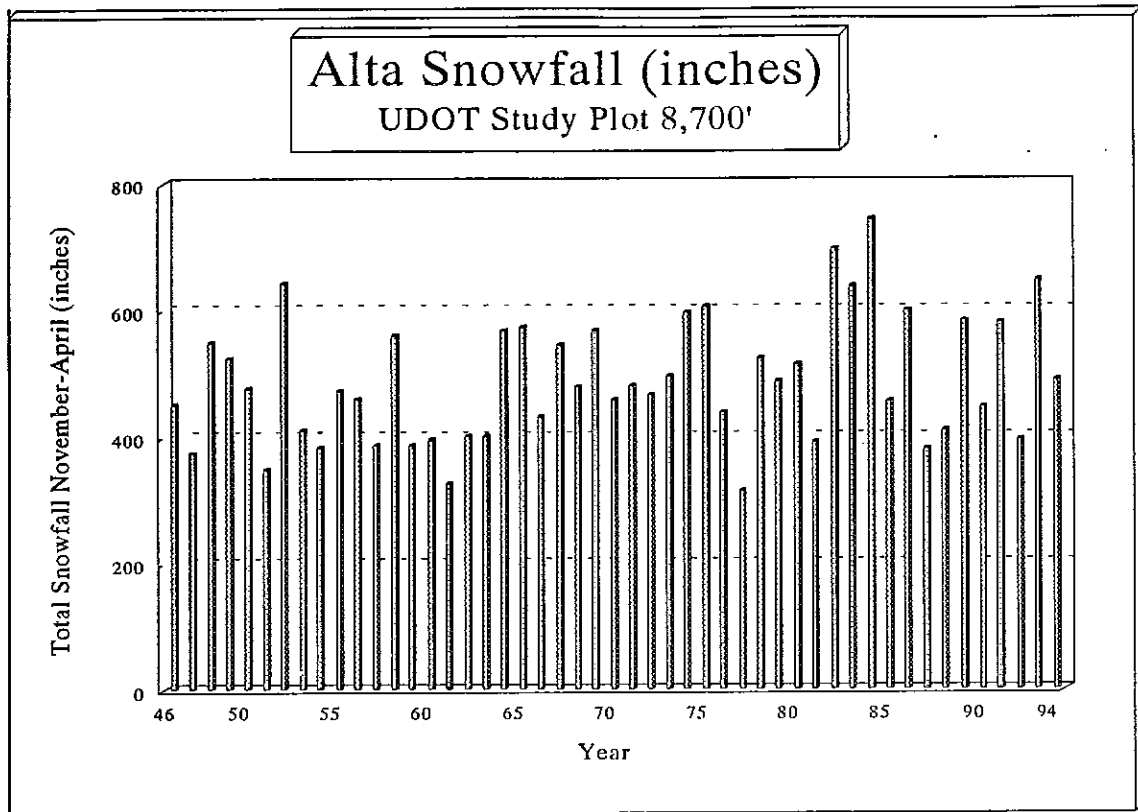
Low snow is bad enough, but it was the way the snow came which kept most of the powderhounds well supplied with grousing fodder. The snowstorms came in schizophrenic lurches and jerks. A huge storm, then nothing for a month, another huge storm, then nothing for a month, nearly all winter long with the notable exception of February.

Thin snowpacks with inconsistent weather strike fear in the hearts of avalanche professionals. Thin snowpacks mean depth hoar. Depth hoar is large, angular poorly bonded snow near the ground which grow to be as fragile as a house of cards. Inconsistent weather means that long periods of clear skies grow the depth hoar punctuated by big storms which overload the depth

Another Drought Year for Most of Utah

"God regularly smiles on the Cottonwood Canyons, the amount increasing the closer one gets to Alta."

"Thin snowpacks with inconsistent weather strike fear in the hearts of avalanche professionals."



Total November 1st through April 30th snowfall at Alta for the past 49 years of accurate record keeping. This season was almost exactly average while areas outside of the Cottonwoods were 60-70 percent.

hoar with catastrophic results. Depth hoar also forms a notoriously persistent weak-layer within the snowpack and everyone walks on eggshells for a week or two after each big storm.

Colorado is famous for experiencing exactly these conditions on an almost yearly basis which is one of the major reasons they lead the country by far with the most avalanche fatalities—an average of 5 each season. This season, Utah had a Colorado snowpack, but luckily we did not share their avalanche statistics. (Interestingly enough, this season, Colorado had only one avalanche fatality, and that one coming only at the very end of the season.)

The avalanche lay person understandably thinks that snow equals avalanches, but this isn't necessarily true. Most avalanche accidents traditionally occur on low snow years. A thin snowpack means a weak snowpack and each snowstorm causes havoc. If an avalanche professional could design the perfect winter weather for being lazy, it would be lots of cloudy, warm weather with small snowstorms twice per week, all winter long. This way, weak layers never get the chance to form and the loads on whatever weak layers do form are small. But this winter was the antithesis of that scenario.

October gave some hint that a dry winter was on the way. A few innocent early storms were followed by a long, cold, dry spell which melted the snow on the sunny slopes and it turned the entire snowpack on the shady slopes into depth hoar. This depth hoar blanketed the mid and upper elevation, north, east and west facing slopes, and was our weak layer for almost all of the major avalanche cycles through out the winter.

October

After over a month with little or no snow, just before Thanksgiving a decent storm finally arrived. Alta received a storm total of 30 inches of light density snow. It may have been a godsend for the powderhounds but this was just the wrong amount of weight on the for powderhounds in combination with avalanche terrain. There wasn't enough weight to produce widespread spontaneous avalanche activity during the storm, but there was enough to make the buried depth hoar as cranky as this winter's stocks and bonds owners. All through the holiday weekend as soon as a skier or snowmobiler touched a high and shady slope the depth hoar would collapse and if that slope, or any nearby slope, was 30 degrees or steeper, it would avalanche. Where October's snow had melted the pre-existing snow the new snow sat directly on the rocks and was quite stable. So there was the choice: smash your knees and skis on the rocks on south facing slopes, or take your chances with the avalanches on the north. There were several close calls but most people restrained their early season enthusiasm and stayed out of trouble. Ski patrollers, forced to deal with what was essentially a scary, north-facing, backcountry snowpack, coupled with the necessity for Thanksgiving openings, took several hair-raising rides.

November

But this is the winter of '94, where it seemed we were only allowed one snowstorm per month. December was mostly a long wait for the next one. The snowpack gradually adjusted becoming more stable, but before that could happen, early in the month the consolidated slab overlying the depth hoar caught two backcountry skiers in large and dangerous slides but neither were injured. But by Christmas ski conditions were quite horrid again with bottomless depth hoar on the north facing slopes being the only show in town. People could travel just about anywhere but few where interested.

December

By the new year, the snowpack had rotted away to become so weak that a mere 4 inches of snow combined with wind created a high avalanche hazard. There were 5 skier triggered avalanches on January 2nd.

January

Later that same week was one of the most remarkable avalanche cycles in Utah history. On January 4th, an extremely rare mid winter rain fell all the way to the highest peaks in the range, with freezing levels well over 13,000'. The rain fell on cold snow instantly freezing into nearly a quarter inch, clear-ice rain crust which was impossible to ski without doing huge, exhausting jump turns. Ron Kain, a 25 year veteran of the Alta Ski Patrol, told us that there were only two skiers at Alta able to make turns, and he wasn't one of them.

Then, on January 6th, the snowstorm finally arrived. Starting out rather innocuously, the National Weather Service called for the usual 12 inch accumulation, maybe 18 inches if it all works out. And it didn't even seem

One of the most remarkable avalanches cycles in Utah history.

"It's like taking a pile of potato chips, laying a pane of glass on top and then slamming an Oldsmobile down on the whole mess."

to be working out right. Then the flow turned northwest and the famous lake effect turned on in the Cottonwood Canyons. Moist and unstable air coming off the Great Salt Lake was forced into the mountains and down came the snow which makes Utah famous. Two inches an hour, three inches, then four inches each hour--all day long. By 5:00 p.m. the Alta 24 hour snowfall record had been broken by ten inches. The new record stands at 55.5 inches, with 3.20 inches of water. The storm total came in just under 70 inches. How much snow in Salt Lake City? Not a flake.

Predictably, this initiated the most widespread avalanche activity that most people could remember in the Wasatch. As Bruce Tremper told it to a local TV news station, "It's like taking a pile of potato chips, laying a pane of glass on top and then slamming an Oldsmobile down on the whole mess." What didn't slide naturally was easily triggered by people. Unfortunately, the rain crust was frozen solid before the storm began and all the snow slid on *top* of the rain crust leaving the depth hoar untouched. Although the widespread spontaneous avalanche activity took care of most of the avalanche hazard, we were left with the depth hoar with a nasty rain crust on top which we knew would plague us for the rest of the season.

With the weekend coming up, we issued strongly worded avalanche warnings and sounded the alarm to every kind of media which would listen. The warnings worked and no one died. But there are always a few who prefer to take their avalanche education from the school of hard knocks. Most dramatic were two snowmobile incidents. In the Logan area a snowmobiler was totally buried by the avalanche he triggered. Without a beacons, probes or shovels, his companions starting *randomly* digging with their hands, locating him barely alive in about thirty minutes under four feet of snow. The other was in Farmington Canyon when a snowmobiler was buried with just a hand sticking out. Then in the following days as brave skiers ventured out on the snow which didn't slide during the storm, there was several other very close calls as thier weight was just enough to overload the fragile depth hoar.

Another big snowstorm meant, of course, that we needed to wait for another month for the next one. Once again, the snow rotted away--for the third time of the season. That is before February, or the month from Hell as we came to call it.

February The Month from Hell

A series of winter storms then hit the Wasatch February 7th through 27th, making it the 3rd snowiest February on record at Alta UDOT, with 134 inches of snow. Avalanches first ran on the upper layers of faceted snow, but as the snow built up, the depth hoar began to fail below the rain crust. Backcountry avalanches with four to six foot crowns were common, day after day, both explosive and human triggered.

The first storm of that cycle arrived with strong prefrontal precipitation on February 7. This type of storm tends to even out accumulations across the range. The Park City, Ogden and Provo mountains all received about two feet of snow, doubling their snow on the ground. The storm also doubled the avalanche activity in these areas. Escaping the brunt of previous storms meant an even weaker snowpack, resulting in many spontaneous avalanches triggered by the new snowfall. Patrollers at Park City observed 11 slides in their neighboring backcountry in thirty minuets on February 8.

With no shortage of weak underlying layers, avalanche conditions were exceedingly tricky. The patterns of instability were not clear cut. All aspects and most elevations came into play. Slides were large and very dangerous and stability tests were not always reliable. On several occasions slopes were shot without results one day, then released spontaneously overnight after just a few inches of new snow and a little wind. There was one card for the backcountry skier to play and card was slope angle. Few, if any, of the slides released on slopes less than 35 degrees.

The deadly nature of the game became clear on February 18. Two backcountry skiers in Big Cottonwood Canyon triggered a deep slab avalanche, killing one of them.

The avalanche season in the interior of the U.S. is separated into three seasons, the early season (the depth hoar season), the winter season (usually dealing with just new-snow avalanches), and the spring season (dealing with wet slides). This season in the Wasatch the early season lasted until February. Then came one month of Winter. The rest of it was Spring.

About March 1st someone moved the avalanche switch to off. Spring arrived early with two weeks of warm days and cold nights eliminating virtually all of the deep slab instability. The corn skiing conditions were excellent, the best that many Wasatch veterans can remember. The initial warm up did trigger a few wet slabs. The largest was actually a dry slab, but probably heat related, on Box Elder Peak, south of Little Cottonwood Canyon.

Small storms provided brief powder skiing interludes from mid March through mid April. The stable snowpack changed the nature of steep skiing and snowboarding from February's Russian Roulette to a more rational endeavor. The frequent new snow additions continued to push up total depth except on low elevation south facing slopes that never really had much accumulations. They also hindered the development of corn snow and widespread breakable crust made snowboards the backcountry vehicle of choice.

With all of the buried depth hoar, spring thaws are often catastrophic with huge wet slabs breaking out. They often start on the south facing slopes early in the Spring, then move onto the east and west later in the Spring. Finally, the north facing slopes warm up for the first time of the season and they often produce the largest and most destructive wet slabs. On April 17th, a group of 19 people in Stairs Gulch, one of the largest and steepest avalanche paths in the Wasatch, had to scramble to higher ground as a large wet slide snaked slowly down the north facing chutes. Rescue crews also probed another slide that same day in Little Cottonwood Canyon which turned out to be a false alarm.

After watching and worrying and getting up in the night all winter long, for us avalanche forecasters, the snowpack becomes our child. And when it melts in the spring and slips off for the ocean, like a teenager will do, most of us go through a mourning process. Don't whisper this too loudly. But this winter, being the problem child it was, when the end came we were happy to see it go.

March

April
Happy to see it go

Season History - La Sal Mountains

by Dave Medara

"The first crisis of the season was a budgetary one."

Last season—the 1992-1993 season—was my first year at the La Sal Avalanche Forecast Center (LSAFC). It was a year of learning for me and a year of great innovation and technological change. This season the changes were of a little different nature.

The first crisis of the season was a budgetary one. Last season, the Friends of the UAFC helped support the LSAFC by hiring a part time observer and paying for some weather instrumentation. But since the Wasatch-Cache National Forest decided to dramatically cut the funding, the Friends of the UAFC, decided to concentrate all of its resources into northern Utah where the vast majority of the users are. This decision occurred over the summer when I was on vacation, and when I arrived in November I discovered that just like the staff in northern Utah, I had to scramble for additional money if I wanted to run the program at last year's level.

For me, this meant that we no longer had funding for a part-time employee, a computer, technical assistance or communication equipment for the weather station we set up last year, all things previously paid for by the FUAFC.

But luckily Bruce Tremper had already begun making arrangements for these much needed funds. Peter Lawson and the Quinney Foundation donated \$2000 dollars to help keep the center afloat. William Levitt, the mayor of the town of Alta, in addition to donating privately, lobbied the Salt Lake County Council of Governments who donated \$20,000 to the FUAFC. After this life-saver the FUAFC decided to match all monies raised from the LSAFC dollar for dollar, up to \$2500. Finally, a benefit party was held for the center at the Poplar Place and donations from Grand County and Moab locals helped us out even further. After a busy month of scrambling, we at least had the funding to operate the center at the level of services offered in the past, but with a little left for new equipment.

November

Fortunately, November was a dry month, leaving me with more time for fund-raising activities and less to worry about in the mountains. It only snowed 21 inches that month, and the snowstake at 9600ft read only 14" at month's end. We opened the center full-time Thanksgiving weekend with forecasts being issued at least 5 days a week, more frequently during storm cycles. Even with only 21" of new snow at the 9600ft level, winds and greater snowfall totals at the upper elevations combined to produce at least 5 observed avalanches on high elevation north faces including a skier release into Horse Canyon.

December

Once December rolled around the fundraising dust settled a bit but the snowpack was going from bad to worse. The faceted snow was nearly full-depth on all aspects (even sandwiched between sun crusts on south facing

slopes) so when we finally did get some snow on the 13th (14" at 9600 ft) we had a fairly major slide cycle. No one was going near any of the north faces and with good reason. You could plant your pole to the ground almost anywhere and the snowpack "whooped" wherever you went. Snowpit stability tests were very unnerving. The avalanche hazard was high on north facing slopes for most of the month.

Bureaucratic challenges returned again in December when I found out that the FUAFC would no longer be able to pay for our assistant position as a private contractor. We would have to make my newly hired assistant, Brian Murray, a Forest Service employee and get the money that would have been paid to him by the FUAFC donated to the Forest Service. Finally after a couple months of delay, Brian was finally hired netting him a raise and worker's compensation protection. Not a bad deal in the end.

January was bone dry and we went without precipitation until the 26th of the month. Not much going on in the avalanche realm, but lots going on in the education department. Every weekend, either myself or Brian helped out with training programs for the Southeast Utah Hasty Rescue Team for all of the month of January. Beacon drills and rescue protocols were the main topics of the weekend sessions and a full-scale rescue drill was held for the hasty team the last weekend of the month. I also traveled to Alta, Utah in mid-January to help out with a three-day avalanche course being taught by the UAFC and staff from the renowned Alaska Avalanche School. This was a great experience for me to learn avalanche education from some of the countries leading teachers.

When the snow finally fell again after nearly a month of dry weather, it fell onto a snowpack to rival the most rotten that Colorado has ever seen. The slides began to run on the 27th of January. Following a 22" dump (the full January total) the snow continued throughout the snowy month of February (51" snow, 5.2" water). Many climax avalanches occurred, most notably a large skier release near South Mountain on the 19th that was 4-6 feet deep. This avalanche nearly caught a group of visiting skiers including a ski patroller from the Wasatch. It took out their skin track and two runs the group had already made. Another incident involving some Salt Lake skiers occurred at the end of the month. Unlike last year, the snowpack was not gaining strength as the winter progressed. Thin snow, lots of wind and too many cold, clear nights all combined to make the La Sal snowpack a layered, rotten, faceted mess, horribly inconsistent, with extremely long-lasting instability possible. The avalanche hazard was again high for most of the month. Increasing visitation, especially from Salt Lake area skiers accustomed to a deeper and more stable snowpack, are going to bring about an increase in avalanche incidents such as these.

Also in February, at lower elevations, we established a sub-board of directors and a Moab branch of the FUAFC. This sub-board was created to give us some autonomy with funds raised for the LSAFC. An account was established in Moab so that all checks for expenditures would not have to come from Salt Lake. The sub-board administers this account, approving any outlays and eliminating a drawn-out process of getting approval for expenditures from Salt Lake. With this mechanism in place, we are ready to do a much more effective job fund-raising, which in the future will be part of keeping

"No one was going near the north faces and with good reason."

January

February

avalanche forecast centers in Utah operational. Steve Russell, John Lewis and Craig Bigler have volunteered to staff the sub-board for this year and we welcome their help. The sub-board will save me many hours of bureaucratic hoop-jumping and help organize fund-raising activities for next year.

March

March was the month I'd been dreaming about all season. With the sun high in the sky, the snowpack finally began to heal up, the deep slab instability of mid-winter gave way to great corn skiing on the big south faces of the La Sals. It was finally safe to go out on something steep that would offer decent skiing, something we'd been denied most of the season. Warm days and great nightly freezes produced tremendous corn skiing that we hardly saw until June last year. March was a very dry month (16" snow, 1.6" Water), and with the bureaucratic grappling mostly dealt with, it was nice to relax and get some good turns in. The La Sals are truly an unbelievable range to ski in when the snow is good and the avalanche hazards are acceptable.

April

April storms ended the corn conditions until the end of the forecast season and boosted our snowpack totals up to 100% of normal after hovering around the 75% mark all winter. This compares to 175% of normal at this time last year. The biggest storm of the year blew in on the April 7th right on the heels of a smaller storm making for a wet month and insuring corn conditions well into May. All in all, this has been representative of a relatively normal water year in the La Sals, where large fluctuations in the percentage of normal figure can result from a single storm. We've received 200.5" of snow at the Geysers Pass trailhead (9600ft) which is generally quite a bit less than we receive at upper elevations and about two-thirds of what we receive at Geysers Pass or lower Gold Basin snow study plots. These last two sites unfortunately are often difficult to reach. Last year for the period beginning of January 4th until April 15th we received a 184" of snowfall.

New Instrumentation

As of this writing I am pursuing new technology that will hopefully improve our knowledge of snowfall in the La Sal Mountains. Through a cooperative effort with the Forest Service National Avalanche Center, the Moab Ranger District of the Manti-La Sal National Forest and the Friends of the UAFC, we've raised the money to set up another weather station. This one will measure precipitation and snowfall totals. This will allow us to do a forecast in the morning hours based on actual snowfall totals, no more guesswork or forecasts issued in the afternoon after a day on the mountain when the information is no longer timely or needed. I am also currently experimenting with a powerful new software package from the National Weather Service that will provide us with new weather forecasting information for southeast Utah. It is our hope that these additions will improve our message content and provide more timely information to the users of our service.

Winter recreation use in the La Sals is up from last year. According to the people who signed in at the trailhead the use was up by 20 percent with 1516 visitors signing in at three different trailheads. Skiers outnumber snowmobilers by about three to one but snowmobilers tend to sign in less frequently. Also, commercial outfitters who operate on the forest in the winter are reporting large increases (60-200%) in bookings in the hut and yurt systems. Finally, the calls to our recorded avalanche advisory are up this

season as well totaling 2911 calls. With the increased use, it's no surprise that the number of human-triggered avalanches increased this year. It is worth noting that all avalanche incidents this year occurred when the avalanche advisory stated the danger of a human triggered avalanche was high.

Our contact with the southeast Utah community was up this year, while by contrast, our contacts with the local media were down. Efforts to produce a short video with the local news station didn't work out due to conflicting schedules and the weekly interview seems to have turned bi-annual. On the upside, community education and training were increased this year, mostly due to increased flexibility and availability of LSAFC staff.

In closing, I will have to thank many for their efforts in getting me through my second season here at the LSAFC. First of all is Brian Murray, who proved to be an unbelievable avalanche forecaster and ski companion. He has surpassed all my expectations this year. Hopefully I won't have to fight with the Solitude Ski Area for his help next year. My boss, Jerry Shaw, and everyone else at the Moab Ranger District has been very helpful and patient this year. Special thanks go out to Rainee Guymon (the guru) and Jim Harte of the Bureau of Land Management for their technical support with the weather station. Louise Schultz, the new treasurer of the FUAFC did a great job and really helped us out. Of course, none of it would be without the efforts of Mark Yates, founder of the LSAFC. I now understand the monumental effort it must have taken to get this program started. Neither Mark or any of the others who perished in the 1992 Gold Basin accident will be forgotten. We would also like to wish the former Mary Yates, now Mary Grizzard, the best of luck in her new marriage.

Winter use was up this year, not only the visitation, but the call rate.

Logan Area

Maiden Voyage of Local Forecasting

The Logan area has always been an anomalous part of the terrain covered by the UAFC. First, the climate, in the Logan area mountains is different enough from the rest of the Wasatch Range to warrant special treatment. Second, it's an hour and a half to two hours drive from Salt Lake City. Consequently, with an increasing demand the Salt Lake-based forecasters found themselves visiting the Logan area mountain less and less each season and our forecasts becoming less and less accurate and credible. Especially with budget crunches underway, last season we had all but decided to terminate our forecasts for the Logan area because it has long been the

"Avalanche hazard forecasting is just as much an art as a science, and it's impossible to paint good pictures without seeing the canvas."

philosophy of the UAFC that we do not issue forecasts for areas which we don't visit regularly.

We have always avoided "forecasting from the office" because it simply doesn't work. Avalanche hazard forecasting, after all, is just as much an art as a science and it's impossible to paint good pictures without seeing the canvass. There are hundreds of variables which can't be displayed on a computer monitor or spoken over a telephone line. It has to be skied and dug into and poked and tweaked and smelled and tasted. The office may be a good place for gathering and disseminating information, but real avalanche hazard forecasting happens on the snow. Because of this, we have always believed in diversified forecasting i.e. local forecasts by local people.

For these reasons, we have long dreamed of having a satellite forecasting center in Logan but, as usual, it has always come down to money. But this season, when faced with the prospect of no forecasts at all, the Logan area volunteer observer network came to the rescue and offered to put out their own forecasts for free, but doing it every day for the entire season was more than they were willing to take on. So we reached a compromise: the UAFC staff in Salt Lake City would record the Logan forecast on the weekdays and the Logan volunteers would record the forecast for the Logan area on the weekends. The partnership has worked wonderfully. It has not only provided great assistance to the Salt Lake based forecasters, but it has increased the accuracy and credibility to the Logan advisories.

The Logan area forecasting program is under the capable direction of Mike Jenkins who has taught the Snow and Avalanche class for a number of years in the Utah State University Department of Forest Resources. His partner is the long-time Logan area volunteer observer Kevin Kobe. This winter they produced excellent avalanche advisories each Friday, Saturday and Sunday.

The Logan area office is located in the Snow Science Laboratory in the College of Natural Resources at Utah State University. A memorandum of understanding has recently been signed between the College of Natural Resources at USU and the Wasatch-Cache National Forest.

The Logan area mountains have always been deficient in real-time automated weather instrumentation. The sole site at Logan Peak is owned and operated by Campbell Scientific as a demonstration project. Thanks to Austin McHugh and Keith Sauter of Campbell Scientific, we were able to not only monitor their wind speed, wind direction and temperature sensors, but we also installed our own precipitation and snow height sensors on the north facing slopes near Logan Peak. Although we had some bugs to work out of the new system, it was a great help in knowing how much snow fell in the otherwise obscure high country of the Logan area mountains. Several other snow study plots must be manually checked, one at Beaver Mountain and two others at the yurts operated by Ken Guest of Powderridge Ski Touring. This information aids in following the evolution of the snowpack but it does not supply critical real-time snow amounts during a storm. We hope to add another automated station for next season if we can find a local business who will sponsor the project.

Mike Jenkins and Kevin Kobe also handle most of the avalanche education in the Logan Area. This season, Mike Jenkins made significant

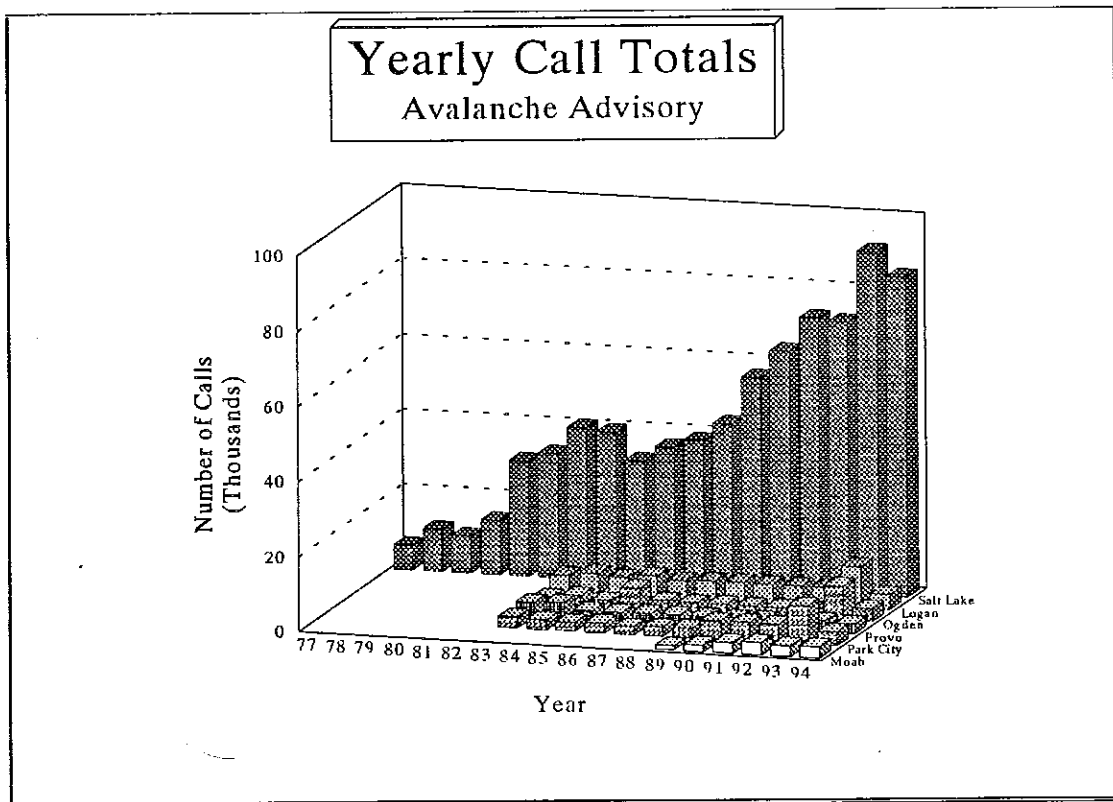
inroads with the local snowmobile community. He gave an invited avalanche talk to the Cache Valley Highmarkers snowmobile with 200 people in attendance. Kevin Kobe also spoke to a group of 25 in nearby Preston Idaho about avalanche search and rescue. Finally, the new avalanche video Winning the Avalanche Game was shown to a group of 125 people who were mostly backcountry skiers.

This season, Mike Jenkins made significant inroads with the local snowmobile community.

In summary, the maiden voyage of local forecasting in the Logan area has been a huge success. It has not only made the forecasts more accurate and credible, but it has increased community involvement in both the operation and funding of the program. Next season, we plan to fund a part-time forecasting position through Utah State University. With greater community financial support, this could turn into a full-time position.

Calls to the UAFC Recording

Drought year means a decrease in calls



Number of calls to the UAFC recorded avalanche and mountain weather advisory. The numbers decreased this season, especially outside the Salt Lake area mountains because of a low snow year, poor snow conditions and long periods between storms.

The number of calls dropped for all areas of northern Utah

The number of calls to the UAFC recorded advisory dropped at all Utah locations this season with the exception of Moab. We have long known that the call rate closely follows the amount of snow. The 1992-93 season saw a 41 percent increase because of a very snowy winter and better skiing conditions than Utah has seen in years. Conversely, the 1993-94 winter was not only a low snow year with most parts of northern Utah 50-70 percent of average, but the winter had long periods with no snow making skiing conditions poor. Utah's are notoriously spoiled by the "Greatest Snow on Earth," and many of the less hard-core recreationists ventured out only on the truly good days—meaning 3-4 days all season.

Although the Salt Lake area mountains had long dry spells between storms and poor skiing conditions the mountains had near normal snowfall and correspondingly the call rate dropped only about 10 percent. But all the outlying areas had disastrous snow years. With only 50-70 percent of average snowfall, a very late start to the season and long periods between storms, the call rate dropped 62 percent in Logan, 17 percent in Provo and a whopping 64 percent in Park City. Unfortunately (or perhaps fortunately in this case) the call counter on the Ogden machine malfunctioned and all the counts were lost for the season. It would have been disappointing news anyway.

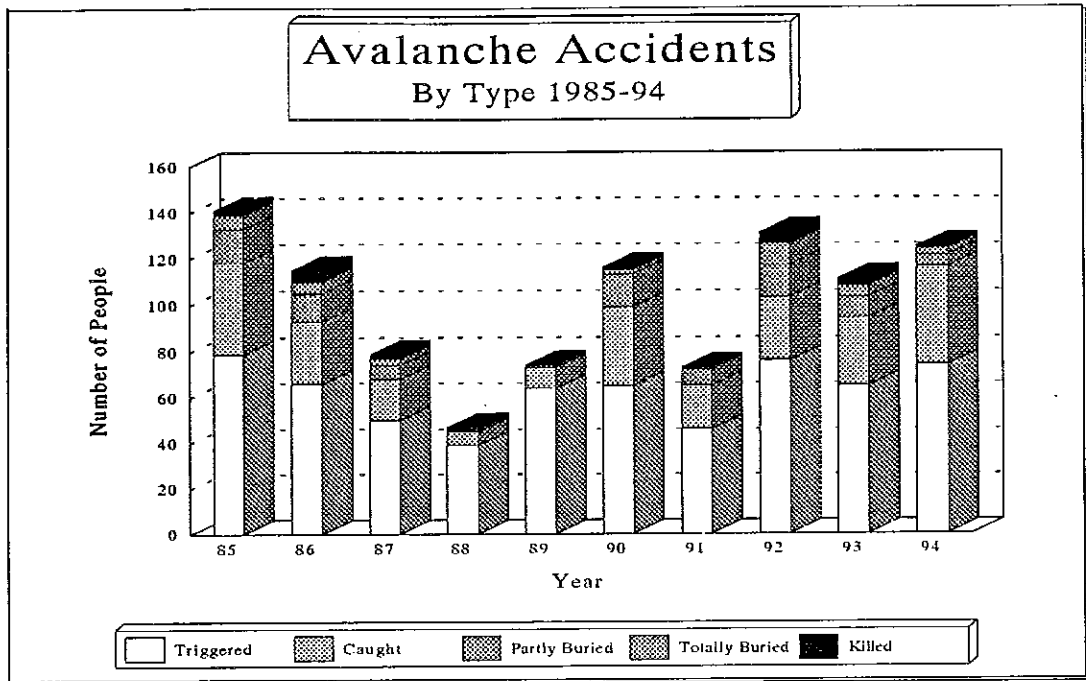
The large drop in Park City was also due to the closure of backcountry access from the Park West resort. In the past, Park West was the only easy and quick access to the backcountry on the Park City side of the range. After the closure, backcountry skiers had to either trudge up the Guardsman's Pass road or into the Uintas for several miles and breathe heavy snowmobile exhaust all the way. We heard several requests to put the Salt Lake information on the Park City line because many people traveled to the Salt Lake side of the range to go skiing. The only bright spot was the Moab area which had a slight call increase.

Avalanche Incidents and Accidents

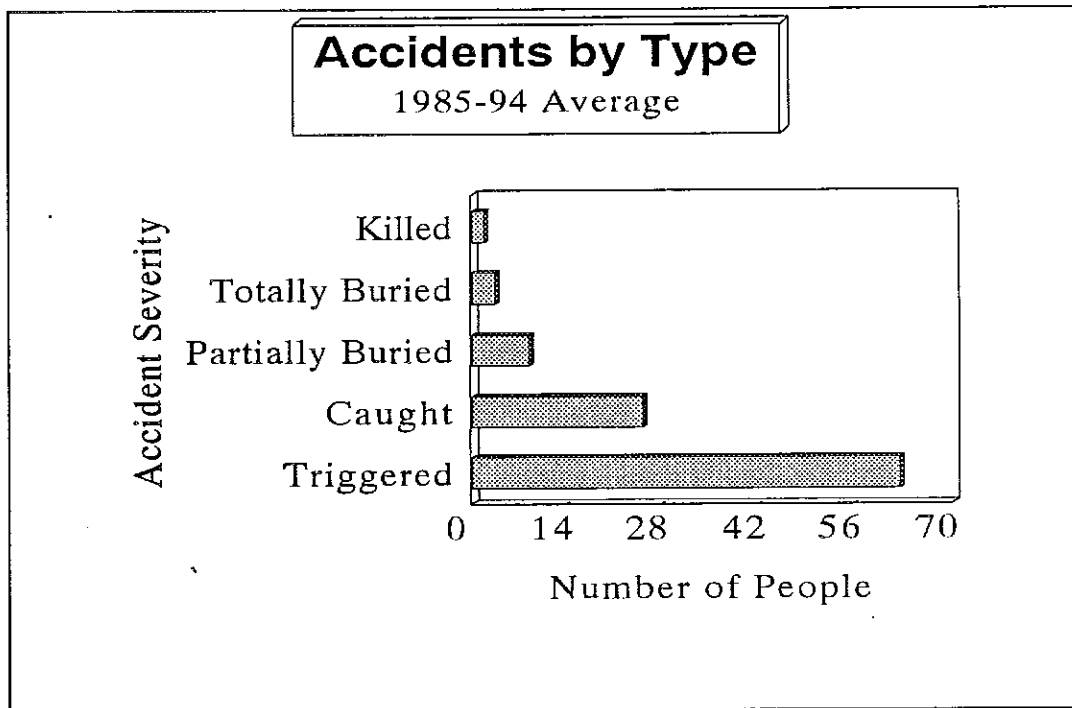
Snowmobile fatalities exploded like a bomb.

There was only one avalanche fatality in Utah this season, which is slightly under the previous 10-year average of 1.8 fatalities per year. Incredibly enough, Utah was decidedly in the national minority in that our avalanche fatality was non-snowmobile related. Nationwide, as of this writing, there were 11 avalanche fatalities, 9 of them were snowmobilers.

In the past 10 years, snowmobilers have traditionally accounted for a quarter to a third of avalanche fatalities. Backcountry skiers traditionally account for most fatalities with the second highest risk group being climbers. Snowboarders and snowmobilers were rapidly gaining ground but this season the snowmobile fatalities exploded like a bomb. Part of the reason was that



Utah had only one avalanche fatality this season. The number of people caught in avalanches, however, reached an all-time



The average number of avalanche accidents in Utah for 1985-94 listed by severity. Only 3 percent of those who trigger avalanches are killed, 8 percent of those caught in avalanches are killed, 23 percent of those partially buried are killed, and 54 percent of those totally buried are killed.

Nationwide, as of this writing, there have been 11 avalanche fatalities with 9 of them snowmobilers.

Contrary to popular belief, thin snowpacks mean lots of avalanche accidents.

A close call in Logan

5 snowmobilers were killed in the same avalanche in Montana. But that still leaves 4 more in 4 separate accidents.

We have long known that snowmobilers were the epitome of an accident waiting to happen and this season proved our predictions right with a vengeance. Snowmobilers make the perfect avalanche victims for two reasons. First, snowmobiles have become incredibly powerful with very efficient traction systems allowing them to climb steep slopes even in soft snow. Snowmobiles can not only go virtually any place a skier can go, but one snowmobiler can cross 100 times more avalanche terrain in a day than a skier or climber can. Second, very few snowmobilers have any type of avalanche training or carry avalanche rescue equipment.

There have been a large number of close calls involving snowmobilers in Utah in the past few years but no fatalities—so far. Almost every western state has had at least one snowmobile fatality in recent years and it's not a matter of if, but when, Utah will join the list.

Another statistic just as incredible as the snowmobiler carnage is the small number of fatalities in Colorado this season. On the average, Colorado leads the nation, by far, in avalanche fatalities with 5 each season. This season they have had only one and that happened at the very end of the season.

Utah had a below average snowpack but contrary to popular belief snow does not always equal avalanches. In fact often it's just the opposite. A thin snowpack means temperature gradient metamorphism which means the development of very weak faceted snow also known as depth hoar. Depth hoar is a notoriously persistent weak layer. Historically, 75-90 percent of all avalanche fatalities involve either faceted snow or surface hoar as the weak-layer. These layers form primarily during clear weather and Utah had a plethora of clear weather this winter. These well developed weak-layers were overloaded continually by big storms making for persistently unstable conditions with the perfect powder "sucker snow" on the surface. As a case in point, we had a record number of people caught in avalanches this season. We were lucky to escape with only one fatality.

Avalanche accidents got off to a rousing start with the second significant snowfall of the season. The large storm of November 22nd fell on top of this depth hoar and promptly began sliding. Early season powder hounds had a rude re awakening to the harsh reality of avalanches. In four days, there were 15 skier and snow boarder triggered slides, with 10 people going for rides.

We had to wait until the New Year for the next snow which fell—once again—on depth hoar. The New Year started out with five skier triggered slides on January 2nd. Then came the rain crust of January 4th and then the Big Storm of January 6th which broke the 59 year old record for the amount of snow in a 24-hour period at Alta. The storm total was just under 70 inches.

Between January 6th and 13th, there were 14 human triggered slides in backcountry. On the 8th, two snowmobilers in two separate incidents triggered and were caught in avalanches. One of these was undoubtedly the closest call of the season. On the east face of Logan peak, a snowmobiler triggered an avalanche while high marking and it buried him four feet deep for 30 minutes. In one of the luckiest avalanche rescues of all time, his

companions found him by digging *randomly* with their helmets and hands. The victim was four feet deep and did not even have a visor on his helmet which often helps to form an air pocket. The snow was packed directly against his face. According to the statistics, he should not have survived. Bruce Tremper appeared on a television show with him on Channel 5 and the snowmobiler said, "I don't know why I survived. The lord must have some plan for me."

"Yes, avalanche education," Bruce responded.

In Farmington Canyon, another snowmobiler was completely buried except for hand sticking out. In both cases, quick responses by their partners saved their lives.

The skiers didn't fare much better during this avalanche cycle. One skier was totally buried in Porter Fork on January 6th. January 12th was a busy day in Upper Day's Fork. First, a skier preparing to dig a pit triggered a 600 foot wide, three foot deep slide, and barely escaped a long ride by digging into the bed surface. Moments later, witnesses in another party who were trying to leave the obviously unstable area as fast as possible, triggered a second slide, and one skier was buried up to his neck.

Up until the first of February, the winter was characterized by a big storm, then an month of drought, big storm, month of drought, and so on. But February was the third snowiest February in the 59 year history of Alta. It was one crazy month.

There were skier triggered slides 16 days in a row. Our hair turned gray. There were three slides on the 8th, with two people going for rides. One was an out of bounds skier near Sundance was carried 1,500 vertical feet after triggering an avalanche in Trailer Court Chute. The Sundance ski patrol pulled off some very difficult maneuvers to reach and evacuate the injured skier. Skiers went for rides again on the 9th and 10th. One skier was buried to his chest in the Logan area mountains, and another went for a bruising ride at Solitude. On the 12th there were 5 skier triggered avalanches. On the 13th skiers were triggering bigger slides in Mill Creek - class 3's and 4's. More rides were taken by skiers on the 14th, 15th, and 16th, with some resulting in injuries.

This series of mishaps reached an unfortunate crescendo on February 18th, when Utah's only avalanche fatality of the winter occurred. Layne Mitchell and his partner Mark Mason had skied to the top of peak 10,420, which is between Brighton and Park City resorts. They knew that there was a high avalanche hazard that day and they had already dug one snowpit when they Mason dropped off of the ridge to dig another snowpit. It was a steep (37 degree) north facing slope. When Mason stopped where he was going to dig the snowpit he heard the slope collapse and he began to move. He braced himself against a nearby tree and the slide washed over him leaving him only partially buried.

After digging himself out he yelled for Mitchell and heard no answer. He then climbed back up to the ridge and discovered that Layne Mitchell had been caught in the slide as well. Presumably Mitchell had tried to follow Mason out onto the slope. Mason then started a beacon search on the debris. He found Mitchell near the bottom of the debris with a hand sticking out. He dug him out, from under about three feet of debris and started CPR but Mitchell did not respond. He was buried for an estimated 20-30 minutes and

In one of the luckiest rescues of all time, his partners found him by digging randomly with their helmets and hands buried four feet deep.

Layne Mitchell Fatality

"Since the UAFC first began, this makes the 16th out of 17 avalanche fatalities in northern Utah in which the victim did not call the UAFC recording before they went out."

A large group narrowly escapes a wet slide

died from suffocation. Since the UAFC first began, this makes the 16th out of 17 avalanche fatalities in northern Utah in which the victim did not call the UAFC recording before they went out.

After this death, people finally began to take the hazard more seriously and activity in the backcountry was quiet for several days.

But by the 24th, backcountry users were creeping back into the steep terrain after the mountains received several more small shots of snow. There were several more skier triggered slides toward the end of the month. A helicopter in the Oquirrh Mountains even took a ride when the cornice it set down on collapsed, and the ship started an avalanche as it rolled down the hill.

March finally brought a respite from both snow and avalanches. Winter seemed to end early, with the month having much warmer than average temperatures and only 47 inches of snow. The snowpack strengthened, and there was a cycle of excellent corn skiing. With a mostly stable snowpack, there were only 6 skier triggered avalanches in March. The most serious one was in Silver Fork, where a skier was completely buried except for one leg.

When winter finally made a brief reappearance April 1st, the old snow had stabilized, and we had 10 days of powder skiing with the only avalanche activity in the more predictable new snow. Late in the month, the snowpack once again became interesting when above average temperatures and a week of nonfreezing nights started a wet snow avalanche cycle on all aspects. One of the closest brushes with huge disaster was April 17th. A group of 19 people were up on the north facing sections of Stairs Gulch practicing self arrest and crampon techniques, when a massive wet slide came rumbling toward them. Hearing the roar, they acted quickly and ran up the sides of the gully, and watched the slide move slowly by, some of them only an arm's length from the walls of wet debris. Though they lost 16 packs, no people were buried.

Incidents and Accidents 1993-94

Date	Location	Details
11/23	Alta	Skier triggered, carried, came out on top
11/24	Alta	Several skiers went for rides
11/25	Patsy Marly	Skier caught, lost skies and poles
11/25	Alta	Three separate rides by skiers
11/25	Upper Cardiff	Skier triggered, short ride
11/25	10,420	Skier triggered
11/25	Cardiff Cliffs	Snowboarder triggered, carried, came out on top
11/26	Grizzly Gulch	Skier triggered
11/26	Upper Grizzly Gulch	Sympathetic to skier
11/26	Georges Bowl	Skier sympathetically triggered 3 slides
11/26	Patsy Marly	Sympathetic to skier
12/5	Rocky Point	Broke out 300' above skier, skied out to side

12/11	10,420	Skier triggered
12/14	Reynolds Peak	Skier triggered
12/15	Uintas	Skier triggered
12/25	Mineral	Skier triggered
12/31	Red Pine, LCC	Skier triggered
1/2	Dutches Draw	Sympathetic to skier on ridge
1/2	Reynolds	Skier triggered
1/2	West Monitor	Skier triggered
1/2	Little Water	Skier triggered
1/2	Alta	Skier triggered, carried
1/6	Porter Fork	Skier triggered, one totally buried , OK
1/7	Toll Canyon	Skier triggered
1/7	Bountiful Peak	Sympathetic to snowshoers
1/8	Dog Lake Chutes	Skier triggered, carried
1/8	Logan Peak	Snowmobiler triggered, totally buried 30+ min, OK
1/8	Farmington Canyon	Snowmobiler triggered, buried except for hand
1/8	Lost Canyon, Provo	Skier triggered hard slab
1/9	Mineral Ridge	Skier triggered
1/10	Mary's Chutes Brighton,	2 skiers triggered, skied out
1/11	Meadow Chutes	Skier triggered, sympathetically
1/11	Westward Ho Access	Skier triggered
1/12	Upper Days Fork	Skier triggered hard slab, carried, dug into bed surface
1/12	Upper Days Fork	Skier triggered, one skier buried to neck , no injuries
1/13	No Name	Skier triggered
1/21	Tuscarora	Skier triggered small wet slab
1/23	Mineral Fork	Skier triggered
1/23	White Pine	Skier triggered, twisted knee
1/24	Toledo Bowl	Skier triggered, carried, not buried
1/26	Daley Canyon	Broke below skier when he fell mid slope
1/29	Cardiac Bowl	Skier triggered, buried to waist , lost ski
2/1	Tri Chutes	Skier triggered
2/5	Wilson Chutes	Skier triggered
2/5	Broads Fork	Skier triggered slide on partner below, carried, grabbed tree
2/5	Box Elder	Skier triggered
2/8	Catherines area	Skiers triggered several slides
2/8	Rockhouse	Skier triggered, went for ride, dug into bed surface
2/8	Sundance, Trailer Court Chutes	Out of bounds skier triggered slide, rode 1,500 vertical, injured knee
2/9	E. Monitor	Skier triggered, went for ride, dug into bed surface
2/10	Solitude	Skier triggered, carried, minor injuries
2/10	Melville Pk, Logan	Skier triggered, buried to chest
2/11	Winter Sport Park	Sympathetic to skier on ridge
2/12	Toledo Bowl	Sympathetic to skiers on up track
2/12	Patsy Marly	3 skiers caught, 1 partially buried , lost equipment
2/12	Bowman Fork	Skier triggered
2/12	West Monitor	Skier triggered
2/12	Upper Mill Creek	Skier triggered, went for ride
2/13	Soldier Fork	Skier triggered class 4 slide
2/13	Wilson Fork	Skier triggered

2/14	Gobblers, SE Face	Skier released class 4 slide by cutting cornice
2/14	Mineral	Skier triggered, went for long ride, minor injuries
2/15	Georges Bowl	Skier triggered, short ride
2/16	Silver Fork	2 skiers caught, both came out on top
2/18	10,420	Skier triggered, buried 34', killed
2/24	Soldier Fork	Skier triggered
2/24	Rocky Point	Cornice broke under skier
2/25	Patsy Marley	Cornice broke under skier
2/26	Provo Mountains	2 people almost buried by natural slide
2/27	Dog Lake Area	Skier triggered, grabbed tree, was 6th run
2/26?	Oquirrs	Cornice failed under helicopter, helicopter and pilot partially buried , pilot OK
3/3	Flagstaff	Snowboarder triggered
3/12	Uintas	Snowmobile triggered slides
3/19	Poineer Ridge	Skier triggered
3/20	Silver Fork	Two skier triggered soft slabs
3/21	Days Fork	Several skier triggered soft slabs
3/22	Silver Fork	Skier carried, buried except for leg , OK
4/7	Pioneer Ridge	Skier triggered, carried, got out to side
4/17	Stairs Gulch	19 climbers narrowly escape wet slide. 17 packs buried.

74 Total backcountry incidents

42 Caught

5 Partially buried

3 Completely Buried

1 Killed

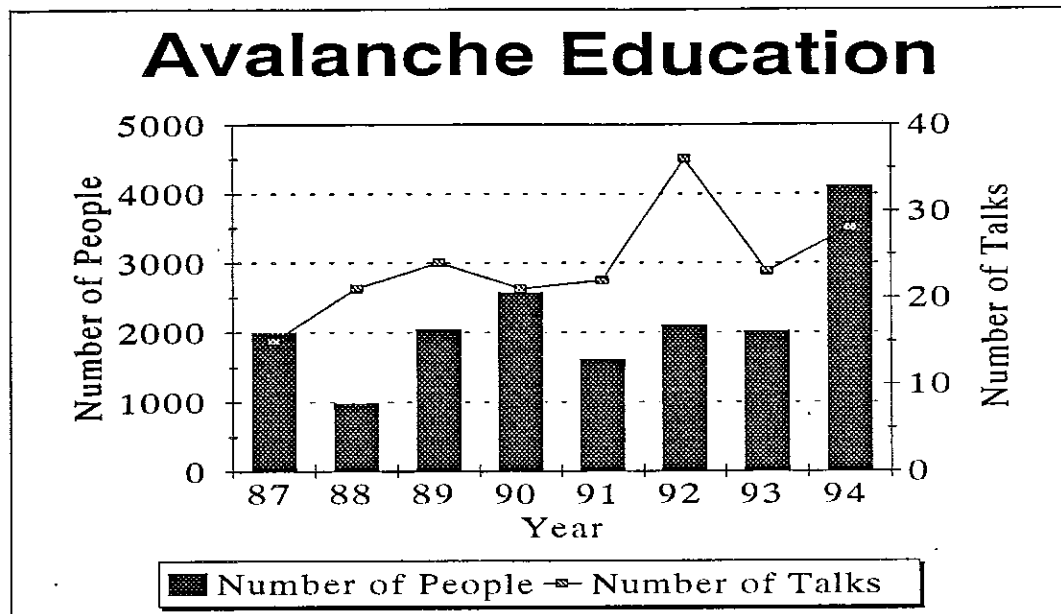
Avalanche Education

The UAFC staff gave 38 talks and workshops reaching a record number of 4100 people directly.

The winter of 1993-94 was a whirlwind of avalanche education. Each year we try to balance time spent on education with our other duties of forecasting and field work. But this year avalanche education picked up momentum on it's own, and we seemed unable to stop the tide. The UAFC staff ended up giving 38 talks and workshops in Utah, reaching a record 4,100 people.

Through the years many of the UAFC staff have become both nationally and internationally recognized avalanche educators. Bruce Tremper, for instance is a regular lead instructor at the National Avalanche School in both the U.S. and in Canada. Avalanche talks by the UAFC staff utilize an entertaining, multi-media approach with a large slide library, videos, models and stories. The talks have become extremely popular in recent years. For instance, in two different talks at REI each season, the public knows to arrive at least 15 minutes early to find a seat. Many people are turned away for each talk after 250 people cram into the room.

We get many more requests for talks than we have time to do, so we



The UAFC staff gave a record number of avalanche talks reaching a record number of people.

usually have to get more than 100 people together to justify our time. For smaller requests, we had an excellent new tool this year. UAFC Director Bruce Tremper finally completed the long awaited one-hour avalanche education video, *Winning the Avalanche Game*, which was funded by the Forest Service National Avalanche Center and private contributions. Premier showings of the video in Salt Lake, Park City, and Logan attracted over 635 people, and also acted as fund raisers for the Friends of the UAFC. Five hundred copies of the video have been sold to date only through word of mouth. Next season, they will be distributed through national and international distribution networks.

Much more than videos or talks, outdoor clinics are the best way to really learn about snow and avalanches. The entire UAFC staff helped instruct the Friends of the UAFC's annual 3 day January workshop. We were also involved in two outdoor avalanche awareness clinics for snowboarders and sent two people as trainee-instructors to 3 day avalanche courses at the renowned Alaska Avalanche School. We also lectured, and conducted field seminars for the Wilderness Medicine Conference and the National Avalanche School.

Evelyn Lees continued her innovative work with snowboarders this winter. Greg Smith of Wasatch Powderbird Guides (WPG) got together with a local snowboard shop, Salty Peaks, to provide avalanche education and avalanche rescue beacons to snowboarders for a low cost. WPG was adamant that avalanche education and practice with the beacons had to be a part of the program, and that's where the UAFC came in. The UAFC organized an educational clinic which included lots of beacon practice, and an emphasis on avoidance of avalanches. Instructors from the UACF, FUAFC and WPG, taught two of these 6-hour clinics. Those completing the workshop could then purchase used beacons from WPG at a steal of a price. This was

New Avalanche Video *Winning the Avalanche Game*

Evelyn Lees continued her innovative work with snowboarders

Snowmobile avalanche education continues to be a problem.

Bruce Tremper, working under the National Avalanche Center, will complete an avalanche education video especially for snowmobilers.

a great example of several entities working together in partnership for a common good. Many thanks to WPG not only for their sponsorship of avalanche education for snowboarders, but for providing the best rescue service in the country for backcountry avalanche victims.

Snowmobile avalanche awareness continues to be a problem in both Utah and nationwide. In the previous decade, snowmobilers have historically accounted for only a quarter of avalanche fatalities nationwide. But as snowmobiles have become extremely powerful with better traction systems, they are accounting for an increasing percentage of avalanche accidents. And no wonder. Snowmobiles can now routinely venture into terrain of where only extreme skiers and climbers used to go. Plus, one snowmobiler can cross 100 times more avalanche terrain in a day than a skier or climber. To complete the gloomy picture, few snowmobilers have even the most cursory avalanche skills and very few carry avalanche rescue equipment. This season, as of this writing, an unprecedented 9 out of 11 avalanche fatalities in the U.S. have been snowmobilers. In Canada this season 4 out of 6 fatalities were snowmobilers. It has launched both countries into an intensive avalanche education program aimed especially toward snowmobilers with at least three videos in the planning stage.

Next season, Bruce Tremper, working under the Forest Service National Avalanche Center in partnership with the Canadian Avalanche Association, will complete an avalanche education video especially for snowmobilers.

In Utah there were 2 complete burials of snowmobilers, with only the most incredible luck allowing happy endings. Long-time avalanche forecaster and current snow ranger, Al Soucie, turned out to be our key to snowmobile avalanche education. An ex-snowmobile racer, he put a lot of time and thought into developing slide shows oriented towards snowmobilers. Both the UAFC and National Avalanche Center are now sending all requests for avalanche education from snowmobilers in his direction. It's great to finally have someone with credibility and who speaks the lingo to work with this group. With Al's help, we hope to continue our efforts to educate snowmobilers next year.

There continues to be an ever increasing thirst for avalanche education, and from more widely varied groups. This demand continues to exceed the pool of good avalanche educators in Utah. We desperately need more qualified instructors not only in Utah but nationwide. But simply having good avalanche skills does not necessarily translate into good avalanche education skills. It takes time to train an instructor, and because of this we have taken on several apprentices. For instance, we had four assistant instructors for the FUAFC 3-day workshop, and then used several of these people for the snowboard clinics later in the winter. Bob Athey and Matt Ryan did especially good jobs, with not only a strong field background in snow and avalanches, but both are accomplished snow boarders as well. We look forward to using them again.

Finally, Tom Kimbrough appeared as an avalanche expert in a video by Channel 4 on natural hazards in Utah. Channel 4 has distributed the video free of charge to schools and libraries throughout Utah.

Avalanche Talks by UAFC Staff

Date	Forecaster	Location	Topic	No.		
11/7	Tremper	Nat'l Av School	Safe travel	250		
11/13	Tremper	Canadian Av School	Stability summary	230		
11/16	Kimbrough	USFS Blaster Clinic	Explosive place	150		
11/19	Kimbrough/Lees	Crestview Middle Sch	Avi Awareness	500		
11/30	Staff	REI	Avi Awareness	260		
12/7	Tremper	Tower Theater, SLC	Video premier	440		
12/9	Staff	U of U	Avi Awareness	12		
12/14	Staff	REI	Avi Awareness	253		
12/16	Medara	Moab M.I.C.	Avi Awareness	10		
12/18	Medara	Moab Boy Scout Leaders	Avi Awareness	10		
1/13	Kimbrough	Ak Mnt Safety Center	3 day workshop	30		
1/2	Tremper	AAI at Wasatch Touring	Avi introduction	30		
1/5	Tremper	Logan	Video premier	125		
1/15	Murray	Moab Hasty Rescue	Beacon Drill	10		
1/8	Tremper	Wasatch Mnt Club	Avi Awareness	50		
1/9	Lees	AAI at Alta	Stability, terrain	18		
1/12	Tremper	U of U	Snow stability	100		
1/13	Tremper	Park City	Video premier	95		
1/19	Jenkins	Logan	Snowmobilers	200		
1/22	Lees	Nat'l Av Sch, phase II	Snow stability	7		
1/1517	Staff	Alta	3 day workshop	26		
1/25	Tremper	REI	Stability	220		
1/30	Medara-Murray	Moab Hasty Rescue	Beacon Drill	12		
2/3-4	Medara	Global Expeditions	2-day Course	16		
2/10	Tremper	Park City Middle Sch	Avi Awareness	400		
2/12	Lees	Altasnowboarder clinic	Avi/beacon clinic	16		
2/14	Tremper	Wilderness Med Con	Mnt weather	400		
2/14	Tremper	Wilderness Med Con	Avi accidents	400		
2/15	Kimbrough	Wilderness Med Con	Snowpack, routes	60		
2/17	Kobe	Preston Idaho	Avi SAR	25		
2/1822	Tremper	Ak Mnt Safety Center	3 day workshop	30		
2/23	Tremper	U of U, Geog class	Mountain weather	25		
2/26	Kimbrough	Snowbird	Educational film	2		
3/2	Murray	Grand Co. High School	Avi Awareness	40		
3/2	Jenkins	USU	Avi Awareness Week	15		
3/5	Lees	Altasnowboarder clinic	Avi/beaconclinic	34		
3/6	Jenkins-Kobe	Logan Cyn.	Observers Workshop	12		
4/5	Soucie	SL Valley Snowmobilers	Avi awareness	40		
Total talks		38	Total Hours	282	Total People	4178

Media

"Since 1980, only one of the 17 people killed in avalanches in northern Utah called our advisory before they went out."

We may get over 100,000 calls to our recorded advisories each season, but still, that's only a drop in the bucket compared to the number of people the newspapers, radio and television can reach. In fact, one of the original reasons for setting up the UAFC was to act as an avalanche warning service and the primary warning method was through the media.

We try and target our efforts towards the kind of people who are getting killed in avalanches. For instance, we know that since the UAFC began operations in 1980, only one out of the 17 people killed in avalanches in northern Utah had called our advisory before they went out. In other words, we don't worry so much about the regular callers to the UAFC recordings because we figure we are already preaching to the choir. Most have had avalanche classes, carry beacons and shovels and most know how to stay out of trouble by using the information provided on our recordings. But it's all the rest who seem to be getting killed in avalanches and the most efficient way to reach them is through the media.

Avalanches are like fish; they run in schools. And when conditions are especially unstable, an uninformed person bumbling around in dangerous terrain is almost certain to get an expensive lesson. For that reason, we try to reach as many people as possible during the active avalanche cycles. Our warnings go out over the National Weather Service weather wire which reaches all the newspapers, radio and television not only in Utah but nationwide. When we run warnings it's not unusual to get calls from a national reporter in New York or even Florida. The local press almost always calls to confirm details or to get a good quote for their story.

This season we talked to prominent local or national reporters on at least 21 occasions. The actual number is probably much higher because during avalanche warnings we are so busy that we simply don't have time to write down all the calls. These media calls range from the local newspaper reporters who seem to call once every other week to the Associated Press, Outside Magazine, Horizon Magazine and network television shows such as Rescue 911. Needless to say, these contacts reach millions of people.

How many lives do they save? There's no way to know. Certainly dozens of snowmobiler tours or Boy Scout troops have changed their weekend plans because they heard our warnings on the radio. Certainly hundreds of thousands of people have learned more about avalanches by reading about them in the paper or magazines and millions on the television shows. How many of these translate into saved lives? It's only the fatalities which seem to get attention or to produce better funding. In this business, it's possible to work your way out of a job. And we may never know the value of our service until that happens.

Media Contacts by UAFC Personnel

Date	Forecaster	Agency / Reporter	Topic
11/1	Tremper	Hansell, SL Tribune	Season Opening
11/25	Tremper	Hansell, SL Tribune	Avalanche Video
1/4	Tremper	Hansell, SL Tribune	Avalanche Warning
1/5	Tremper	Gorrell, SL Tribune	Avalanche Warning
1/5	Tremper	Fulmer, Herald Journal	Avalanche Forecasting
1/6	Tremper	Smith, Park Record	Avalanche Forecasting
1/6	Tremper	Alex Wells	Risk Management
1/6	Tremper	Channel 5	Avalanche Warning
	Kimbrough		
1/7	Tremper	Channel 5	Avalanche Activity
1/7	Kimbrough	Channel 4	Avalanche Warning
1/7	Kimbrough	KSL Radio	Avalanche Warning
1/8	Kimbrough	Channel 5	Avalanche Warning
1/10	Tremper	Rescue 911	Avalanche Video
1/12	Tremper	KTALK Radio	Avalanches in General
1/14	Kimbrough	Horizon Magazine	Mill Ck. Trail
2/8	Shaw	Susan Furnace	Current Conditions
2/4	Lees	KCALL Radio	Current Conditions
2/22	Shaw	Associated Press	Current Conditions
2/24	Tremper	S.L. Tribune	Avalanche Conditions
2/25	Kimbrough	Associated Press	Avalanche Warning
3/17	Tremper	Outside Magazine	Avalanche Forecasting

Volunteer Observer Program

The volunteer backcountry observer program began several years ago through the hard work and creative thinking of ex-UAFC forecaster Brad Meiklejohn. The idea behind this program is to seek out motivated and talented people who regularly go into the backcountry. Then we train them and then pay them about \$10.00 per day for calling in good observations. Since the UAFC forecasters certainly can't be everywhere at once, we rely heavily on these "paid informants." With a very small investment, we triple or quadruple the amount of good incoming information about the backcountry snowpack, avalanche activity, not to mention gossip overheard in various circles about people triggering or getting caught in avalanches.

Finding and training good backcountry observers often takes a prodigious amount of time—time which has become increasingly scarce in recent years. Without Brad's overachieving, frenetic presence at the UAFC, the volunteer program has predictably suffered. In addition, a couple of our

We seek motivated and talented people who regularly go into the backcountry.

"Luckily we have the indefatigable Bob Athey who skis or snowboards in the backcountry almost every day of the season."

good observers have moved on to other "real jobs," and we have not yet found replacements.

Two of the most highly trained and talented observers were Greg Dollhausen and Rip Griffith who used to give good information from the Park City side of the range, but they both now work for the Utah Department of Transportation as avalanche forecasters. They still call in good observations but from different locations—Big Cottonwood Canyon and Provo respectively. We have not yet found a good replacement in Park City.

Luckily, we still have the indefatigable Bob Athey who skis or snowboards in the backcountry almost every day of the season. He has worked on the volunteer staff since the beginning and he is by far, the most valued member of the program. His long mane of wild, flaming red hair, red beard and gruff exterior belie his intelligence and well developed mountain sense. For years, he has kept a large graph of the season's weather and avalanche activity on the wall at his home which he updates regularly. He often refers to charts from previous years to check on the exact conditions which created various avalanche cycles. As a Utah native, much of the avalanche history of the Wasatch is contained in his brain. Obviously, he is an extremely valuable resource.

The aforementioned Rip Griffith, the veteran volunteer observer who became the UDOT avalanche forecaster in Provo Canyon has helped to fill a historical "black hole" for the UAFC. We have tried for years to find a qualified observer in the Provo area and have always come up lacking.

Then suddenly this season, another Provo observer materialized in the form of Phil Lowery. He is a Provo area lawyer who regularly flexes his cardiovascular muscles by mountain running and skiing in the backcountry in the winter. Like ex-UAFC forecaster Alex Lowe, Phil regularly wakes up early, either runs or skis up some of the Provo area mountains and makes it into his day job by 8:00 am. His regular, enthusiastic and detailed reports have helped us throughout the season. After his rookie year he will move up a notch, becoming a paid observer for next season.

Brad Bodily continues to do a fine job in the Ogden Mountains, but the new information Black Hole is, surprisingly, Park City. Not only have we lost Rip Griffith and Greg Dollhausen but Park West has closed their popular backcountry gates, which significantly reduces the traffic on the north end of the Park City - Park West ridgeline. The call rate for our Park City telephone recording has plummeted this season to only 3,100 calls from over 10,000 last season. With a very low snow year for Park City combined with the closure of the Park West backcountry access, it has taken a big bite out of backcountry recreation in Park City.

Although the backcountry volunteer program has slipped from previous years, it remains as a healthy and valued part of the UAFC forecasting system. Hopefully, next season, with some needed maintenance and revamping, the volunteer program will return to the highly efficient state of the Meiklejohn era.

Forest Service expenses this year were \$820, well within our budgeted \$1000. In addition, Bob Athey is paid by The Friends of the Forecast Center instead of the Forest Service. Bob was paid \$1,100 this past season.

Observer	Nov	Dec	Jan	Feb	Mar-Apr	Total
Bob Athey (SLC)	9	14	21	20	25	89
Brad Bodily (Ogden)	1	3	2	2	2	10
Greg Dollhausen (SLC)	0	4	6	3	3	16
Rip Griffith (Provo)	3	5	7	14	11	40
Phil Lowery (Provo)	3	7	13	9	14	53
Kevin Kobe (Logan)	0	3	3	5	3	14
Mike Jenkins (Logan)	0	7	3	3	5	18
					Total	240

Budget

This past season has been a major watershed in the financial history of the UAFC. For most of the 14 year history of the UAFC, the Wasatch-Cache National Forest provided all of the cash funding. Especially in the present climate of the shrinking federal dollar, the Wasatch-Cache management team decided that it was unfair that Uncle Sam should pick up the entire tab on a program which is used by so many entities. As a result, last season the Wasatch-Cache National Forest decided to dramatically cut funding of the UAFC by about 40 percent in hopes that others would step in to take up the slack.

Upon receiving this news, we were understandably pessimistic because in the past we had only limited success in raising funds from other sources. Also, because of federal ethical standards to which government employees are held, it took a prodigious amount of research and creative thinking to keep our fundraising efforts from crossing over into questionable territory. Because of these obstacles, our first job was to plan for the worst case scenario.

We began to outline which services to cut in the future. Avalanche education, forecasts for outlying areas and mountain weather forecasts all seemed to be programs which would have to go. What was left over would have only been a bleached skeleton of what the public has come to depend upon to keep them alive. Fortunately, none of our worst fears were realized.

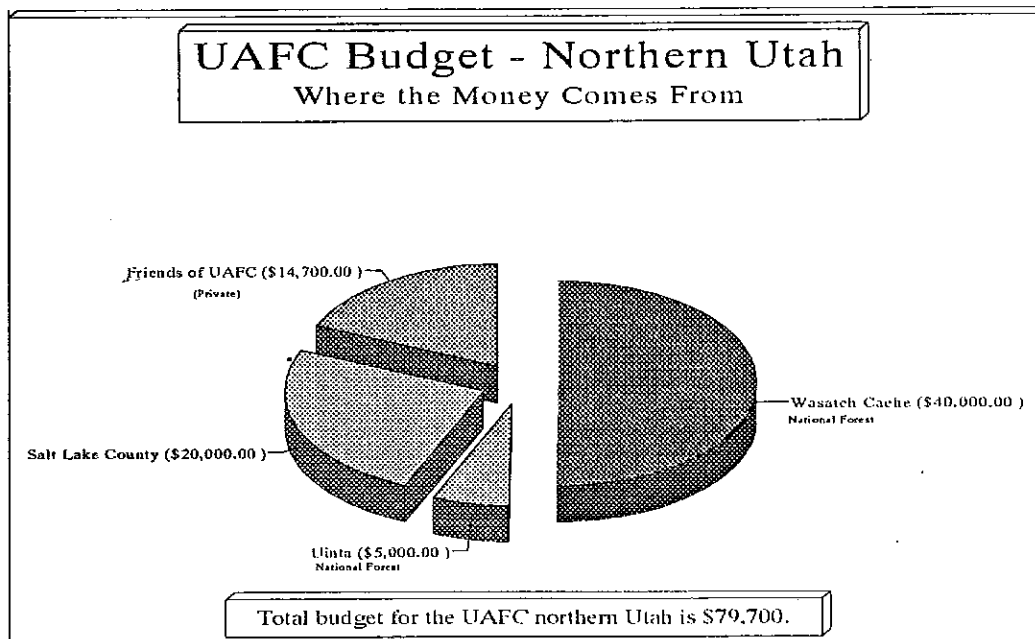
As soon as the word spread, support began to pour out from all sectors. Two essential pieces suddenly fell into place. First, Bill Levitt, Mayor of the Town of Alta, approached Salt Lake County and asked for

significant contribution to the UAFC and they responded to the tune of \$20,000. This was literally a life saver for the services whose heads lay on the chopping block.

The second hand from heaven reached down to us in the form of Merilee Latta and her brother Ted Wilson, the ex-mayor of Salt Lake City and almost-Governor. First Ted hosted a fund raiser at his house this past fall and raised over \$6,000 for the UAFC. Next, he showed up at a key legislative committee hearing to lobby for support for the UAFC from the State of Utah. In two minutes, his impassioned plea turned a room full of skeptical legislators into supporters, and suddenly it was a done deal. As is often the case the true heroes play behind the scenes and in this case it was Brad Barber, the State Planning Coordinator. Brad was able to set up all the infrastructure, lobby the Governor and make sure we appeared on the Governors budget to the legislature. The appropriated money is for the 1994-95 season and it will come through the Department of Public Safety, Division of Emergency Management.

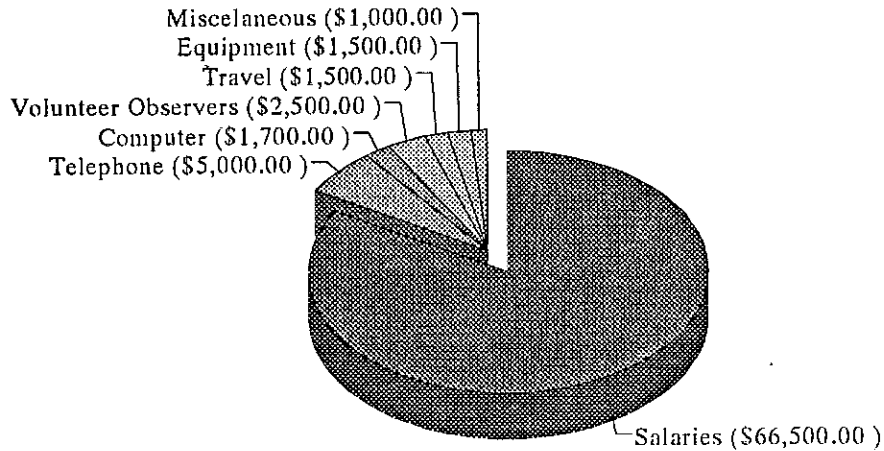
Finally, it seems, we have arrived near the place we have always envisioned, where State, County, Federal and private monies combine to fund the UAFC. This more diversified support not only makes a stronger platform on which to stand, but it creates a greater community involvement in a program which affects and is used by nearly every segment of the community.

This season, the Wasatch-Cache National Forest contributed just slightly over 50 percent of the budget, with the rest coming from Salt Lake County, private contributions through the Friends of the Utah Avalanche Forecast Center (FUAFC) and the Uinta National Forest. The total Budget for 1993-94 stands at just under \$80,000.



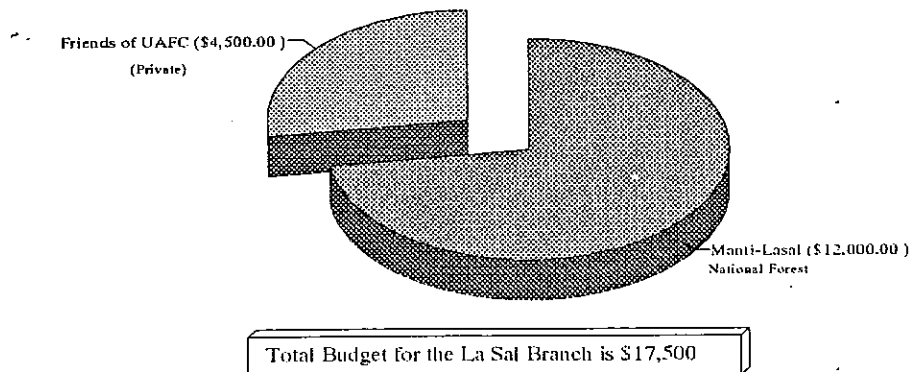
Where the money comes from for northern Utah. In the recent past, the Wasatch-Cache National Forest contributed almost all of the budget. This season, they account for about half of the budget.

UAFC Budget - Northern Utah Where the Money Goes



Almost all the money goes to support salaries of 3 1/2 forecasters. Total budget is just under \$80,000.

UAFC Budget - La Sal Mountains Where the Money Comes From



In the recent past, the Manti-Lasal National Forest contributed almost 100 percent of the cost of avalanche forecasting services. This season, private contributions have provided over a quarter of the budget.

Appendix

Monthly Call Rate - Salt Lake Short Recording

	November	December	January	February	March	April
1979-80	714	1,514	4,274	2,967	3,389	1,313
1980-81	2,200	4,800	6,257	7,277	6,887	3,135
1981-82	1,761	6,879	8,522	5,485	6,361	3,416
1982-83	2,741	6,804	7,614	7,731	9,911	5,339
1983-84	3,216	10,708	7,073	7,032	5,983	4,396
1984-85	2,827	5,704	5,260	8,399	7,122	3,021
1985-86	4,119	4,703	6,298	10,628	6,225	3,706
1986-87	3,903	3,911	10,022	8,201	8,364	3,406
1987-88	2,390	6,534	10,201	7,297	9,208	3,780
1988-89	6,200	11,484	8,603	9,678	9,050	3,472
1989-90	3,854	7,626	14,126	12,528	10,831	3,933
1990-91	5,800	11,813	12,789	8,864	13,087	5,964
1991-92	10,925	8,075	10,322	15,000	13,107	5,000
1992-93	15,281	15,282	16,842	15,349	10,971	5,523
1993-94	5,656	10,400	16,760	19,115	12,407	7,879

Yearly Call Totals - All Areas

	SLC 3 MIN	SLC 5 MIN	Logan	Ogden	Provo	Park City	Moab	Total
1976-77	6,522							6,522
1977-78	11,258							11,258
1978-79	9,924							9,924
1979-80	14,469							14,469
1980-81	30,736							30,736
1981-82	33,099							41,610
1982-83	40,355		4,357	1,890	3,671	3,042		53,315
1983-84	39,647		5,300	2,725	4,076	2,577		54,325
1984-85	32,476		4,652	1,706	2,278	2,386		43,498
1985-86	36,535		5,469	5,464	2,292	2,562		52,322
1986-87	38,841		4,693	2,587	2,518	2,121		50,760
1987-88	39,614	4,020	2,500*	2,500*	2,500*	2,500*		53,000
1988-89	48,488	8,033	2,500*	2,500*	2,500*	2,500*	1,100	67,621
1989-90	52,898	10,947	5,000*	2,500*	2,500*	5,000*	1,693	80,297
1990-91	62,814	10,160	5,000*	2,500*	2,500*	5,000*	2,811	90,785
1991-92	62,429	9,970	5,000*	2,500*	2,500*	5,000*	3,216	90,615
1992-93	79,248	12,136	11,030	9,102	3,134	10,257	2,763	127,670
1993-94	71,880	13,296	4,110	3,000***	2,610	3,663**	2,911	101,470****

* Conservative estimates based on past counts.

** Dramatic drop partially due to the closure of the Park West boundary and low snow year.

*** Call counts were lost due to counter malfunction. Estimated 3,000 calls based on other stations.

**** Assuming 3,000 calls for Ogden.

Total Calls versus Total November-April snow at Alta

	Calls	Alta Snow (Inches.)
1976-77	6,522	314.5
1977-78	11,258	524.5
1978-79	9,924	588.0
1979-80	14,469	514.0
1980-81	30,736	391.0
1981-82	41,610	696.0
1982-83	53,315	637.0
1983-84	54,325	743.5
1984-85	43,498	457.0
1985-86	52,322	599.0
1986-87	50,760	378.0
1987-88	53,000	410.3
1988-89	67,621	581.5
1989-90	80,297	448.0
1990-91	90,785	580.2
1991-92	90,615	395.0
1992-93	127,670	647.0
1993-94	101,470	490.3
49 year average		490.8

Backcountry Avalanche Incidents

Year	Triggered	Caught	At Least Partially Buried	Totally Buried	Killed
1993-94	74	42	5	3	1
92-93	65	29	9	5	3
91-92	76	27	14	9	5
90-91	46	19	7	1	0
89-90	65	34	14	2	0
88-89	64	9	1	0	0
87-88	39	6	(1)	(1)	0
86-87	50	18	6	3	2
85-86	66	27	12	5	5
84-85	79	39	15	6	2
83-84	M	24	M	M	1
82-83	M	M	15	M	0
81-82	M	M	M	M	1
80-81	M	M	M	M	2
79-80	M	M	M	M	1
78-79	M	M	M	M	2
77-78	M	M	M	M	0
76-77	M	M	M	M	1
75-76	M	M	M	M	1
74-75	M	M	M	M	0
73-74	M	M	M	M	0

Examples of Avalanche Advisories

ZCZC SLCWRKSNW SLR
TTAAOO KSLC DDHHMM

GOOD MORNING, THIS IS BRUCE TREMPER WITH YOUR BACKCOUNTRY AVALANCHE AND MOUNTAIN WEATHER ADVISORY. TODAY IS SATURDAY, JANUARY 8, AT 7:30 AM. THE UTAH AVALANCHE FORECAST CENTER IS BROUGHT TO YOU BY THE WASATCH-CACHE NATIONAL FOREST IN PARTNERSHIP WITH THE NATIONAL WEATHER SERVICE, (THE UINTA NATIONAL FOREST ON PROVO FORECAST), AND BY CONTRIBUTIONS FROM PEOPLE LIKE YOU.

I TOOK A HELICOPTER RIDE YESTERDAY TO SURVEY THE DAMAGE AND IT WAS DEFINITELY THE MOST WIDESPREAD AVALANCHE ACTIVITY I HAVE EVER SEEN IN MY LIFE. IN THE CENTRAL WASATCH, ABOUT 70 PERCENT OF ALL THE STEEP SLOPES HAVE ALREADY SLID. IN SOME DRAINAGES LIKE MINERAL AND CARDIFF, ALMOST ALL THE SLOPES HAVE ALREADY SLID. FOR A MORE DETAILED LIST, CALL OUR DETAILED REPORT AT 364-1591. MANY SLOPES SLID EARLY IN THE STORM AND THEN FILLED IN. I WAS MOST SURPRISED BY ALL THE LOWER ELEVATION LITTLE BREAKOVERS IN THE TREES WHICH SLID. SOME OF THEM LOOKED TO BE ABOUT 25 DEGREES IN STEEPNESS. TODAY, I THINK THEY MAY ACTUALLY BE THE MOST DANGEROUS KINDS OF PLACES. JUST LITTLE BREAKOVERS DOWN LOW WHICH YOU HAVE NEVER SEEN SLIDE BEFORE HAVE A GOOD CHANCE OF SLIDING TODAY WITH A PERSON STOMPING AROUND ON TOP OF IT. REMEMBER THAT ALTHOUGH MANY OF THE SLOPES HAVE ALREADY SLID, THERE'S STILL LOTS OF SLOPES WHICH HAVEN'T AND THEY'RE JUST HANGING IN THE BALANCE. THIS IS THE KIND OF CONDITIONS WHERE YOU'LL SEE ALL KINDS OF THINGS SLIDE YOU WOULD HAVE NEVER IMAGINED WOULD SLIDE. YOU'LL SEE WEIRD STUFF, YOU MIGHT TRIGGER SYMPATHETIC SLIDES HUNDREDS OF YARDS AWAY FROM YOU. YOU MIGHT TRIGGER SLIDES OFF OF STEEPER SLOPES AS YOU WALK ACROSS THE FLATS BELOW. THERE WILL CERTAINLY BE LOTS OF COLLAPSING OF THE SNOW WITH GIANT WHOOMPES. IN OTHER WORDS, THINGS ARE REALLY SCARY OUT THERE.

PEOPLE WITHOUT WELL DEVELOPED AVALANCHE SKILLS SHOULD DEFINITELY AVOID ANY SLOPES STEEPER THAN ABOUT 25 DEGREES AND STAY WELL OUT FROM UNDERNEATH SLOPES STEEPER THAN ABOUT 30 DEGREES. REMEMBER THAT TRAILBREAKING IS STILL DIFFICULT AND THAT YOU HAVE TO BE ON A STEEPER SLOPE JUST TO GET GOING. IF IT'S STEEP ENOUGH TO SKI, THEN IT'S PROBABLY STEEP ENOUGH TO SLIDE. IT'S PROBABLY BETTER SKIING OUTSIDE OF LITTLE COTTONWOOD CANYON WHERE THE SNOW ISN'T AS DEEP. ALSO, A STIFF WIND HAS BEEN BLOWING MOST OF YESTERDAY AND LAST NIGHT OUT OF THE NORTH AND NORTHWEST AND THERE'S NO LACK OF WIND SLABS UP ON THE WIND EXPOSED RIDGES. AS ALWAYS, YOU SHOULD AVOID STEEP SLOPES WITH RECENT DEPOSITS OF WIND DRIFTED SNOW. ONE FINAL THING. WATCH OUT FOR THE SUN WARMING UP THE SOUTH FACING SLOPES. WE MAY SEE SOME WET SLUFFS AND ROLLERBALLS AS THINGS HEAT UP. TODAY IS DEFINITELY NOT A GOOD DAY TO HIKE UP SUPERIOR SLIDEPATH, FOR INSTANCE. AS YOU MAY HAVE GUESSED THE HAZARD OF HUMAN TRIGGERED SLIDES IS STILL HIGH ON ANY SLOPE STEEPER THAN ABOUT 30 DEGREES. IT'S PROBABLY MORE DANGEROUS ON THE NORTH FACING SLOPES THAN THE SOUTH FACING ONES. ALSO, WE STILL HAVE AN AVALANCHE WARNING IN EFFECT FOR ALL THE MOUNTAINS OF NORTHERN UTAH.

MOUNTAIN WEATHER:

WE SHOULD SEE SOME SUN THIS MORNING WITH INCREASING HIGH CLOUDS BY AFTERNOON IN ADVANCE OF A RELATIVELY WEAK DISTURBANCE TONIGHT AND ON SUNDAY. WE'RE EXPECTING MORE SNOW, ABOUT 6 INCHES TO A FOOT IN THE COTTONWOODS WITH ABOUT 6 INCHES OUTSIDE OF THERE. RIDGETOP WINDS SHOULD BLOW 20-30 FROM THE SOUTHWEST AND WEST WITH RIDGETOP

TEMPERATURES AROUND 25 DEGREES. BY SUNDAY THEY SHOULD TURN NORTHWEST WITH TEMPERATURES AROUND 15 DEGREES. FOR THE EXTENDED FORECAST, WE SEE ANOTHER WEAK DISTURBANCE ON ABOUT TUESDAY, THEN HIGH PRESSURE AND NO SNOW FOR ABOUT ANOTHER WEEK OR MORE.

THE WASATCH BACKCOUNTRY RESCUE WILL BE HAVING THEIR ANNUAL FUNDRAISER BENEFIT ON SUNDAY, JANUARY 9TH AT D.J.'S BEER GARDEN WHICH IS 3200 E. BIG COTTONWOOD ROAD. IT GOES FROM 5:30 PM TO 12:00 PM WITH MUSIC AND RAFFLES. ENTRY IS \$5.00.

(FOR PARK CITY)

PREMIER SHOWING OF THE AVALANCHE VIDEO "WINNING THE AVALANCHE GAME" THURSDAY, JANUARY 13, AT PROSPECTOR SQUARE, 7:00 PM. ADMISSION IS \$5.00. PROCEEDS WILL GO TO THE UTAH AVALANCHE FORECAST CENTER.

IF YOU SEE ANYTHING OF INTEREST OUT THERE PLEASE GIVE US A CALL AT 524-5304 (1-800-662-4140 PROVO, OGDEN, PARK CITY - 750-3696 IN LOGAN)

IF YOU WOULD LIKE MORE DETAILED INFORMATION YOU CAN CALL OUR 5-MINUTE ADVISORY AT 364-1591.

EVELYN LEES WILL UPDATE THIS FORECAST BY 7:30 ON SUNDAY MORNING.
THANKS FOR CALLING.

TREMPER
NNNN

ZCZC SLCWRKSNW SLR
TTAAOO KSLC DDHHMM

GOOD MORNING, THIS IS BRUCE TREMPER WITH YOUR BACKCOUNTRY AVALANCHE AND MOUNTAIN WEATHER ADVISORY. HAPPY NEW YEARS. TODAY IS SATURDAY, JANUARY 1 1994 AT 7:30 AM. THE UTAH AVALANCHE FORECAST CENTER IS BROUGHT TO YOU BY THE WASATCH-CACHE NATIONAL FOREST IN PARTNERSHIP WITH THE NATIONAL WEATHER SERVICE, (THE UINTA NATIONAL FOREST ON PROVO FORECAST), AND BY CONTRIBUTIONS FROM PEOPLE LIKE YOU.

CONGRATULATIONS. IF YOU'RE CALLING THIS REPORT, ESPECIALLY IF IT'S BEFORE 8:00 IN THE MORNING THEN YOU ARE A GENUINE, BONA-FIDE AVALANCHE REPORT JUNKIE. BUT IF YOU ARE ONE OF THE HARD CORE, YOU KNOW THAT EVEN WHEN YOU THINK THAT NOTHING IS GOING ON IN THE AVALANCHE WORLD, SOMETIMES THERE IS SOMETHING GOING ON. TODAY IS A GOOD EXAMPLE. YESTERDAY THERE WAS SEVERAL AVALANCHES TRIGGERED BY BACKCOUNTRY SKIERS. THE PROBLEM, OF COURSE, IS THE OLD SNOW THAT HAS BEEN SITTING AROUND OUT THERE FOR THESE LAST FEW WEEKS THAT WE WOULD ALL RATHER FORGET ABOUT HAS TURNED INTO SOME OF THE WEAKEST, MOST FRAGILE SNOW WE'VE SEEN IN A NUMBER OF YEARS. BUT JUST BECAUSE IT'S WEAK DOESN'T MEAN THAT IT'S UNSTABLE OR DANGEROUS. YOU NEED A SLAB ON TOP OF THE WEAK SNOW TO MAKE AN AVALANCHE. WELL FUNNY YOU SHOULD ASK BECAUSE THE STRONGER WINDS ALONG WITH THE HIGHER HUMIDITY AND THE SKIFF OF NEW SNOW WE GOT YESTERDAY WAS JUST ENOUGH TO MAKE SEVERAL AREAS OF LOCALIZED WIND SLABS AND THERE WERE AT LEAST THREE DIFFERENT INCIDENTS YESTERDAY WHERE BACK-COUNTRY SKIERS WERE ABLE TO TRIGGER THESE WIND SLABS.

THE LARGEST AND SCARIEST OF THESE WAS IN RED PINE CANYON IN LITTLE COTTONWOOD

CANYON ALONG AN UPPER ELEVATION WIND EXPOSED RIDGELINE. IT WAS 80 FEET WIDE AND UP TO 4 FEET DEEP. HE ALSO SAW A RECENT SLIDE OFF THE SOUTH SIDE OF THE PHEIFFERHORN. TWO OTHERS HUMAN TRIGGERED AVALANCHES OCCURRED IN THE ALEXANDER BASIN AREA WHICH IS ON THE BIG COTTONWOOD-MILL CREEK DIVIDE. ONE PERSON WAS ABLE TO KICK OFF A COUPLE WIND SLABS, THE LARGEST OF WHICH WAS 30' WIDE AND 8 INCHES DEEP. HE ALSO SAW ANOTHER RECENT AVALANCHE IN UPPER ALEXANDER WHICH WAS SLIGHTLY LARGER. WITH MORE SNOW AND WIND IN THE FORECAST, I'M AFRAID THAT TODAY WILL BE THE LAST OF OUR LOW HAZARD AVALANCHE CONDITIONS FOR QUITE SOME TIME. ALTHOUGH MOST OF THE SNOW OUT THERE TODAY WE WOULD CALL LOW HAZARD, THERE ARE LOCALIZED AREAS OF WIND SLABS IN WIND EXPOSED AREAS. AS ALWAYS, ANYTIME YOU FIND RECENT DEPOSITS OF WIND DEPOSITED SNOW ON STEEP SLOPES, IT'S A HIGH HAZARD OF HUMAN TRIGGERED AVALANCHES AND YOU SHOULD AVOID THEM AT ALL COSTS. THESE WILL USUALLY BE SMOOTH, ROUNDED AND HARD. OFTEN YOU CAN'T EVEN KICK A BOOT INTO THEM BUT THEY CAN BE SOFT AS WELL. THE HARDER THEY ARE, THE FARTHER THEY WILL BREAK ABOVE YOU.

ALONG THE SAME VEIN, THERE WAS A BAD AVALANCHE ACCIDENT IN WESTERN MONTANA YESTERDAY WHERE 4 SNOWMOBILERS WERE KILLED.

MOUNTAIN WEATHER:

BUT BACK TO UTAH, WE'RE EXPECTING SNOW TONIGHT WITH STRONGER WINDS AND YOU CAN EXPECT THE AVALANCHE HAZARD TO RISE ESPECIALLY IN WIND LOADED AREAS BY SUNDAY MORNING. THEN ON WEDNESDAY, WE HAVE A MUCH LARGER STORM ARRIVING, AND IF IT COMES IN LIKE I SUSPECT, WE WILL DEFINITELY BE ISSUING A STATE-WIDE AVALANCHE WARNING AT THAT TIME SO BE FORWARDED. TODAY YOU CAN EXPECT CLOUDY SKIES WITH LIGHT SNOW SHOWERS AND HEAVIER SNOW SHOWERS TONIGHT AND INTO SUNDAY. WE'RE EXPECTING 3-6 INCHES OF SNOW WITH RIDGETOP WINDS 20-30 FROM THE SOUTHWEST THROUGH THE NORTHWEST. RIDGETOP TEMPERATURES SHOULD REMAIN IN THE MID 20'S

FINALLY, WASATCH BACKCOUNTRY RESCUE WILL BE HAVING THEIR ANNUAL FUNDRAISER BENEFIT ON SUNDAY, JANUARY 9TH AT D.J.'S BEER GARDEN WHICH IS 3200 BIG COTTONWOOD ROAD. IT GOES FROM 5:30 PM TO 12:00 PM WITH MUSIC AND RAFFLES. ENTRY IS \$5.00.

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EVERLYN LEES WILL UPDATE THIS FORECAST BY 7:30 ON SUNDAY MORNING.

THANKS FOR CALLING.

TREMPER
NNNN

Examples of Weather Forecasts (available on computerized buletin board)

ZCZC SLCWRKMTN SLR
TTAA00 KSLC DDHHMM

****MOUNTAIN WEATHER FORECAST****
UTAH AVALANCHE FORECAST CENTER

MONDAY, FEBRUARY 21, 1994

1230 HRS.

THE BIG PICTURE IS STILL THE SAME, WITH THE NEGATIVELY TILTED TROUGH TO OUR NORTH MOVING SOUTHEASTWARD, AND STAYING NORTH OF US. THE FINER DETAILS ARE LESS CERTAIN. POORLY DEFINED AREAS OF MOISTURE ARE MOVING UNDER THE RIDGE, AND HEADING OUR WAY. TONIGHT'S DISTURBANCE NOW LOOKS TO BE OVER US THROUGH TOMORROW, WITH THE WINDS SHIFTING TO THE NORTHWEST DURING THE DAY TOMORROW.

LATE WEDNESDAY/THURSDAY: A SHIELD OF WARM AIR WILL MOVE OVER NORTHERN UTAH. THOUGH NO DYNAMICS, LOTS OF OVERRUNNING MOISTURE IN COMBINATION WITH MODERATE TO STRONG WEST WINDS SHOULD BRING SNOW TO THE MOUNTAINS.

AVI ACTIVITY: BACK COUNTRY EXPLOSIVE TESTING:

SILVER FORK - FLANNIGANS: HS-AE-5, 800' X 5-6' DEEP, 1000+ VERTICAL, NORTH FACING, 9800', CLIMAX ON DEPTH HOAR; EAST BOWL: HS-AE-3/4, 200', W FACING, DEPTH HOAR; A SMALLER EAST FACING SLIDE. DAY'S FORK - LARGE SLIDES WEST, EAST AND NORTHEAST FACING. NO RESULTS IN CARDIFF FORK AND WEST FACING PASTY MARLEY.

	5AM-5PM TODAY	5PM-5AM TONIGHT	5AM-5PM TOMORROW	5PM-5AM TOM NITE
700 MB (10,000' FREE AIR)				
WIND DIRECTION	SW,W	WSW	W>NW	NW
WIND SPEED (MPH)	<20	15-25	15-30	25-35
TEMPERATURE	13	5	15	3

8,000' TEMPERATURE	21	10	25	8
CLOUD COVER	CLR/SCT	OVC	OVC>BKN	SCT
WEATHER		S-	S-	
SNOW LEVEL		VALLEY----->		
SNOW DENSITY		6-8%----->		
LIGHTNING				

QUANTITATIVE PRECIPITATION GUESSTIMATE (INCHES OF SNOW):

	5AM-5PM TODAY	5PM-5AM TONIGHT	5AM-5PM TOMORROW	5PM-5AM TOM NITE
LOGAN MOUNTAINS		2-4	2-4	
SNOWBASIN/POWDER MT		3-6	2-4	
PARK WEST		3-6	2-4	
PARK CITY/DEER VALLEY		3-6	1-3	
SOLITUDE/BRIGHTON		3-6	3-6	
ALTA/SNOWBIRD		3-6	3-6	
SUNDANCE		3-6	1-3	

LEES
NNNN

ZCZC SLCWRKMTN SLR
TTAA00 KSLC DDHHMM

****MOUNTAIN WEATHER FORECAST****

UTAH AVALANCHE FORECAST CENTER

SATURDAY, FEBRUARY 19, 1994

1430 HRS.

A BROAD TROUGH CONTINUES OVER THE WESTERN STATES, WITH THE LOW OFF THE PACIFIC NORTHWEST. ANOTHER SHORTWAVE IS COMING ONTO THE CALIFORNIA COAST. IT LOOKS WELL ORGANIZED ON SATELLITE PICTURES, BUT MODELS CONTINUE TO SHEAR IT APART AND WEAKEN IT AS IT MOVES INLAND. WHEN IT REACHES THE WASATCH, IT WON'T REALLY HAVE A FRONT OR DEFINED FEATURES, BUT WILL GIVE US UNSETTLED WEATHER AND SNOW. INCREASING CLOUDS TOMORROW, AND PERIODS OF SNOW THROUGH MONDAY. 8 TO 12 POSSIBLE BY MONDAY AFTERNOON.

TUESDAY/WEDNESDAY THE OFF SHORE LOW WILL MOVE INLAND. TWO MODELS BRING THE LOW NORTH AND EAST OF US INTO THE PLAINS. THE THIRD GIVES IT A MORE SOUTHERLY TRACK. FORECASTERS ARE LEANING WITH THE NORTHERN TRACK, WHICH WOULD GIVE THE WASATCH NO SPECIFIC STORM, BUT CONTINUING UNSETTLED WEATHER AND A NORTHWEST FLOW.

AVI ACTIVITY: PARK CITY HAD 2 HS-AE-4; 4-7' DEEP, 150-200' ACROSS, NE FACING. BOTH WENT ON FACETED SNOW BELOW THE JANUARY RAIN CRUST.

AVI FATALITY: AVALANCHE WAS ON A STEEP, NNE FACING SLOPE OFF THE WEST RIDGE OF 10,420. 3-5' DEEP, 100 YDS WIDE, 200 VERTICAL. THE SLIDE WAS TRIGGERED FROM A 37 DEG SLOPE THAT WAS ABOVE A 55 DEG SLOPE. ALPHA ANGLE FROM BURIAL SPOT TO CROWN - 41 DEG. VICTIM WAS STRAINED THROUGH VERY THICK TREES. WEAK LAYER WAS ABOUT 6 INCHES ABOVE THE JANUARY RAIN CRUST, IN A FACETED SNOW LAYER.

	5AM-5PM TODAY	5PM-5AM TONIGHT	5AM-5PM TOMORROW	5PM-5AM TOM NITE
700 MB (10,000' FREE AIR)				
WIND DIRECTION	W,NW	SW	SW	W
WIND SPEED (MPH)	<15	<15	20-25	15-25
TEMPERATURE	4	10	8	7

8,000' TEMPERATURE	23	8	25	12
CLOUD COVER	OVC,BRK	SCT	SCT>OVC	OVC
WEATHER	S-	S-	S-	
SNOW LEVEL	VALLEY	VALLEY----->		
SNOW DENSITY	6-8%	6-8%----->		
LIGHTNING				

QUANTITATIVE PRECIPITATION GUESSTIMATE (INCHES OF SNOW):

	5AM-5PM TODAY	5PM-5AM TONIGHT	5AM-5PM TOMORROW	5PM-5AM TOM NITE
LOGAN MOUNTAINS	1-3	2	2-4	2-4
SNOWBASIN/POWDER MT	2-4	2	2-4	2-4
PARK WEST	1-3	2	2-4	2-4
PARK CITY/DEER VALLEY	1-3	2	2-4	2-4
SOLITUDE/BRIGHTON	3-6	2	2-4	2-4
ALTA/SNOWBIRD	3-6	2	2-4	2-4
SUNDANCE	1-3	2	2-4	2-4

LEES
NNNN

Examples of Avalanche Warnings

ZCZC SLCSABSLC CSW
TTAA00 KSLC DDHHMM
UTAH AVALANCHE FORECAST CENTER
NATIONAL WEATHER SERVICE, SALT LAKE CITY, UTAH
0600 HRS, TUESDAY, JANUARY 7, 1992

**** AVALANCHE WARNING ****

AN AVALANCHE WARNING HAS BEEN ISSUED FOR THE NORTHERN UTAH MOUNTAINS FROM SPANISH FORK CANYON NORTH TO PARLEYS SUMMIT.

A VERY WEAK SNOW PACK EXISTS IN MANY AREAS OF THE UTAH MOUNTAINS. WITH NEW SNOW AMOUNTS IN THE MOUNTAINS EXPECTED TO TOTAL TWELVE TO EIGHTEEN INCHES BY LATE AFTERNOON, THE AVALANCHE HAZARD IS CONTINUING TO RISE RAPIDLY. THERE IS A HIGH HAZARD OF HUMAN TRIGGERED AVALANCHES ON MANY SLOPES STEEPER THAN 35 DEGREES.

PEOPLE WITHOUT GOOD ROUTEFINDING AND SNOW STABILITY SKILLS SHOULD AVOID BACKCOUNTRY TRAVEL AT THIS TIME.

THIS ADVISORY DOES NOT APPLY TO DEVELOPED HIGHWAYS OR SKI AREAS WHICH ARE CURRENTLY OPEN AND PERFORMING AVALANCHE CONTROL.

FOR RECORDED AVALANCHE INFORMATION. IN THE SALT LAKE AREA, 364-1581.....IN PARK CITY, 649-2250....IN LOGAN, 752-4146....IN OGDEN, 621-2362....IN PROVO, 374-9770. TO CONTACT OUR OFFICE....524-5304.

UTAH AVALANCHE FORECAST CENTER (USDA FOREST SERVICE/NATIONAL WEATHER SERVICE)
LEES
NNNN

ZCZC SLCSABSLC
TTAA00 KSLC DDHHMM
UTZALL-120630-
UTAH AVALANCHE FORECAST CENTER
NATIONAL WEATHER SERVICE, SALT LAKE CITY, UTAH
0630 HRS, SATURDAY, FEBRUARY 12, 1994

***** AVALANCHE WARNING *****

AN AVALANCHE WARNING REMAINS IN EFFECT FOR THE MOUNTAINS OF NORTHERN UTAH. A HIGH HAZARD OF HUMAN TRIGGERED AVALANCHES EXISTS ON MANY SLOPES ABOVE ABOUT 7,000 FEET THAT ARE STEEPER THAN 35 DEGREES.

FOR MORE DETAILED AVALANCHE INFORMATION CALL 364-1581
THIS WARNING DOES NOT APPLY TO HIGHWAYS AND SKI AREAS WHERE AVALANCHE CONTROL IS NORMALLY CONDUCTED.

UTAH AVALANCHE FORECAST CENTER (USDA FOREST SERVICE/NATIONAL WEATHER SERVICE)
TREMPER
NNNN

Press Articles

Utah avalanche forecasters combine science and art to save skiers' lives

by LUKE SMITH
Record staff writer

For those Utahns who spend a lot of time in the backcountry during the winter months, the Utah Avalanche Forecast Center (UAFC) has become a literal lifesaver. And according to the center's director, Bruce Tremper, the backcountry enthusiasts are grateful.

"They tell us all the time: 'Hey, you guys saved my life.'" In fact, for anybody who plans on touring for years to come, any trip now is best prefaced by a call to the center's information hotline for the latest in avalanche conditions and mountain weather.

But almost a year ago, the UAFC faced an uncertain future. As a branch of the United States Forest Service, the center received all of its funding from the federal government. After complaints in political circles of the Forest Service that it was the only entity paying the costs of the center, funding cuts were implemented that jeopardized the UAFC's very existence.

The Forest Service cut its budget for the center from \$70,000 last year to \$40,000 this year. Fortunately for those who've come to depend on Tremper and his fellow "gurus" at the UAFC: Tom Kimbrough, Evelyn Lees and Seth Shaw; "we were able to make it up" says Tremper. The UAFC

received \$20,000 from Salt Lake County and raised \$30,000 from private donations in order to make up the shortfall.

The cuts in federal funding are baffling when one considers the UAFC received about 127,000

words, Colorado's avalanche center gets twice the money and half the use that Utah's gets.

Ironically, Utah's backcountry enthusiasts may be loving the center to death. "In a lot of ways we're hurt by our success," says Tremper. "They [the Forest Service] see we're so popular and think we can get funding from outside." But, after an initial summer of trepidation, Tremper is actually in favor of the developments with the Forest Service.

"I don't see the cuts as a negative thing. I think it's a positive thing in the diversification of the funding sources. It's community ownership of the Forecast Center.

"I think it's working well."

For the future Tremper says, "I suspect the Forest Service will continue their current level of support. At least I hope they will. I hope the state will support us." He added that Ski Utah had provided funding for the UAFC, and thus Utah's ski resorts were helping. "We would like to see support from the state, the county, from private sources and from the Forest Service. We'd like to diversify so the Forest Service isn't the only supporter."

The UAFC itself is located at the NOAA National Weather

continued on C5

UAFC video to be shown in PC

The Utah Avalanche Forecast Center is also actively involved in educating the public on avalanche awareness. "I really enjoy education," says UAFC Director Bruce Tremper. He pointed out that about once a week, one of the UAFC's gurus is out in the community giving talks and showing slides in an effort to further the public's awareness of just what they're dealing with when it comes to avalanches. To that end, Tremper has produced a video "Winning the Avalanche Game" that has been shown throughout the area and is available for purchase. "Winning the Avalanche Game" will be shown in this area at the Prospector Square Hotel on Thursday, Jan. 13 at 7 p.m. Cost is \$5 and tickets can be purchased at Jans on Park Avenue or at the door. All proceeds will go to benefit the UAFC.

calls to its various hotlines along the Wasatch Front last season. That number is more than twice the number of use that a similar operation received in Colorado and yet that entity receives twice the funding that the UAFC gets from the Forest Service. In other

Park City Record 1-13-94

Gurus mix science, art to save lives

continued from C1

Service offices at the Salt Lake City airport. There, amidst the computers and satellite feeds, one of the four employees (the other three are in the field) takes weather data and combine it with information on the snowpack received from automated stations in the mountains, from volunteers who are out there "in it" and from area resorts and other sources in order to make the forecasts.

According to Tremper, the process that results in a forecast is a combination of science and art. Science provides data, but it takes an artist's perception in order to process it all. "The only computer on earth that can process all of the variables with the snowpack is the human brain," says Tremper. So while computers improve, they will never

With the recent heavy snowfall, the Wasatch Range is going through a period of heavy avalanching. On Saturday, Jan. 8 in the UAFC's recorded hotline message, Tremper called the scene "By far the most widespread avalanche activity I've ever seen in my life. It's just incredible." Tremper said that around 70 percent of the steep slopes in the central Wasatch had slid, and others were still expected to go. The recent record-setting snowfall came on top of a small snowpack and a crust from recent rainfall. Tremper compared the current conditions to a layer of potato chips (the light snowpack), with a sheet of glass on top (the rain crust) followed by slamming an Oldsmobile on top (the heavy snow). It's no surprise things are unsteady in the backcountry right now.

Stay tuned to "Backcountry Beat" appearing weekly in the *Park Record* for basic information on getting around off the beaten path. And before you venture out into the backcountry at any time, make sure you call the UAFC's hotline for the area in which you plan to tour. In the Park City area, the number is 649-2250. For Salt Lake City, a more detailed report is available by calling 364-1591.

replace, the years of experience necessary to be able to accurately tell what the snowpack is going to do.

Tremper explained the combination with an analogy: "You can give a computer all the information you have about a child. But is the computer going to be able to understand that child better than the mother who raised it, nurtured it, changed its diapers? Of course not.

"And we're the mothers of the snowpack."

In order to receive private donations, an organization called the Friends of the Utah Avalanche Forecast Center has been set up. Donations are tax-deductible and can be sent to the Friends of the UAFC at 4760 Highland Drive, Suite 219; Salt Lake City, Utah; 84117-5009. Or you can call 272-5349 for more information.

Experts work to control avalanches

Continued from B-1

sive charge. "The snowpack fractured 3 feet deep about 20 feet above me," Collinson recalls. "Everything I could see was sliding. The slab acted like water and swirled around a little to the left."

"I cringed, expecting to hit the trees. When I saw I was going to miss them, I lunged for a tree, and I was face-first going downhill. I didn't think anything like that could bury me 6 feet deep."

Collinson was lucky. His transceiver radio beacon allowed his three companions to find and dig him out quickly.

Although he wasn't breathing and his skin was blue, Collinson's colleagues literally blew life back into him through artificial respiration.

Experts like Collinson work to ensure the safety of runs at ski resorts.

Backcountry skiers take their destiny into their own hands. Understanding the natural causes of avalanches can save their lives.

Snowpack stability is a balancing act between stress and strength.

Changes in temperature and humidity melt the interlocking tentacles of snowflakes, leaving crystals, like marbles, which won't support added weight.

Avalanches, which can move at 200 miles per hour, occur when the weight of snow exceeds the friction to hold it on the slope.

"Most slides occur on slopes 35 degrees or steeper, but the bull's-eye is pretty much 38 degrees," Tremper says.

"An expert run at a ski resort is about 35 degrees, and 40 degrees is the steepness of the steepest run at a ski resort."

In 1885, an avalanche and fire destroyed the Alta City mining camp in Little Cottonwood Canyon, causing 15 deaths.

A more recent avalanche in Little Cottonwood Canyon punched through the windshield of a parked van near Peruvian Lodge. The slide hit with such velocity it blew open the rear doors and spit out the van's contents, even snatching the steering wheel and seats — while not moving the van from its parking spot.

Wind is the major factor affecting avalanches on the Wasatch Front, Tremper says.

In 15 minutes, a strong wind can transport enough snow onto the lee side of a ridge to make the area unsafe.

"People are always saying avalanches are so unpredictable. I disagree. Avalanches occur for a reason," Tremper says.

"It is just a matter of developing your avalanche eyeballs, digging down, listening and looking for clues to instability."

Anatomy of an

SL. TRIBUNE

1-25-94

AVAILANCHE

Small noise can spark big snow slide with destructive potential

By Craig Hansell
THE SALT LAKE TRIBUNE

Tons of snow can be sent cascading down mountainsides by the tiniest disruption — noise, movement, temperature changes.

A truck rumbling down a canyon road. A jet streaking overhead. A skier or animal moving across a slope or meadow. A ch-

nook wind. Heavy snow or rain.

There are an estimated 10,000 avalanches a year in the Wasatch Mountains. "And at least 1,000 are large and scary, big enough to kill somebody," says Bruce Tremper, director of the Utah Avalanche Forecast Center.

Eighty-two avalanche deaths have been recorded in Little Cottonwood Canyon since 1860.

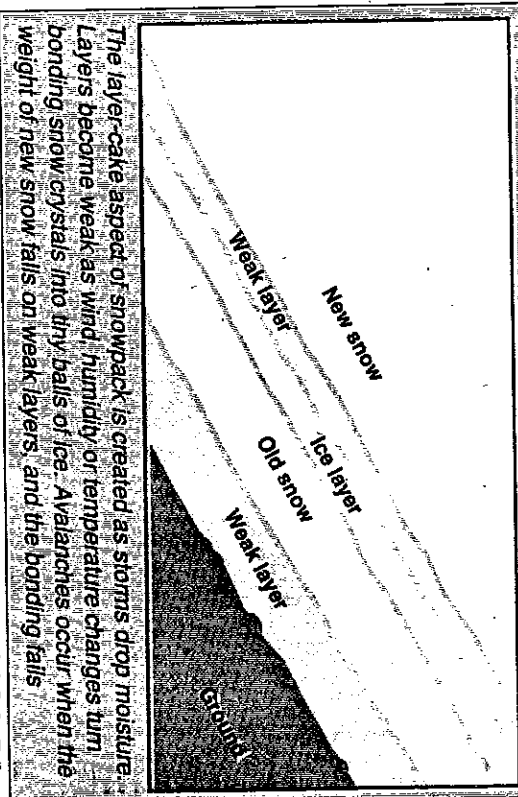
Jim Collinson, a ski patroller at Snowbird, nearly became a statistic in 1987 when he checked the safety of a slope by sking it, rather than detonating an explo-

See B-8, Column 1

EN STIR YOUR TASTE BUDS...DONNA LOU MORGAN

COMMENT? DAYBREAK SECTION: (801) 237-2075

SNOWPACK LAYERS



Source: The Avalanche Handbook

Steve Baker / The Salt Lake Tribune

Searchers Find Backcountry Skier Killed in Avalanche

Salt Lake County search and rescue crews used snowmobiles Friday night to retrieve the body of an experienced skier who was buried alive in an avalanche in Big Cottonwood Canyon.

The avalanche buried two men near the Salt Lake-Summit county line at Guardsman Pass, said Salt Lake County sheriff's Deputy Rod Norton.

"One man was covered completely, the other one was only partly buried and he managed to

dig himself out," said Norton. He said both men apparently were experienced backcountry skiers.

The man found his partner by using radio transmitters the skiers were wearing. "He managed to dig his friend out and tried to resuscitate him for about half an hour," said Norton.

But his attempts were unsuccessful, said Norton, so he skied down the hill to notify authorities.

Sheriff's deputies set up a com-

mand post near Brighton Ski Area, 12700 East Big Cottonwood. They called out a helicopter, but Norton said heavy snow and a second avalanche in the same area prevented rescuers from using it.

"The terrain out there is unstable," said Norton, so they resorted to snowmobiles.

Authorities were not releasing the identity of the victim until his family is notified.

Storm-Tossed Cars Cause 100 Mishaps As Utah Gets Plastered by Big Storm

A wind-whipped, lightning-charged snowstorm rumbled across the state Friday, sending cars bouncing off each other like billiard balls.

Gary Whitney, Utah Department of Public Safety spokesman, said more than 100 accidents had occurred on Wasatch Front highways by 3 p.m. Fourteen people were injured, but there were no fatalities.

Two of those smashups, one in Salt Lake City and another near Woods Cross, forced the Utah Highway Patrol to close Interstate 15 around noon.

Schools in Park City closed for the day because the snow came so fast, said Sandra Hall, a secretary for Park City School District. "We seldom call a snow day."

"The whole state was blessed with a very generous storm," said National Weather Service meteorologist William Alder, who reported snowfall from Brigham City to Monticello.

But the main thrust was north of Point of the Mountain. Sandy

had 10 inches; Holladay, 8; Centerville, 5; Ogden, 6; and Smithfield, 8. Bryce Canyon had 4 inches and Nephi had 6, but Orem had just an inch.

Skiers will find 31 inches of new snow at Alta this morning and at least 2 feet at Snowbird, Brighton and Solitude. Park City had 18 inches and Sundance, 16.

Tom Kimbrough, U.S. Forest Service avalanche forecaster, said at least three spontaneous avalanches occurred in the backcountry of the Wasatch Mountains.

"Saturday will be a nice day to get out there, but we still will have a warning in effect for a high hazard of human-triggered avalanches on slopes 35 degrees or steeper," Kimbrough said.

Alder expects some clearing behind the storm, meaning temperatures should be frosty this morning. Today should be mostly clear, with northern highs in the 30s, and 40s in the south. But some clouds will build Sunday in advance of another, weaker storm system expected Sunday night or Monday.

Layne Mitchell

MIDVALE—Layne Mitchell, 23, was killed February 18, 1994 in a snow avalanche.

Born November 12, 1970 in Midvale, Utah to Michael Daniel and Karen Beth Moon Mitchell. Married Tammi Suzette Pinnell in the Salt Lake LDS Temple on October 12, 1991.



Layne enjoyed living life to its fullest—his many interests included hunting, fishing, camping, skiing, climbing, archery, hiking, sketching and painting, designing and sewing articles of clothing, welding and clay and ceramic sculpturing, and sharing his interests with his friends. He was an expert at Jeep restoration. Layne was a child at heart and everyone who knew him considered Layne to be their best friend.

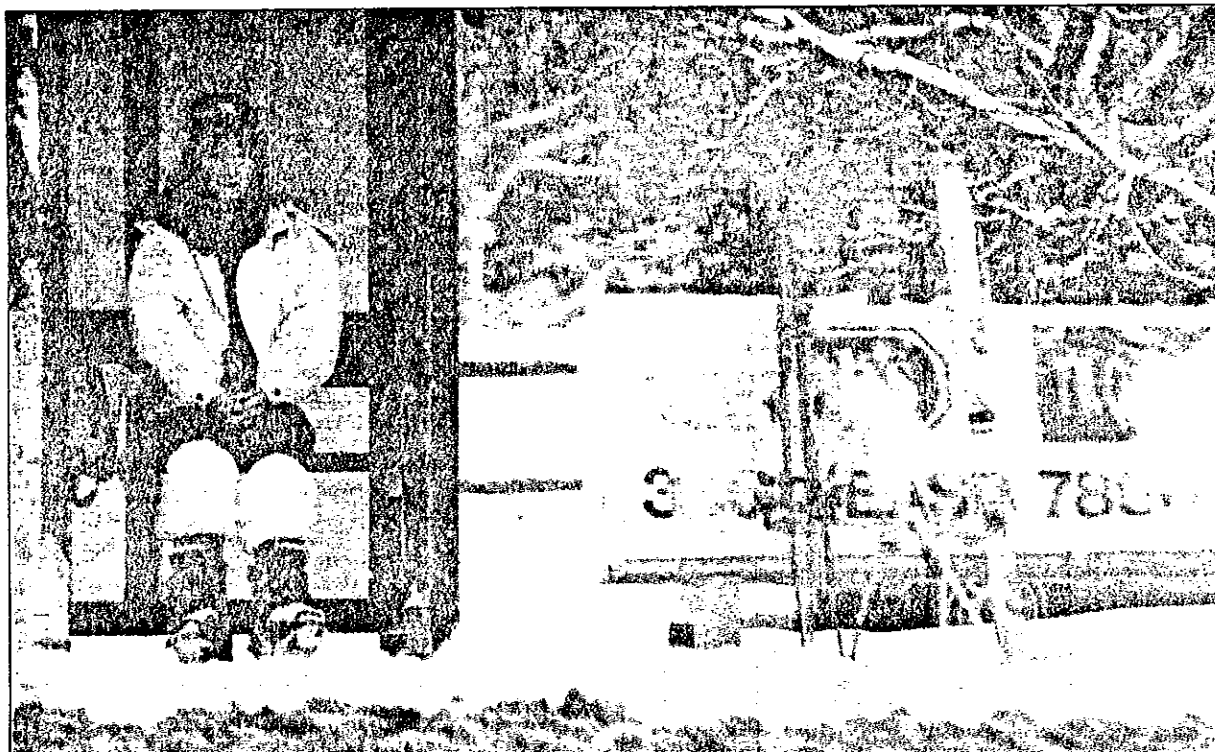
Survivors: wife, Suzette and son, Asher Layne Mitchell, both Midvale; parents, Midvale; brothers, Brook and wife Amy, Forrest and fiancée Karen; sister, Paige Christensen and husband Justin, all Midvale; grandparents, Charles and Beth Moon, Orem; grandmother, Helen Mitchell, Rose Park; great grandmother, Mary Wood, Salt Lake City; father and mother-in-law, Michael and Lorraine Pinnell, Sandy; brother and sisters-in-law, Matthew Pinnell, Tiffany, Bethany, Brittany and Natalie, all Sandy; grandmother, Helen Perich and husband John, Whittier, California; grandfather, Max Bridge, Grand Junction, Colorado; also many nieces and nephews.

The family wishes to express special thanks to Mark Mason of Sandy, for his friendship to Layne. Layne has been reunited with his brother, Mike.

Funeral services Tuesday, February 22, 1994, at 11:00 a.m. in the East Midvale LDS Stake Center, 7570 South 240 East. Friends may call at Goff Mortuary 8090 So. State Monday from 6-8 p.m. Interment, Wasatch Lawn Memorial Park.

T 2/20 N 2/20

Tribune 2/12/94



Aya Shida waited a long time Thursday for a bus to take her to Snowbird Ski Resort. Heavy snow closed Little Cottonwood Canyon. Deirdre Eitel/The Salt Lake Tribune

A Real Snow Job: Alta Piles Up 55½ Inches in 24 Hours

By Mike Gorrell
THE SALT LAKE TRIBUNE

All those powder dumps through all the years do not measure up to the storm that hit Alta Wednesday night and Thursday.

With unrelenting consistency, a record-breaking 55.5 inches of snow fell at the Little Cottonwood Canyon resort in the 24-hour period that started at 5:15 p.m. Wednesday. Four to 5 inches of snow piled up hour after hour.

It was too much snow. The avalanche threat closed Alta and Snowbird. Guests were confined to their lodges for most of the day. Road crews plowed and replowed the canyon road, which was closed

all day, clearing natural slides and those shot down by avalanche-control officials.

"We had a pretty frantic morning, but we achieved a fair amount of safety," said Utah Department of Transportation avalanche forecaster Rick Wyatt. "I've certainly seen it snow this hard and I've seen bigger storms than this. But I've never seen it snow this hard for this many hours, except for maybe in the Himalayas. It's pretty impressive."

He and Paul Cobee worked through the night and all day Thursday, repeatedly checking snow totals, then making arrangements for detonations that would release what they figured were

the most perilous avalanches.

"We couldn't see any of them run today, just the aftermath," Mr. Wyatt said. Low gray clouds and the densely falling flakes reduced visibility to a few yards.

Steve Robinson, 31, of Hermosa Beach, Calif., spent his day reading, relaxing and watching the snow fall from his room in Alta's Peruvian Lodge. He had planned to be on the slopes to kick off a four-day ski vacation.

"I just made it up here about 10 p.m. [Wednesday] expecting a great powder day after tracking the storm pattern all week. I did not expect an unbelievable storm that has left me in amazement,"

he said. I was dressed by 7 a.m. and sat around in ski clothes all day, wondering if it would stop.

"But Friday is going to be awesome. I will be turning it up, hitting it hard," Mr. Robinson said.

So will Kenneth Louie, 39, of Holladay, a season-ticket holder at Alta for most of his life. He sat at the bottom of Little Cottonwood Canyon for a couple of hours Thursday morning before learning it was in vain.

He will be on one of the first chairs today to ensure he has first shot at untracked powder in the special places avid skiers keep to themselves. "It could be a tough

■ See D-2, Column 4

B1

Tribune 2/19/94

Heavy Snow Hampers Search for Alta Skier

Officials Still Seeking Seattle Man After 3 Feet of Fresh Snow

By Mike Gorrell
THE SALT LAKE TRIBUNE

Alta officials are counting on a predicted break in the stormy weather today to help rescuers locate a 28-year-old Seattle skier missing in the Albion Basin since Monday afternoon.

Fears for the man's safety intensified Tuesday as nearly three feet of new snow covered slopes and magnified avalanche threats in the cirque atop Little Cottonwood Canyon.

"The snow is extremely unstable. It's frightening out there," said Salt Lake County Sheriff's Capt. Bill Van Wagenen, who had two members of his special-operations teams helping Alta town searchers and the Alta Ski Patrol comb the runs, gullies and stands of trees off Supreme chairlift.

The missing man, Jamie McClain, who is staying in Park City, became separated from friends while skiing Monday afternoon. After he failed to meet them at an appointed time, they notified Alta Ski Lifts officials and a search was launched at

about 5 p.m.

Working with avalanche-rescue dogs, the searchers stayed out on the mountain until 11 p.m. despite the fact "it was snowing like mad and the wind was gusting to 75 mph," said Alta Mayor William Levitt.

Snow continued through the night. Searchers set out again early Tuesday morning, but without the dogs because of the depth of the powder. They searched all day, without luck.

"You have the best search-and-rescue people out there that I can imagine having. They did everything one could humanly expect," Levitt said. "They literally risked their own safety out there."

The avalanche threat throughout the Wasatch Mountains is rated high today, with lingering showers Tuesday night adding a few inches and more weight to the unstable snowpack conditions.

But avalanche-control work and an interlude before the next storm hopefully will give searchers the time needed to locate the Seattle skier, Van Wagenen said.

Heavy snow also unleashed a small slide that required the Sundance Ski Patrol to dig out a partially buried man, the Utah County Sheriff's Office said. Rescue details were not available.

■ See B-2, Column 4

Heavy Snowfall Slows Search For Alta Skier

■ Continued from B-1

A vigorous southwesterly air flow enriched with tropical moisture fueled the snowstorm, the first to benefit Utah in several weeks. Almost the entire state was affected, said National Weather Service meteorologist William Alder. Only the Uinta Ba-

sin, Hanksville and the Cache Valley were exceptions.

"It was a pretty strange storm," he said. "We usually don't do very well in Salt Lake and Davis counties when there's a southwest flow, but those counties did real well Tuesday."

Besides dumping 3 feet of snow at ski resorts in the Cottonwood canyons and 2 feet at Park City and Snowbasin, the clouds left 3 to 5 inches of snow at lower elevations around the state.

A few places were hit harder. A foot of snow fell in Scofield, Carbon County. Johnson's Pass between Tonnele and Dugway received 9 inches. In southern Utah,

totals reached 20 inches at Duck Creek Village in Cedar Canyon, 18 at Long Valley Junction and 10 inches in Monticello.

The new snow is welcome in the mountains. The water content of the snowpack statewide was just 53% of normal on Monday. To get to normal would require snowfall to exceed 160% of normal for the rest of the winter, said U.S. Soil Conservation Service snow-survey supervisor Randall Julander.

Tuesday's storm helps, Alder said, but much more is needed. He predicts a storm Thursday night and Friday could drop another 1-1½ feet of snow in the northern mountains.

Friday Helps Chase Away Cabin Fever With 60-Degree Highs and Heavenly Skies

By Mike Gorrell
THE SALT LAKE TRIBUNE

Friday was a day for sunglasses, not coats. For skiing, not working.

For admiring the clarity of sunshine reflecting off snow-covered mountains, not complaining about views obscured by pollution.

"Wasn't it just a lovely day?" asked National Weather Service meteorologist William Alder, who was more ebullient than usual Friday because he had just become a grandfather for the first time.

High temperatures along the Wasatch Front warmed into the low 60s, making Salt Lake City, Ogden and Provo

feel a bit like Utah's Dixie. Salt Lake City's high of 61 was just three degrees cooler than St. George.

That's not bad for late February, Alder said, but not record-setting. Salt Lake City's record for Feb. 25 is 68 degrees.

No matter. The heat was sufficient to lure people outside to soak up a few rays. It also took a toll on the 8 to 16 inches of snow that fell just three days earlier. Gutters carried ample streams of melting snow by late afternoon.

The day got a jump on a warm start thanks to cloud cover that persisted through the night, holding Salt Lake City's early morning low to 38 degrees.

The clouds had moved into the area Thursday evening,

producing light to moderate rain in Wasatch Front valleys and varying amount of snow at ski resorts — ranging from 13 inches at Beaver Mountain northeast of Logan to 1 inch at Sundance.

"High-density cement" is how Tom Kimbrough of the Utah Avalanche Forecast Center described the snow above Logan. The weight of the new snow, coupled with wind and weak layers below, combined to create a high avalanche hazard in the northern Wasatch Mountains, he said.

Alder predicted more showers tonight and Sunday. But after they taper off, pleasantly clear weather dominates the forecast. "Next week looks basically gorgeous," he said. "March should enter pretty lamblike."

the Alaska avalanche school and the forecast center. In its place, Fesler and Fredston organized the nonprofit Alaska Mountain Safety Center — and have continued the work of studying avalanches and teaching avalanche awareness in the years since then.

They conduct avalanche seminars now up to 20 times a season. Much of the class hinges on studying real accidents, evaluating actual snow conditions in the field and testing new avalanche knowledge with practical scenarios.

"It's the human factor that gets us into trouble," Jill tells students. Deciding to ski because the snow is fabulous, because you've skied it before, because it "seems" safe, because of peer pressure, because "an expert" telemarker or snowboarder or snowmachiner says it's safe — is all thinking like a human.

"But the mountains don't care what you think," she says. "What we're going to do in this workshop is make you think like a mountain."

In the dragon's lair

For two days our group of five people in the avalanche workshop had practiced rescue techniques, dug snow pits, traveled the ridges and slopes above Independence Mine State Historical Park in Hatcher Pass. We had concluded, under our instructors' tutelage, that there were intermittent wind slabs — hollow sounding snow — that could break apart and slide. But they appeared as islands surrounded by ideal powder-skiing conditions, sugary snow that had metamorphosed into angular, poorly bonded grains.

Some slopes seemed dangerous. But after repeated tests digging snow pits — which allowed us to see the consistency of snow in the underlying layers — we concluded that the unstable slabs weren't dangerously connected and the places prone to failure were isolated. Usually right underfoot. It was a tricky situation, one that required caution. But, as long as we stayed off the slabs and stayed on the unconsolidated loose snow, skiing appeared to be safe.

On the third day, under brilliant sunshine, we started skiing with Bruce Tremper, program director of the Utah Avalanche Forecast Center. Assuming the persona of a novice, Tremper demanded that we escort him up a steep pass with a view of Denali.

"But I'm worried about getting caught in an avalanche," he told us. "I don't want to die out here. What about this crust?"

We jumped on some mini-slopes, trying to make them fail. They did. We debated whether the bond between the surface slab and the loose snow underneath was sufficient. We weren't sure whether something had changed from the day before.

Tremper interrupted us and told us to dig some holes.

"You have to open up the trap doors in the roof of the dragon house," he said, digging out a small pit with his gloves. "Sometimes the dragons are sleeping, sometimes they're angry, and sometimes they bite your head off."

Tremper found the same thing: wind slab on top of the loose, angular snow. More experimenting was needed. So he then led us along a 10-foot-high drift of wind-loaded snow — jumping on the miniature ornières, kicking loose slab avalanches that fell four or five feet.

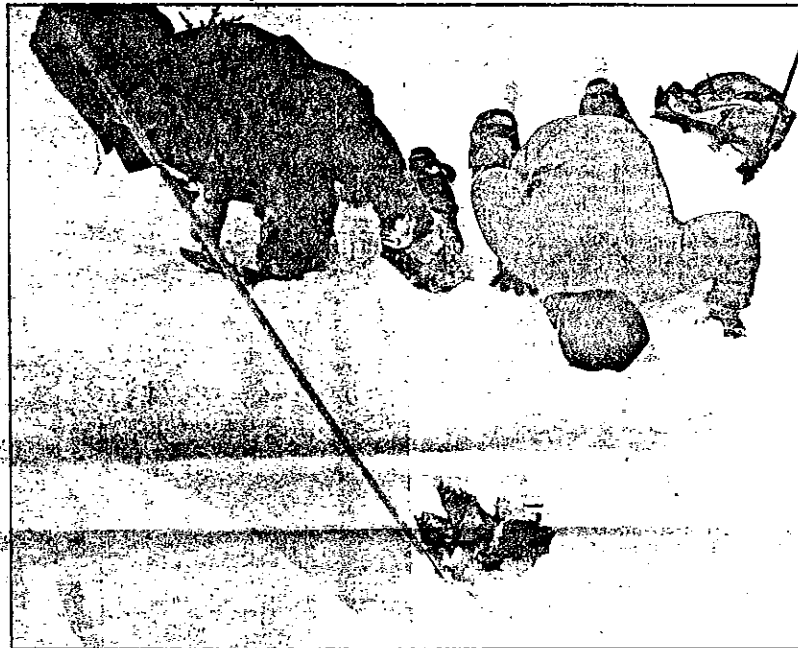
"Don't ever pass by something like this," he said. "This is the place where you do your experiments. If you're not here, it can kill you. But down here, you're a kid with a dump truck in a sandbox."

Then we began climbing in earnest. We were all carrying avalanche beacons that we had tested that morning one-by-one. Each person carried a shovel and an avalanche probe — and we had practiced using these tools in simulated rescues.

Just as important, we planned to do a test of a slope similar to our final destination by using an avalanche hazard checklist devised by Fesler and Fredston to recognize nature's avalanche traffic signals. To the side of the bowl, we found one.

**"Sometimes the dragons are sleeping,
sometimes they're angry, and sometimes they
bite your head off."**

— Bruce Tremper



BILL ROTH / Anchorage Daily News

Gregory Kalal was intentionally buried in the snow at Glen Alps so students could use various techniques learned in their avalanche class to locate him and dig him out.

Could the slope avalanche?

We didn't merely eyeball it and talk the question over. We lay down on the snow with inclinometers and measured it. The slope varied — 30 degrees to 35 degrees. Definitely capable of avalanching. A "flashing yellow or red light" slope. Our destination might be even steeper at the top.

What had the weather been doing?

If it had been wind-loading or blizzarding, for example, we'd know right then and there to turn back. Such "red light" weather added to a "red light" slope translates into a "no go" under Fesler & Fredston's hazard evaluation checklist. But for two weeks, the weather had been clear and bitterly cold — tending to keep conditions from changing. So it was a "green light" for the weather.

Was there a slab? Were there weak layers? What would it take to make them fail?

Again, we didn't just stand there and talk about these final, critical questions. We marched further up the test slope, divided into groups, and began shoveling out deep pits.

We found that the slab, where it existed, collapsed easily. Danger: A "red light." But some of our pits showed only unconsolidated snow with no slab at all. The deep layers there were strong: A "green light."

The difference between these two types was easily observable on the surface. The dangerous slabs showed a smooth shiny surface of crust, while the safe snow showed a rumped, etched surface. By

paying attention, we could stay off the shiny crust.

So, with a "green light" on snow conditions and a "green light" on weather, we decided that we could safely enter the "red light" avalanche slope.

We continued climbing. Reaching a gully, we confronted a prime avalanche slope — rising from 25 to 30 degrees at the bottom to 38 to 40 degrees at the top. But most of the slope was coated with the same unconsolidated snow we had tested before. The shiny crust indicating slab conditions appeared off the slope, on a much steeper face, completely avoidable.

Dividing into two groups of three, we climbed the slope separately. "Always be thinking about who is going to perform the rescue," Tremper told us.

We reached the saddle without problems, staying off any crusted snow, not following an old track that led onto a portion that appeared to have a wind slab, but making our own more difficult trail through the soft snow.

Denali, Foraker and Hunter gleamed in the distance. We were surrounded by white slopes streaked with the yellowing light of late afternoon.

"Now comes the fun part," someone said. One by one, we skied down the slope we'd painstakingly climbed, making turns in the crystalline snow. But the ultimate reward for our careful testing of the snow was safety. Nothing avalanched.

□ Doug O'Hara is a staff writer for *We Alaskans*

Salt Lake / Davis

FRIDAY, FEBRUARY 11, 1994

LE-BENNION • WEST JORDAN

D. News

NEWSLITE

3 Solitude skiers survive avalanche at Milk Run

BIG COTTONWOOD CANYON — Paul Sherman began working at Solitude ski resort Tuesday to earn a few extra dollars and enjoy the area's powdery, snow-laden runs. Thursday payday came early for the 22-year-old Colorado native.

Sherman and two friends were literally in over their heads in powder after being caught in an afternoon avalanche while skiing on a challenging trail facetiously named Milk Run. Miraculously, none of the skiers were seriously injured — although one man, David Olsen, 24, was flown to an area hospital to be treated for bumps and bruises.

"My friend Chris (Williams) and I were skiing together when we spotted (Dave) ski down a steep shoot," said Sherman. "Dave yelled out two words that I couldn't make out and then I saw a huge cloud of what looked like smoke coming towards us."

Sherman darted into a patch of trees just before he was swallowed by the descending force of the giant slide.

After being dragged an estimated 200 yards, Sherman skillfully dug his skis into the slope and popped himself out of the snow. Uninjured, he began looking for his friends. Williams was fine but Olsen was not in sight.

Moments later, Sherman and Williams spotted their pal over the edge of a 30-foot cliff.

Olsen remains at LDS Hospital where he was listed Friday in satisfactory condition.

Ski officials are investigating the cause of the Milk Run slide — which had been deemed safe earlier that day, according to a Solitude spokesman. Eight inches of snow had fallen in the 24 hours prior to the avalanche.

Alta lives up to reputation as snow hub

Alta, the "snow capital of the Wasatch," did it again.

The Little Cottonwood Canyon resort chalked up a record 55.5 inches of snow between 5:15 p.m. Wednesday and 5:15 p.m. Thursday, eclipsing the previous record of 45 inches that fell Nov. 22-23, 1992, said William J. Alder, meteorologist in charge of the Salt Lake office of the National Weather Service.

The 55.5 inches is a 24-hour record for all of Utah — valleys or mountains — Alder said, labeling the snowfall as "just a perfect storm." The snow contained 3,200 inches of water.

Alder said the valley snowfall record is 35 inches, which fell during a 24-hour period on Feb. 5, 1983, in Kanosh, Millard County.

The storm total at the Alta guard station, where Thursday's record was measured, was 69.5 inches of snow, which contained 4.65 inches of water, for the 48-hour period ending at 11 p.m. Thursday. Snowbird reported 69 inches.



Rich Miller and Joe Thomas ski in Park City, where only 24 inches of snow was recorded. But in Alta, a 24-hour record 55.5 inches fell.

RESORT NEWS
1/17/94



The Park Record

1670 Bonanza Drive
P. O. Box 3688
Park City, Utah 84060
801-649-9014
801-649-4942(Fax)

Bruce Tremper
Director, Utah Avalanche Forecast Center
337 North 2370 West
Salt Lake City, Utah 84116

Dear Bruce,

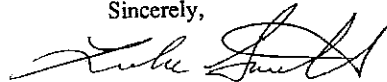
Just a short note to thank you once again for taking the time to speak with me about the UAFC and its activities. I am very appreciative, especially in light of the events of that day (it was January 6). I learned a lot and enjoyed talking to you and Tom Kimbrough and seeing just how the process of forecasting backcountry conditions takes place.

You should know that I have received a great many favorable comments regarding the story that ran in the *Park Record* a week later; something that is very rare here in Park City. In order to have raised the populace out of its lethargy clearly indicates the importance of the UAFC to Parkites.

Finally, a quick thanks for the snow stability clinic you gave at REI on January 25. It was, as you said at Prospector on the 13th, much more specific and informative than most avalanche sessions. I found the demonstrations and your specific description of digging snowpits to be especially valuable.

All of you folks at the UAFC do indeed save lives. I, for one, am grateful for your help both as a journalist and as a backcountry enthusiast. I look forward to any future opportunities to work with you and the rest of the crew at the UAFC.

Sincerely,



Luke Smith



KSL TELEVISION
KSL RADIO 1160
Broadcast House
55 North Third West
P.O. Box 1160
Salt Lake City, Utah 84110-1160

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January 19, 1994

Bruce Tremper
Utah Avalanche Forecast Center
Box 8014
Alta, UT 84092

Dear Mr. Tremper:

Thanks very much for joining us on Utah This Morning, and for rearranging your schedule to be here. Our goal is to educate and inform viewers about issues which affect them. I appreciate your help in reaching that goal, I think we were able to pass along some valuable information today.

It's nice to have professionals in the community who are willing to lend their time and expertise to the show. Thanks again, you did a great job. You are an excellent representative for the Avalanche Forecast Center.

Sincerely,

A handwritten signature in cursive script that reads 'Michele Thompson'.

Michele Thompson
Producer

Utah Avalanche Forecast Center
Evelyn Lees and Tom Kimbrough
337 N. 2370 W.
Salt Lake City, UT. 84116

Last February, our son and brother, Jamie McClain, of Seattle, Washington, was lost at the Alta Ski Area. You, and many others participated in a long and heroic search and attempt to save him. While we all hoped and prayed for a miracle that he would be found alive - that was not to be and his body was discovered late on the afternoon of February 9, 1994.

We had hoped to thank you all publicly with a letter to the Salt Lake Tribune that was never published - but certainly did not mean to let so much time pass before we wrote to let you know how much we appreciated the extraordinary efforts made on Jamie's behalf.

We were in Alta during the search and in many ways that time was a nightmare for us, but the caring and kindness of so many people gave us strength and comfort.

Any "Thank You" seems a very inadequate expression for the extraordinary - to us - search and rescue operation conducted during those 3 days. We came away with a monumental respect for the quality and the intensity of your work and were humbled by your professionalism. We are confident that your skills and training are among the finest anywhere and that you used all of your expertise to try and save him.

We were especially grateful that even when it seemed you had exhausted all possibilities, you were determined to find yet another way to extend and broaden the search, and that you never, never gave up. How can we find the words to tell you what that meant to us?

Jamie had an extraordinary circle of friends and people who cared about him. Many of them have contributed to a memorial fund established in his name, to be used for the benefit of the search and rescue effort. He, more than anyone, would have understood and appreciated your skill and dedication and the burden on your limited resources. The funds collected will be sent to the Wasatch Back Country Search and Rescue as we understand that they are unfunded and could benefit the most from our help. It is our fervent hope and prayer that this contribution will benefit all of your groups and that, one day, another lost skier might be saved.

God's blessing on each of you. We are forever in your debt and will be eternally grateful for all you did for us - and for Jamie.

Jim and Mary Ann McClain, Leanne McClain, Doug McKay and Mariah McKay

Jim McClain

AMERICAN AVALANCHE INSTITUTE, INC.

Box 308
Wilson, Wyoming
83014
phone 307/733/3315

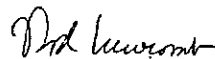
January 26, 1994

Michael Sieg
Wasatch National Forest
Salt Lake District
6944 S. 3000 E.
Salt Lake, UT 84121

Dear Mr. Sieg:

On Thursday, Jan 6, I was to begin my Level I course at Wasatch Touring in Salt Lake. However, nature prevailed and the forecasted storm of 15 inches turned out to be 70 inches. During this storm I was marooned at Alta and unable to leave the canyon. Fortunately Bruce Tremper was able to fill in for me and teach the Thursday evening session. This was much appreciated. It helped to make the course a success.

Sincerely,



Rod Newcomb
President

cc: Bruce Tremper



December 14, 1993

Utah Avalanche Forecast Center
 Attn: Bruce Tremper
 337 North 2370 West
 Salt Lake City, UT 84116

HELI-SKIING

Dear Bruce,

A quick compliment to you and all other contributors involved with producing "Winning the Avalanche Game". The video had its Telluride debut on December 9th and 10th at the Telluride Avalanche Awareness Seminar and was extremely well received by the public and local avalanche professionals.

MOUNTAIN
GUIDES

Without question, the piece breaks new ground in avalanche education through communicating the "tricks of the trade" to a risk taking public whose "technical skills have clearly outpaced their knowledge of avalanches". Rather than speaking in platitudes or over-emphasizing the danger element; "Avalanche Game" explains to its audience the necessity of "tweekin" the snowpack, and viewing the backcountry as the ultimate classroom.

AVALANCHE
CONTROL

Special kudos are due to Tom Kimborough for his performance of "Hamlet Takes a Ride". Finally, I most appreciated the sense of humor which broke up the intensity of those spectacular avalanche shots. Congratulations and thanks again for your tireless efforts.

WILDERNESS
FILMING
LOCATIONS

Yours sincerely,

Mike Friedman
 Program Director
 Telluride Helitrax



p.o. box 1560 telluride colorado 81435 usa 303-728-4904



Colorado Department of Natural Resources

Colorado Avalanche Information Center
10230 Smith Road
Denver, Colorado 80239
(303) 371-1080

January 18, 1994

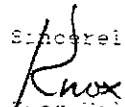
Bruce Tremper, Director
Utah Avalanche Forecast Center
337 North 2370 West
Salt Lake City UT 84118

Dear Bruce:

Congratulations on producing an outstanding video. Since receiving our copies of "Winning the Avalanche Game," I have shown it to three groups, and other CAIC forecasters have shown it several other times. Our audiences have given us very positive reviews.

They -- as well as I -- find it accurate, entertaining, nicely paced, and visually stunning. That's a very difficult hat-trick-plus-one to pull off, and you've done it. Your video is a great addition to the resources available to avalanche educators. It makes our job easier. Thanks.

Sincerely,


Knox Williams
Director, CAIC

JERRY L. BRESSIE, M.D., INC.

3433 Northwest 56th, Suite 780
Baptist Medical Plaza North
Oklahoma City, Oklahoma 73112

Diplomate
American Board Cardiovascular Disease

Phone 405-946-0568

Bruce Tremper
Utah Amalanch Forecast Center
337 North, 2370 West
Salt Lake City, Utah 84116

Dear Bruce,

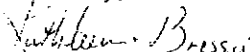
This letter is lone overdue. My excuse is that the videos you sent us came just before the Holidays and your letter sort of became mixed up with the Christmas mail! My apologies for that.

The family viewed the video at Christmas and were very pleased that it was so well done. Our son, Conrad, was the 'typical' avalanche victim. When he was caught he was 27 years old, in excellent physical condition, a skilled back country skier, and was well versed in avalanche lore. His partner was also quite experienced they had on their beepers and did everything right. During the following summer when we hiked up to the area in the Rubys where he was killed to leave his ashes, I began to understand the tremendous force that he had encountered. I saw the trees that were snapped off like tooth-picks and the rock slides and realized that if you are in a full-forced avalanche your number is up. He was simply in the wrong place at the wrong time.

Our son-in-law, Rusty Squire, took the videos back to Bozeman and gave one each to ski patrols at Big Sky and Bridger. I hope many people will be able to see them and perhaps they will help others understand the risks in avalanche country.

My husband and I thank you again for this tireless effort to produce a video. We thnak our son would be very pleased also.

Sincerely,


Kathleen Bressie

(Rusty sort of came out of retirement and blew everyone away in the '24 hours of Aspen') I think he was happy to be back selling stocks the next week! He & Elaine are building a beautiful home in the Bridger Foothills. Perhaps you will have an opportunity to visit there some time.)



April 14, 1994

Mr. Bruce Tremper
Avalanche Forecast Center
Executive Terminal Bldg.
337 North 2370 West
Salt Lake City, UT 84116

Dear Mr. Tremper,

I would like to take this opportunity to forward a word of thanks for taking time from your busy schedule for your presentation to our Geography 526 Snow and Avalanche course.

According to Bill Harrison, the instructor, the class looks forward to your lecture. Your back country scenario problem was the subject of much discussion at the next meeting.

I hope you enjoy the Geography mug and that is enclosed as a token of our gratitude.

Sincerely,

A handwritten signature in cursive script that reads 'George F. Hepner'.

George F. Hepner, Chair

Department of Geography
270 Orson Spencer Hall
Salt Lake City, Utah 84112
(801) 581-8218