

United States  
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National Forest

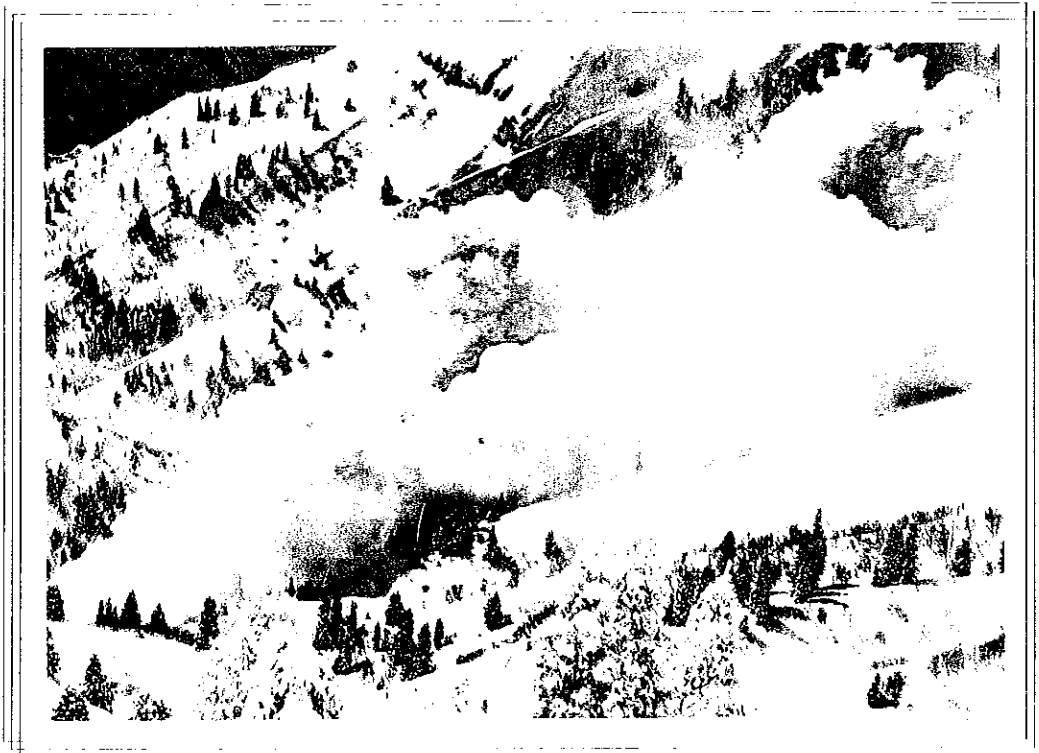


in partnership with

NOAA National  
Weather Service

# Snow and Avalanches in Utah

## *Annual Report—1992-1993*



Utah Avalanche Forecast Center



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**Cover photo by Darce Trotter, Provo Canyon**

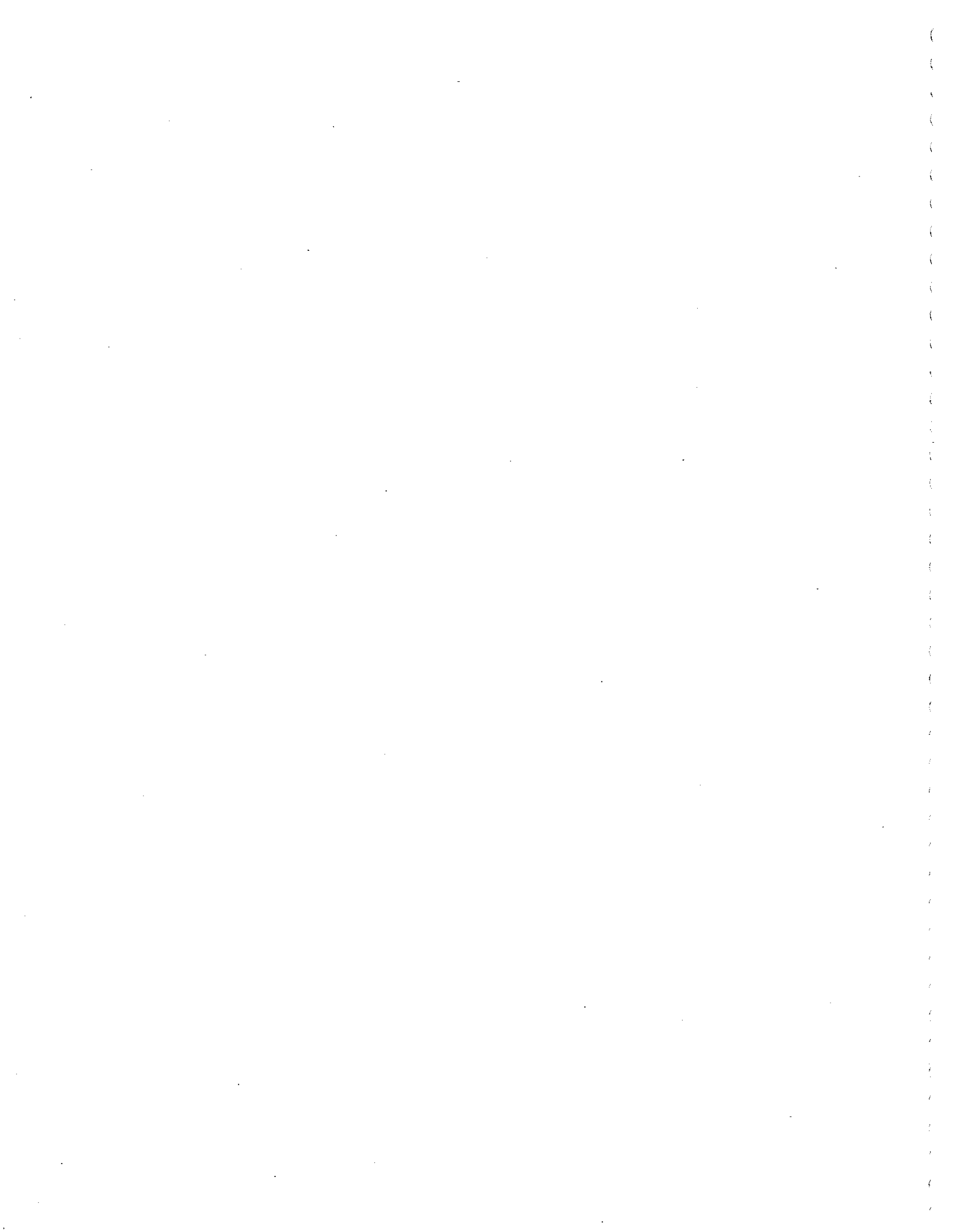
**The Utah Avalanche Forecast Center is a Wasatch-Cache National Forest program in partnership with the National Weather Service. Copies of this report can be obtained by writing or calling:**

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# The Utah Avalanche Forecast Center

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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. The UAFC is also partially funded by 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, Al Soucie and Alex Lowe.

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 covers the La Sal Mountains. Because of this, backcountry avalanche advisories are issued only once per day and only five days per week. This year Dave Medara moved from Alta to take over this position.

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

Salt Lake City 3 minute forecast (7 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

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The winter of 1992-93 was the thirteenth season of operation for the Utah Avalanche Forecast Center (UAFC). Noteworthy events of the winter include:

- . The UAFC received a record 127,670 telephone calls for recorded avalanche and mountain weather information. This averages nearly 700 calls per day, and reaches an estimated maximum of over 1500 calls per day. This number includes both the Wasatch and the La Sal Mountains, although 98 percent of the usage is in the Wasatch. The total number of calls rose 22 percent over any previous year, shattering the previous record of 90,000 calls, set last year. The number continues to significantly increase each season. The UAFC recorded message receives nearly twice as many calls as any other avalanche advisory service in North America.
  - \* Three backcountry avalanche fatalities occurred this winter. One additional backcountry skier died in a non avalanche related accident as he slid on ice into rocks.
  - \* There were 68 backcountry accidents and incidents in which 30 people were caught, 9 people were partly buried, 5 were completely buried, and 3 were killed. Quite a bit of property damage also occurred with 24 unoccupied automobiles either damaged or totaled, One expensive Sundance house was completely destroyed with another nearby house damaged, and there was much property damage on the valley floor from roof slides and roof collapses from large snow loads.
  - \* Snow conditions were generally quite good, with near record snow falls well distributed through the season. It was the third snowiest winter on record. While the deep snowpack was mostly stable, frequent storms produced plenty of new snow avalanches.
  - \* UAFC education efforts reached local, state, national and international audiences totalling 2,015 people through 23 presentations at avalanche slide shows, workshops and seminars. Local media coverage resulted in numerous newspaper articles and several television news stories.
  - \* The announcement of a dramatic decrease in Forest Service funding for next season initiated intensive efforts to develop other funding sources for future operations.
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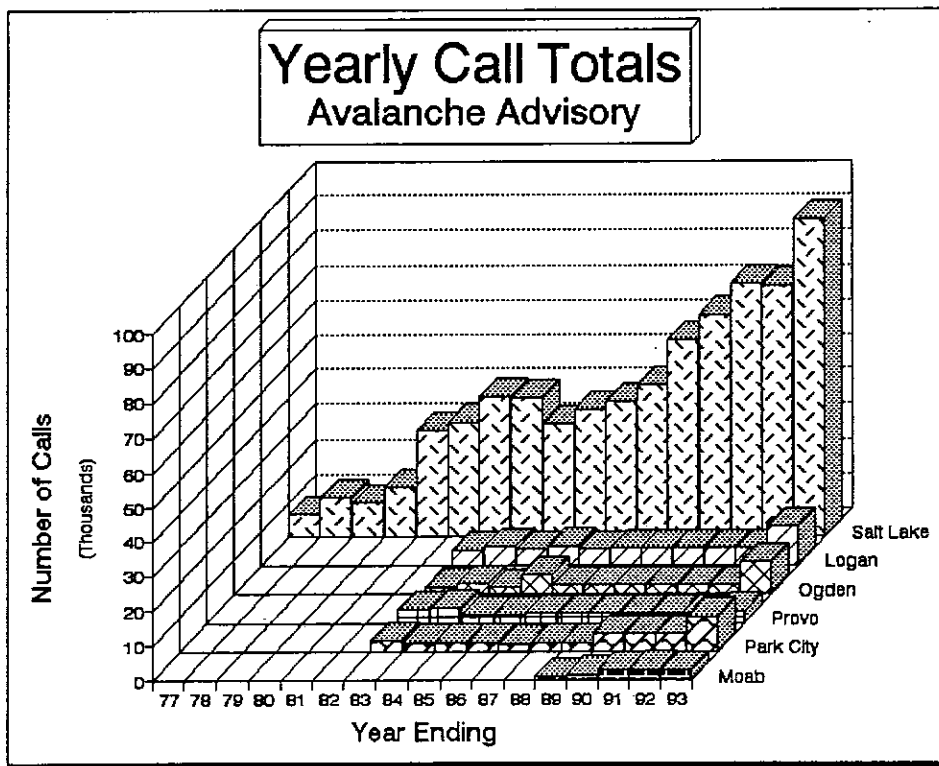
# Introduction

Suitably enough the salient aspect of the 1992-93 season was the weather. Although the last few winters saw a dearth of storms, and below normal snowpacks, this winter changed all that, and changed it with a vengeance. A huge Alta snowstorm just before Thanksgiving was a harbinger of things to come as 45 inches of snow in 24 hours broke a Utah record. In late February, Alta saw the largest avalanche cycle since the 70's. Twenty four cars were either damaged or totaled in two separate avalanche cycles in Little Cottonwood Canyon. In Provo Canyon a semi-truck was knocked off the road, two people sleeping in their camper were tumbled around and buried, and two Sundance houses were hit, one totaled and the other damaged. After three avalanche fatalities, the season finally ended up as the third snowiest winter since records began at Alta in 1945, and that's not even counting the six feet which fell in the first half of May or the two feet which fell in June.

Last winter and this winter were nearly complete opposites. It was famine versus feast. Counterintuitively, at least to the non avalanche educated, the shallower the snowpack, the more unstable the snowpack. And the shallow snowpack in 91-92 was frighteningly unstable. When the big snows finally came in February, it was the classic cast-iron-frying-pan-on-top-of-potato-chips situation and the instability was extremely persistent. Many people simply quit going into the backcountry for the rest of

## Record-Setting Snow Year

## Record-Setting Calls to the UAFC Recording



UAFC hotlines recieved a record number of calls - over 127,000

## Backcountry Use On the Rise

the season. In contrast, this season brought frequent storms with consistently good powder on top of a mostly stable underlying snowpack. But still, it's hard to lay down that much new snow without at least some trouble, which came as frequent slides within the new snow.

We do not have hard figures on how many people were in the backcountry but the number of calls to our recorded avalanche advisory rose by 25%, and this most likely translates to a similar increase in backcountry skier days. Unfortunately, Wasatch avalanche fatalities rose even more dramatically. Two backcountry skiers were killed in avalanches in the Wasatch this winter along with one out of bounds lift skier. This is more than the combined Wasatch fatalities over the previous 5 seasons. The avalanche conditions were not appreciably more dangerous this year than in previous years, but the skiing conditions were much improved. So the increase in deaths could represent the increased numbers of people in the backcountry. But more likely, it simply reflects the fact that people are lured to Utah from all over the world by our famous powder, and on at least three occasions this year, the lure was too strong.

Even though three deaths seems like more than we're willing to accept, what's more amazing, with all the people scurrying around in hazardous avalanche terrain, that there's not more of deaths. How many people are out there? That's a good question. The Salt Lake Ranger District is attempting to answer this question with a survey done this season but the results are not out yet. We could use the number of calls to our avalanche advisory to estimate winter backcountry user-days, but we have no data to say how many backcountry recreationists one caller represents. Even if we conservatively estimate that two people call for every one person going into the backcountry, in the last six seasons somewhere around 250,000 excursions have been made. Yet only five fatalities have resulted. That's one in 50,000, and those are good odds. Apparently, winter travel in avalanche terrain, is not quite the daredevil sport many people imagine.

A major player in the low accident rate is the level of avalanche skill possessed by the bulk of the Wasatch skiers and to a lesser degree, the snow boarders. We consider each of our daily forecasts to be mini avalanche courses, imparting some kernel of avalanche awareness. Snowmobilers do not generally have high avalanche skill levels, but so far none have died in Utah although many close calls have occurred in Utah and many fatalities have occurred in other states. This group will certainly join the ranks of Utah avalanche victims--probably sooner rather than later--and if funding permits, we will direct a greater educational effort toward snowmobilers.

How many of these people owe their lives to the avalanche forecast? There is, of course, no way to know, but we do know that none of these recent five Wasatch fatalities heard our avalanche advisory on the day of their death. In fact, excluding the Moab accident (where three people were killed accompanying the avalanche forecaster) only one out of sixteen people killed since 1981 heard our avalanche advisory before they went out. We would hope that our advisory would have made a difference for the other fifteen people. In the vast majority of the cases, our advisory accurately described the avalanche conditions which killed them. This season, members of two of the parties attempted to get the forecast but did

**"Only one out of sixteen people killed since 1981 heard our advisory before they went out. We would hope that our advisory would have made a difference for the other fifteen people."**

not succeed--both either directly or indirectly because of UAFC budgetary limitations. In the Pinecrest case, the telephone line was busy, as it often is, despite nine lines of access. The Wolverine group apparently dialed a wrong number, did not get an answer and having heard rumors of budget cuts, assumed we had closed for the season.

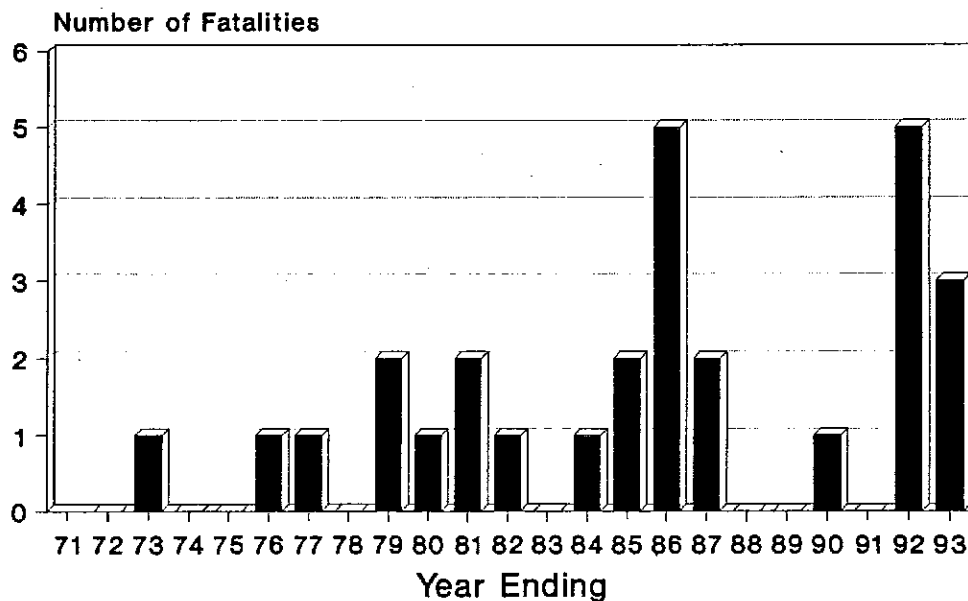
We take each of these avalanche accidents personally. We not only pour over the wording of our advisories to see if accurately reflected the conditions, but we also write up detailed accident reports. In writing these reports we visit the accident site and interview the survivors. Since we have all have spent a lifetime in the mountains, we have all gone through more than our share of grieving our own loved ones and companions who have also died in the mountains. And because of this, we often play the role of councilors as well.

Sometimes, we question our career choices. These accidents remind us that although we have well developed avalanche skills, we are also human. In the words, of Mary Yates, widow of Mark Yates killed last season in a Moab area avalanche, "We are imperfect beings. No matter what you know or how you operate 95 percent of the time, we aren't perfect. And sometimes those imperfections have big consequences."

Yes, our job is sometimes dangerous. It's sometimes filled with heartache and too many hours in the cold away from loved ones, and fighting our own often exasperating bureaucracy and disillusioning budget battles. But it's also our passion, and our passion also happens to save many lives. We keep coming back.

**"We take each one of these avalanche accidents personally."**

## Avalanche Fatalities UTAH 1971-1993



*After a four year hiatus, avalanche fatalities in the Wasatch appear to be on the rise.*

# Season History - Northern Wasatch

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## End of the Drought Years

Did anyone know it was the end of the string of Drought Years? At least one person suspected as much. At our annual open house in the Fall, Bill Alder, the chief of the National Weather Service office in Salt Lake, presented a historical chart showing that yet another low snow Winter was unlikely. Maybe somebody else said something about moss or squirrels or bunions. But by January, whining about lack of snow had turned to moans about too much of a good thing.

## November

The Fall was warm and dry but on October 28 rain began to fall. By the next day the snow level reached the valley floor. Disregarding the calendar, Winter began, and along with it came the inevitable avalanches. The first ones were reported on the first of November. Two nice storms, a couple of piddles and then, we were blasted with a pair of big powder dumps. On November 23, forty five inches of snow fell in a 24-hour period at Alta setting a new state record. With superb skiing and boarding smiling ski area operators and backcountry recreationists enjoyed the Thanksgiving holidays in grand style. But it was not all frolic.

Six ski patrollers were caught in avalanches during November. One of these was not only totally buried, but he was alone. This, of course, usually means certain death, by a stroke of good fortune, his partner, who had taken a different route, realized he might have triggered a slide and got someone to check the area. Defying the odds, they had him safely out and he even escaped without injuries. Unfortunately, several other avalanche lessons in the following months didn't come so cheaply.

## December

Small storms arrived all through December but near the end of the month, the action began to increase. The next several weeks dumped record accumulations of snow in the valley with head-high snow on the level in many parts of normally balmy Salt Lake City. Our forecasts discussed roof avalanches and the warnings were extended to include low elevation urban areas. Bags under the red eyes of the avalanche control workers grew deeper and deeper. Getting to and from work, even in town, became epic adventures.

## January

On January 8 two ice climbers were spending the night in Provo Canyon with the thought of attempting an ascent of Bridal Veil Falls the next day. During the night however the bowl above the Falls released. The resulting large avalanche rolled over their camper and partially buried it under avalanche debris. They managed to get a window open and dug their way out with a tea cup.

The avalanche cycle built to a climax on January 11 when twelve unoccupied cars were damaged in Little Cottonwood Canyon by slides reaching the parking lots. Undoubtedly there were countless avalanches in the backcountry but by this time there were virtually no people in the

wild areas of the mountains.

At Sundance, shortly after the peak of the storm cycle, a Florida man, skiing in an area closed due to avalanche danger, was killed. He was skiing with his nephew, a 15 year old local. Apparently he crossed a roped closure and triggered a slide. The man was carried into a narrow gully and buried several feet deep. He was found by a probe line and uncovered after about 40 minutes.

Early February provided a short respite, but just long enough to dig out and get a little sleep. Soon the storms were arriving again, one after another. The biggest of these storms was on Saturday, February 20 with about two feet at Alta in 24 hours. There was the usual round of avalanche activity and we issued an avalanche warning. By Monday the action had slowed down and the warning was dropped, but the snowfall continued. Several inches of snow fell each day for the next few days with about 10 inches on the night of February 24.

By Thursday morning, the snowpack decided that enough was enough and a major avalanche cycle began in earnest with Little Cottonwood Canyon as the focal point. Counter to the usual pattern, the south facing slopes were more unstable than the north facing ones because of a well-defined faceted snow layer sandwiched between ice crusts. In Little Cottonwood Canyon, however, most of the major avalanche paths affecting the road and villages are south facing, and consequently, many slides hit the road and parking lots during control blasting. Several parking lots were overrun, with at least 12 unoccupied cars either damaged or totaled. A power line above the town of Alta was taken out--one which had withstood at least 30 years of avalanches. Several longtime residents and retired avalanche forecasters thought this was the largest avalanche cycle since the seventies.

Little Cottonwood Canyon wasn't alone though. Large spontaneous slides were observed near Park City and Provo. Another big slide finished off a house that had been damaged in the February 1986 avalanche period near Sundance, and it damaged another house built since then.

Tragically, a backcountry skier triggered and was killed in a slide near his home in Pinecrest Canyon that afternoon. He and his group had made several runs on increasingly steep terrain. On his fifth run, he triggered a slide on a mid slope rollover which carried him into a narrow gully and buried him about four feet deep. He was located by beacon and uncovered as rapidly as possible under the conditions, but he did not respond to resuscitation.

Early March again provided some clear weather but by mid month we were back to Winter. There were no monster storms but breaks between storms were short lived. On the afternoon of March 17th, a semi-truck was knocked off the Provo Canyon road as he was driving, but he was uninjured.

**February**

**March**

**April**

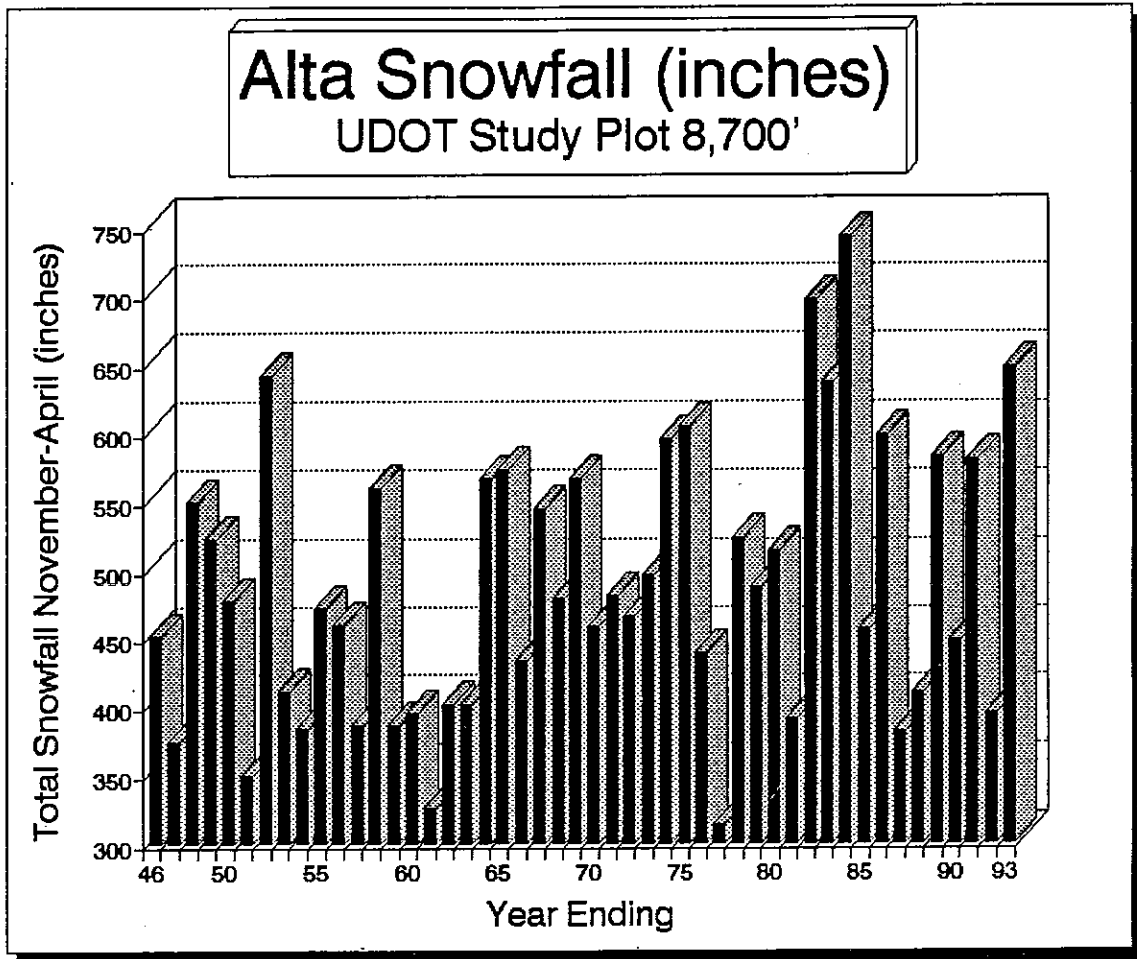
April showers ushered in the Spring, at least for the valley but good powder was still available in the mountains. April 3 dawned clear with 2 feet of prime new snow. Many backcountry enthusiasts were loathe to pass up a final chance of skiing or boarding.

A party of five experienced ski mountaineers headed up along a ridge line between Big and Little Cottonwood Canyons near Wolverine Peak. Although they didn't call the avalanche advisory that day, they knew that there was a significant avalanche hazard, and they took careful precautions. They tried to kick a cornice down the chute they had in mind. The first person tested the slope while on belay. The second person skied the chute without trouble. A small avalanche caught the third skier, Roman Latta, carrying him into the bowl below. The small slide released a larger avalanche in the bowl and buried the victim over six feet deep. Although the rescue, aided by a quick response from the Wasatch Powderbirds helicopter, was about as fast as possible for a backcountry accident, due to the six foot deep burial, the Roman Latta never regained consciousness and died several days later.

**And it just kept snowing**

Due to budget cutbacks our regular forecasts ended on April 12, the day after Easter, but Winter recreation and avalanches did not, as usual, match the calendar. Cool weather with occasional storms limited the development of supportable crusts and corn skiing. Most of the ski areas closed on April 25, but storms continued well into May, adding another six feet. We even issued an avalanche warning on May 4. Storms continued to hit the Wasatch during the first week of May with the total settled snow on the ground at the Alta Guard Station reaching it's season high at 149 inches on May 9. Total snowfall at the Guard Station was 724 inches by mid May. The official Alta records, however, only cover snow received between November 1st and April 30th, and within that time 650.3 inches of snow fell making it the third snowiest since records began in 1945.

If that's not enough, two more feet fell in the first half of June. Finally by mid June, the weather realized what time of year it was and began to act like summer and the snows began to flood many of the Wasatch streams. But with the incredible amounts of snow combined with a cool summer, as of this writing in mid July, many of the popular slopes are still very skiable. As of a week ago you could still ski top to bottom at Alta on good, continuous snow. No one can remember a later snow season.



*The 1992-93 season was the third snowiest winter in the 47 years of record keeping at Alta. A total of 647 inches of snow fell at Alta during the official record keeping period between November 1st and April 30th. Not counted in the official tally were six more feet which fell in May and another two feet in June.*

# Season History - LaSal Mountains

by Dave Medara

**"Needless to say, I needed to hit the ground running, and did."**

It was a strange, scary and hyperactive season at the La Sal Avalanche Forecast Center (LSAFC). Unfortunately, I came to the LSAFC through tragic circumstance. Mark Yates had run the LSAFC for the previous four seasons until he was killed in the line of duty in February of 1992. Then, because of unforeseen bureaucratic delays, I didn't arrive on the scene this season until January 4, after the winter was well underway. I had received my avalanche training as an Alta ski patroller and had only skied in the La Sal Mountains a few times before I took this job—one which requires intimate familiarity with the terrain. Needless to say, I needed to hit the ground running, and did.

When I arrived, I found the scariest depth hoar snowpack I've ever seen, in some of the windiest mountains I've ever seen. Then, of course, it started to snow hard. We immediately had the single largest snowfall in the history of the LSAFC (22" at 9600', which is quite a low elevation for the La Sals). Things got wild really fast.

## January

The tone for the early season (if you can call January an early season) was set when I was intentionally kicking a few cornices along the Pre-Laural Ridge and set off a class 5 slide (Avalanche size is ranked from class 1 through 5. In other words, this was the largest possible slide for this area.) The hard slab had a crown nearly 8 feet tall in places, averaged 5 feet deep and was over a half mile wide! I didn't think anyone would even believe this one. This slide cycle was the biggest of the year and I noticed several other class 4-5 avalanches. I found an area the size of a football field cleared of 10-20" diameter spruces by a slide in Horse Canyon.

The first few weeks were crazy and I rode the steepest learning curve I've ever been on, ingesting all the information about the La Sal snowpack, computers and weather forecasting I could get my puny brain on. Luckily Craig Bigler, the late Mark Yate's longtime partner, was on hand to help guide me around the range. Bruce Tremper made several trips to Moab and not only dug snowpits with me, but set up the computer system, helped with the weather station, and coached me through using all the new technology. I dug many pits and skied many miles.

## February

The snowpack finally began to mellow out in mid February when a heavy, wet snowstorm on the 19th stuck in there hard and seemed to heal up the snowpack. After that, we only had to deal with new snow avalanches, instead of the huge delayed-action monsters of the mid season. The 12 hour days were finally becoming fewer.

## March

A relatively dry month of March gave us a nice corn cycle until the snow began again at the end of the month. It was possible, as Bruce Tremper and I discovered, to ski great corn and great powder in the same day in upper Gold Basin. Late season snowfall ended the corn for the rest of the official season but as of this writing in July, there's still snow left for the devoted skier.



## 175% of Normal Precipitation for the Year

As far as the water content of the snowpack, it was like most everywhere else in the western U.S., a big year. We were a little above normal when I arrived just after the new year began, but January and February snowfall put us well above normal. Even with a relatively dry March, snowpack levels were well above average. Early April snowfall brought us back up to about 175% of normal precipitation for the year.

## The New Technology - Computers and Automated Weather Stations

As far as the content of the advisory, I've tried to keep everything the locals have become used to in the last 5 years. This includes information on avalanche hazard, mountain weather, snow and water totals (including percent of normal for the ranchers), ski conditions, road conditions to trailheads, and community service announcements about winter recreation and the rescue team.

While the advisory content hasn't changed much, we've initiated some big technological changes, namely computers and automated weather stations. Computerized printouts of snowpits and weather graphs now decorate the walls of my office. I can call up the National Weather Service computer for forecasts, satellite images and weather maps via telephone lines. I also use the computer to communicate with a new weather station we've installed at 11,600 feet on Pre-Laurel peak in the central massif. This shows me real-time and past weather data at a remote site in a representative avalanche site. Weather stations also make, I have recently discovered, great summer repair projects. A late but welcome arrival was the Snowlink database software specifically written by Dan Judd in Salt Lake City. This program keeps track of all weather and avalanche information in a customized database and allow me to see it graphically on the screen or print it out. This has made my record keeping and statistical analysis simpler and better.

Calls to the recorded advisory were down this year from two years ago (because of the accident, no reliable numbers are available for last year). The fewer number of callers were, no doubt, due to the late start on the season. Also, with big year at the ski resorts there was an understandable hesitation for out-of-towners to drive very far to ski when it was so good at home.

## Media

We made a number of media contacts throughout the winter. Craig Bigler was interviewed by Channel 4 in Salt Lake City, regarding his recovery from last year's tragedy. I was interviewed several times by the local Moab television station and was featured in a short avalanche awareness video that was aired on the local news for a few nights. My boss, Pat Spahr, was also dragged in front of the camera on several occasions when I was not available.

## Education

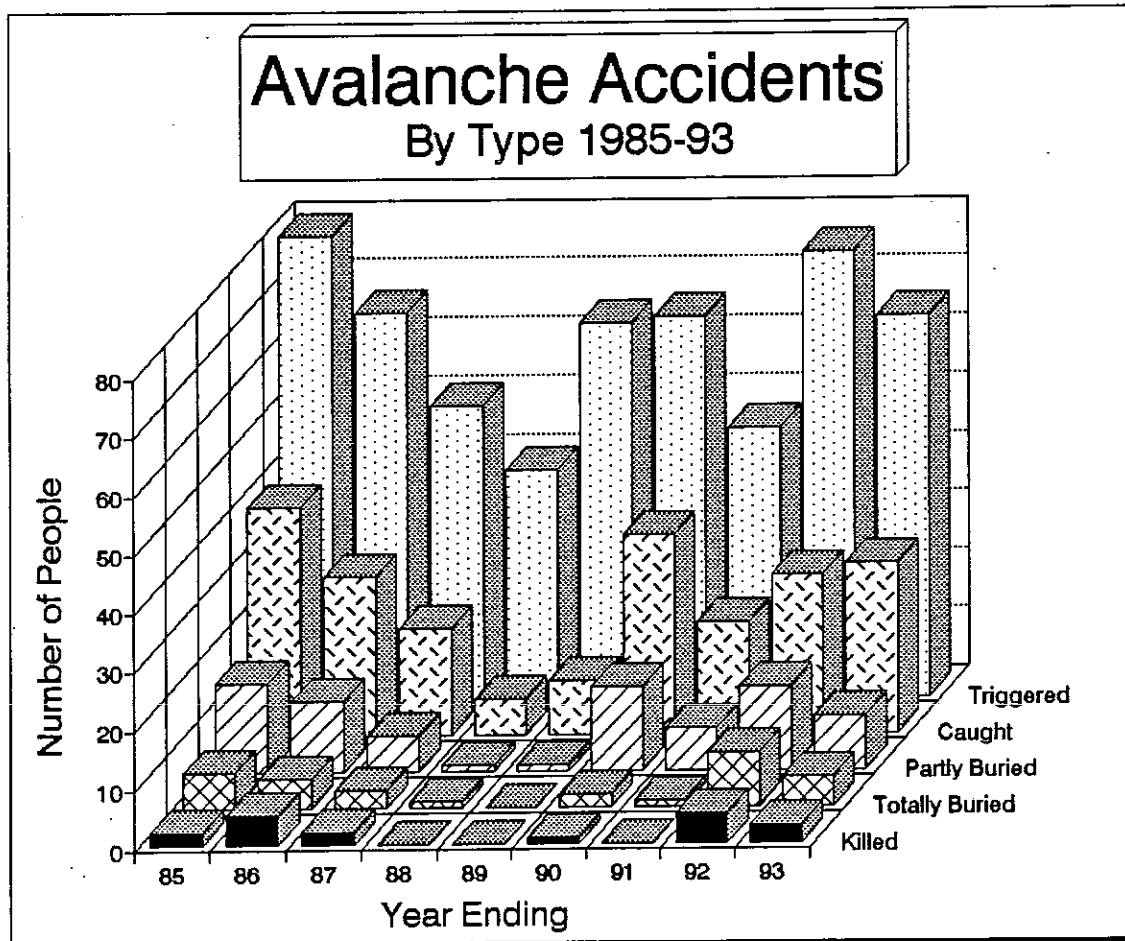
As one of the missions of our avalanche forecast centers is community education, some of my days this winter were spent teaching the Moab residents avalanche safety and rescue skills. On January 16th, I teamed up with Canyonlands Field Institute and Global Expeditions to teach an avalanche class. Bruce Tremper and I taught a two-day class February 19th and 20th. One evening was spent in the classroom and the following day was spent in the field south of Moab in the Abajo Mountains, since a recent large storm had closed the road to the La Sal mountains. On January 24th,

a full scale rescue drill was held above the Geyser Pass trailhead for the southeast Utah winter hasty team. The aforementioned avalanche awareness video was filmed and edited in early March.

Interestingly enough, there was not a single reported avalanche accident in the lasals this winter, while nearly eighty were reported in northern Utah. The accident last year has caused the local community to ski very conservatively this year, myself included.

I made it through my first year largely with the help of several important people. First, Pat Spahr, my supervisor, and everyone else at the Moab Ranger District have been very supportive. Bruce Tremper helped me sort through the bureaucratic and technological challenges and put the program back together. Craig Bigler proved to be a fine weather station sherpa and touring companion this winter, his toils are greatly appreciated. Special thanks go out to Rainee Guymon and Jim Hart of the Bureau of Land Management for all their help the technical aspects of the weather station. I am very grateful for the financial support of the Friends of the Utah Avalanche Forecast Center, which purchased the weather station, rented the computer and paid the salary of Craig Bigler. Last, but certainly not least, the program is successful only because of those who came before me. The hard work and vision of Mark Yates started this program and shaped it into what it is today. Neither Mark's life, nor his death will soon be forgotten.

**"...there was not a single reported avalanche accident in the La Sals this winter."**



# Avalanche Incidents and Accidents

After several years with no avalanche deaths in Utah, the statistics seemed to optimistically indicate a downward trend. We were just beginning to think that our efforts at avalanche education and avalanche forecasting was making the difference. But hubris is one thing that mountains do not tolerate for long.

Five avalanche deaths during the winter of 91-92 and three more deaths this past season put Utah well over our average of 1.4 deaths per year. If the pattern of the past two seasons continues Utah's average will rise to 4 deaths per year, second only to Colorado in annual deaths due to avalanches. This rise in avalanche fatalities is also occurring across the country. Both Colorado and the U.S. have broken previous records for avalanche deaths this year. The U.S. total is up to 27 as of this writing, breaking the previous record of 23 and Colorado has broken their old record of 11 with 12 this year.

Snow conditions don't seem to be the deciding factor, as last year was a less than average snow year while this year was a well above average one. More than likely, the statistics reflect the fact that more and more people are backcountry skiing, snow boarding and snowmobiling. Each season, we seem to inch closer to a European pattern of winter mountain use, where large populations of relatively avalanche ignorant recreationalists swarm over nearly every square foot of our mountains. If this does occur throughout the western U.S., we can also look forward to European style avalanche fatality rates of around 150 per year.

This season's avalanche fatalities were fairly typical in most respects. First, all were in uncontrolled areas; two were backcountry skiers and one was an out of bounds lift skier. Second, all were killed in relatively small to medium-sized avalanches. And third just like 95 percent of all avalanche accidents, all three triggered the avalanches that killed them.

The skirmish between moving snow and people started after the first big storms in late November and kept up all winter. There were 65 reported human triggered slides, with 29 people caught, 9 partly buried, and 3 killed. Many of these incidences were clustered around storm cycles, with almost 40% occurring between February 12th and February 28th.

It was a rough year on property as well. In the town of Alta, in two separate avalanche cycles, at least two dozen unoccupied cars were either damaged or totalled as they sat overnight in parking lots. One lucky vagabond had planned on spending the night in his car but a local bartender talked him out of it and offered him a space on the floor instead. He went to his car the next morning to find it completely packed with snow and totalled.

Near Sundance ski area, two houses were hit by a large avalanche on February 26th. One very expensive house which was badly damaged in

## Record Avalanche Fatalities Nationwide

**"There were 65 reported human triggered avalanche in the backcountry, 29 people caught, 9 partly buried, 3 killed."**

**"...in two separate avalanche cycles, at least two dozen unoccupied cars were either damaged or totalled."**

February of 1986 was finally finished off. The foundation was all that remained. Another nearby house was damaged. Arguments between structures and avalanches are often quite one sided, and this was a spectacular lesson for all involved. Finally, there was uncountable property damage on the valley floor--all the way from Logan to Provo--from roof slides, bank slides and general roof collapses from the heavy snow loads. No one was killed or injured in any of these, but at least on one occasion, we issued an avalanche warning which included roof slides on the valley floor.

Avalanche incidents with humans from late November through early January often coincided with new snowfall, strong winds, holidays and weekends. Most involved new snow soft slabs. Once again, several people got relatively inexpensive lessons; several skiers and boarders went for rides, and two skiers in separate incidents were buried with only a hand out, and promptly rescued by their companions.

### **Close Call at Bridal Veil Falls**

In one close call, on January 8th, two ice climbers from Pocatello were sleeping in their camper at the bottom of Bridal Veil Falls in Provo Canyon. Although it was snowing hard, they apparently didn't realize that they were camped at the bottom of a major avalanche path. In the middle of the night, a large avalanche descended over Bridal Veil Falls and rolled their truck over several times and partially buried it. They had to dig themselves out with a tea cup and they escaped with only minor injuries and a great story.

### **Close Call at Park West**

Perhaps the luckiest cheap lesson was a patroller at Park West who was not only totally buried in an early season avalanche, but he was alone. This, of course, usually means certain death, but by a stroke of good fortune, his partner, who had taken a different route, realized he might have triggered a slide and got someone to check the area. Defying the odds, they had him out and he even escaped without injuries. Unfortunately, several other avalanche lessons in the following months didn't come so cheaply.

### **Sundance**

The first avalanche death in Utah occurred on January 16th, when two downhill skiers went under a rope line and entered a closed area at Sundance Ski Area. The first skier cut into Bishop's Bowl, a 40 degree, northwest facing slope at 7000' and triggered a 12 inch deep, 60 foot wide slab. The slide caught and buried him, and the ski patrol found him by a probe line 38 minutes later. At the time of the slide, a front was crossing the area, bringing light to moderate amounts of wet, heavy snow to the area.

The avalanches started seriously nipping at people's heels again in February, on the Friday before Presidents Day weekend. During February 12th-15th, there were 10 reported incidents. New snow amounts weren't particularly impressive, but numbers of people in the backcountry for the three day weekend were, as people scurried into every nook and cranny in the competition for powder.

The February cycle continued, with four skiers taking rides on Sunday, the 21st, two partial burials in the next few days and it culminated on the

25th, with a serious injury to an experienced avalanche professional, and the death of a backcountry skier.

This second avalanche fatality of the season occurred at the end of a major storm, in which 38 inches of snow with 5.65 inches of water fell at Alta over several days. Three locals were skiing above the Pinecrest subdivision in Emigration Canyon on Thursday afternoon. They had tried to call the avalanche advisory that morning but, as is happening with greater frequency, they kept getting busy signals despite 9 rotating telephone lines being available. They went out without knowing about the seriousness of the conditions. It was 5 pm and their 5th run of the day. Pat Ellsworth triggered a slide on a 36 degree rollover on a southeast facing slope at 8100 feet--exactly the kind of slope our avalanche advisory was calling high hazard. The slide was 100 feet wide, 2.5 to 3 feet deep, and was a repeater which ran on an old ice crust. His partners located him by beacon search, and then dug him out of the dense debris. Estimated burial time was 25 to 30 minutes, and he did not respond to CPR.

Backcountry incidents decreased for most of March and April, partially due to a stable underlying snowpack and well below normal snowfall totals for those two months. Powder gluttons had either gotten their fill, or were off on spring vacations to sunny warmer climes, and other sports. One close call came, once again, in Provo Canyon on the afternoon of March 17th, where a semi-truck was knocked off the road by a wet slide. He escaped without injury but he thought for awhile that he was going into the river.

But springtime in the Wasatch is most often more like Winter than Spring and this Spring was no exception. The snows came once again and the third avalanche death occurred on a truly high hazard day. By April 3rd, 18 inches of new snow deposited with strong winds looked deceptively serene as Saturday dawned clear and calm. It was also the first great powder day in over a week. The group of locals were well prepared and approached their objective with some care, but as is the case in most avalanche accidents, they missed or misinterpreted several important clues.

The touring party chose to ski a steep, north facing chute in Wolverine Cirque--once again, exactly kind of slope our avalanche advisory was calling high hazard. Just like the other two fatalities of the season, they did not reach the forecast before they went out. They tried to call but apparently called the wrong number. Since they had heard the rumors of Forest Service budget cuts to the UAFC, when the voice over the telephone told them that the line was "discontinued or no longer in service," they assumed that we were out of business for the season. Our advisory, in fact, was saying, "The hazard of human triggered avalanches is high today on slopes above 8,000' and steeper than 35 degrees, especially on any slope with recent deposits of wind drifted snow. This was precisely the kind of slope they decided to ski.

Roman Latta was the second skier down the 45+ degree chute and he triggered a 12 inch soft slab, which caught him and carried him down. When the snow hit the lower angled slope at the bottom of the chute, it

## Pinecrest

## Wolverine Cirque

triggered a much larger slide, which broke about 3 to 5 feet deep and 200 to 300 feet wide. Roman was buried 6-8 feet deep near the toe of the slide. Recrystallized graupel from a late March storm was the probable weak layer of the second slide. The other four members of his touring party responded quickly, locating him by a beacon search. Solitude ski patrol observed the slide, contacted Wasatch Powderbird Guides, and a rapid influx of rescuers and medical help made it an unusually fast and well organized rescue. But burials of six or more feet deep are almost impossible to survive, and Roman Latta died several days later in the hospital.

The remainder of the season was less eventful. Steady snows continued through mid May giving Alta another major avalanche cycle on May 5th. By this time, every ski area in the state was closed, including Alta and Snowbird and all but a handful of avalanche professionals had gone on their summer vacations. There were a few more encounters with both dry and wet slides in the late Spring but no injuries. By mid May the weather finally noticed that it was nearly Summer, temperatures rose dramatically and the near-record snows began to fill the streams with flood waters.

## Incidents and Accidents 1992-93

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Date	Location	Details
11/23	Park West	Skier triggered, buried, OK
11/29	Hidden Canyon	Skier triggered, carried, came out on top
12/9	Cardiff Pass	Skier triggered, buried with hand out, OK
12/9	Reynolds Peak	Sympathetic to skier
12/9	Desolation Lake	Sympathetic to skier
12/10	Patsy Marley	Sympathetic to skier
12/10	Dog Leg Chutes	Skier triggered, carried, not buried
12/12	Double Top Mnt, Uintas	Snowmobile triggered, buried two machines
12/14	Hidden Canyon	Skier/boarder released
12/24	Alexanders, Gobblers	Soft slab released after it had been skied.
12/27	Scotts Bowl	Boarder triggered, 150' ride
12/27	Days Fork	Skier triggered soft slab
12/27	Dog Leg Chute	Skier triggered, covered 10 sets of tracks
12/28	Park City - Daly Bowls	Several skier triggered soft slabs
12/29	Sunset Peak	Skier triggered
12/29	West Bowl, Silver Fork	Skier went for ride
1/1	Logan-Green Canyon	Skier triggered
1/3	Bountiful Peak	Skier triggered soft slab
1/3	Emma Ridge, Alta	Skier triggered, carried, not buried, lost ski
1/4	Flagstaff	Skier triggered hard slab
1/15	Cardiff-Superior Ridge	Skier triggered cornice, triggered class 3 hard slab
1/16	Sundance closed area	Skier triggered in closed area, buried, <u>killed</u>
1/19	Silver Fork	Skier triggered
1/19	Park City-North Monitor	Skier triggered, went for ride

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1/20	Provo area mountains	Skier triggered soft slabs
1/24	Tuskarora	Released by skier triggered cornice
1/26	Alexander Basin	Sympathetic to skier
1/30	Little Superior	Skier triggered hard slab
2/3	Cardiff Bowl	Skier triggered wet slide
2/5	Stairs Gulch	Skier triggered hard slab
2/9	Park City-Daly Bowl	Soft slab sympathetic to skier
2/12	Toledo Bowl	Released by 2nd skier, caught, but escaped to side.
2/12	Flagstaff Face	Soft slab triggered by snowboarder
2/13	Logan-Steammill Peak	Skier triggered, caught, escaped to side after 75' ride
2/13	Mill B Fork	Skier triggered soft slab
2/13	Bonkers, Broad Fork	Snowboarder triggered
2/13	Milly Back Bowl	Skier triggered
2/14	Miller Hill, Am. Fork	Skier triggered, lost pole and ski
2/14	Mineral Fork	Two skiers caught, carried 60', dug into bed surface, class
2/15	Hogum Cirque	Skier triggered soft slabs
2/15	Wolverine Bowl	Skier triggered soft slab
2/17	Monte Cristo Ridge	Skier triggered soft slab
2/18	Logan - Wellsvilles	Caught 2 skiers, but escaped
2/20	Silverfork	Skiers hit by natural from above, buried to above knees
2/20	Park West - Home Run	3rd skier, went for ride, not buried
2/21	Rockhouse, BCC	Skier triggered, went for ride
2/21	Reynolds Peak	Released by a skier triggered cornice
2/21	Butler Fork Trees	Skier triggered, went for ride, grabbed trees
2/21	Summit Park	Skier triggered, went for ride, dug into bed surface
2/21	Ogden, Strawberry Bowl	Skier triggered, went for ride
2/22	West Renyolds	Sympathetic to skier
2/22	Uintas	Snowmobile caught, but OK
2/24	Summit Park, Toll Cyn	Large soft slab triggered by skier
2/24	Soldier Peak	2 slides sympathetic to skiers
2/25	Pinecrest	Skier triggered soft slab, caught and <u>killed</u>
2/26	Sound of Music, PW	3 caught, 1 injured
2/28	Scotts Hill area	2 boarders caught and partially buried, both OK
3/6	Emma Ridges	Snowboarder triggered wet slab
3/12	Deaf Smith	Skier triggered, went for ride, dug into bed surface
3/14	Logan - Steammill Pk	Skier triggered, went for ride, dug into bed surface
3/19	Cardiff Fork	Three slides, sympathetic to skiers
3/20	Murdock North Bowl	Triggered by skier
3/20	Tuskaora Shoulder	Triggered by skier
4/3	Wolverine Cirque	Skier triggered, buried 6-8' deep, <u>killed</u>
4/3	Upper Days Fork	Triggered on ski cut, got out to side
4/3	Silver Fork	Skier triggered, new snow
5/8	McConkies, Park City	Skier triggered, lost poles

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<b>68 Total backcountry incidents</b>	<b>9 Partly buried</b>
<b>30 Caught</b>	<b>5 Completely buried</b>
	<b>3 Killed</b>

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# Backcountry Observer Program

The excellent volunteer observer program developed over the last several years by Brad Meiklejohn continued to provide indispensable snowpack information to the staff forecasters. Reduction in available field time, especially in the latter portion of the season, increased our dependence on our observers.

For the Salt Lake and Ogden areas, Brad's system and network of participants continued to function without much effort on the part of its inheritors. The only change in the system was a minor streamlining of the payment procedure.

The Logan area suffered a marked decrease in observer participation. Brad carefully nurtured the Logan observers and this decrease probably reflects his absence.

Our observers possess a high skill level in avalanche assessment. At our standard rate of \$10 per observation, the government receives an excellent bargain. Total cost this year to the Forest Service was \$1500. Two additional backcountry observers, Bob Athey and Craig Bigler, work for the Friends of the Utah Avalanche Forecast Center at a total cost of \$2200.

Observer	Nov	Dec	Jan	Feb	Mar-Apr	Total
Bob Athey (SLC) *	12	16	23	17	29	97
Brad Bodily (Ogden)	4	6	6	6	4	26
Mark Bowen (Logan)		2	2			4
Greg Dolhausen (SLC)	5	6	8	7	2	28
Rip Griffith (Park City)	14	21	25	18	3	84
Kevin Kobe (Logan)		3	4			7
Craig Bigler (Moab) *	Contract Observer					

**Total 246**

*\* Both Bob Athey and Craig Bigler work for the Friends of the Utah Avalanche Forecast Center. All others work for the Forest Service volunteer program.*



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# Avalanche Education

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Education continues as one of the primary missions of the Utah Avalanche Forecast Center. It's also one of our most enjoyable duties since it's the only time we actually have face to face contact with our clientele.

Actually one of the best tools for avalanche education is the over 250 avalanche advisories we put out each winter. The daily advisories provide information on snowpack, avalanche, and mountain weather conditions in a simple and entertaining style which has become our trademark. It's challenging task to make the advisories simple enough so that the novice can understand them, yet technical enough for the aficionados. But, through the years, we have come up with a formula which seems to work well for our broad range of customers. One Logan skier observed that, "You could get a whole avalanche education just by listening to our recording on a daily basis."

But dispensing information is only part of the job. If our listeners don't have the knowledge and background to understand this information, they may either misinterpret it, misuse it or just plain ignore it. The better educated the public and our listeners, the more useful our daily advisories will be. The bottom line is that backcountry travelers not only need the information provided by our advisories, but they need the avalanche education to put it to use.

Once again, our free, public avalanche talks were well attended this winter. We gave 23 talks, which reached 2,110 people--some of them in overcrowded halls where many people were turned away. It's obvious to us that the public has an insatiable thirst for avalanche education, as long as it's presented in a simple and entertaining way. Through the years we have amassed a large library of avalanche education slides and videos--definitely one of the best in the country--and we have honed our presentations down to the essential fundamentals and learned how to present them in an entertaining style. Each season we receive many more requests for our talks than we could possibly deliver. For smaller groups, we often lend them a video free of charge.

In addition to providing information, these talks and clinics allow the public to meet us in person, ask questions, and help us develop a rapport with our clientele. We're already brainstorming for next winter, and have several new ideas for expanding our standard talks. We are also working with the newly formed Utah Snowboard Association, which will provide us with an additional forum for avalanche education.

But the best way to learn about snow stability evaluation is to go out and look at snow in the field. Utah Avalanche Forecast Center staff members organized and/or participated in eight different half-day to 3-day outdoor workshops, which involved 205 people. The three day intensive avalanche classes still remain the best way for people to learn how to avoid triggering

## **Avalanche Advisories An Education in Itself**

**"It's obvious to us  
that the public has an  
insatiable thirst for  
avalanche education,  
as long as it's  
presented in a simple  
and entertaining  
way."**

## Budget Cuts and Avalanche Education

avalanches, and if they fail, how to rescue their partner in time to save their life.

Unfortunately, because of budget cuts for the coming seasons, we may have to curtail many of these educational services unless outside funding can make up the shortfall. To add another unfortunate twist, because of the present ban on honorariums for all federal employees, we can not teach avalanche classes even on our days off, unless we do it voluntarily. Although we often do volunteer work, because of our already overworked schedules, we can only handle some of the many requests without suffering burn-out. This is doubly frustrating because we are more qualified than most to teach avalanche classes, and because of the combination of limited Forest Service funding and the ban on earning money on our own time, we will only be able to handle a fraction of the requests made for our avalanche education talks.

The new Forest Service National Avalanche Center, in Salt Lake City, has taken some of the burden for avalanche education off our shoulders, but much of their educational efforts are directed at a national, instead of a local, audience. Since avalanche education is a critical link in the prevention of avalanche fatalities, we hope that outside funding sources can make up the shortfall and help prevent Utah's avalanche fatality rate from rising to even higher levels.

## Avalanche Talks

Date	Forecaster	Location	Topic	No.
10/28	Tremper	ISSW	Computer apps.	350
11/17	Staff	REI	Avi Awareness	200
12/2	Staff	Univ of Utah	Avi Awareness	80
12/5	Staff	Spruces	Beacon Workshop	24
12/10	Soucie/ Kimbrough	Uinta Nat'l Forest, Provo	Avi Awareness	25
1/6	Kimbrough	AAI	Avy Problems	25
1/9	Tremper	Wasatch Mtn Club	One day course	75
1/9	Lees	AAI	Snow Stability	24
1/10	Soucie	AAI	Terrain/Routes	24
1/16	Lees	Sierra Club	Avi Awareness	15
1/16-18	Staff	Brighton	3 day Workshop	26
1/27	Kimbrough Lowe/Soucie	Univ of Utah	Avi Awareness	25
1/30-2/1	Tremper	Alaska Mnt. Safety Center	3 day Workshop	30
2/6	Lees	Spruces	Beacon Workshop	8
2/9	Staff	REI	Avi Awareness	180
2/9	Tremper	Park City Jr High	Avi Basics	400

2/9-11	Kimbrough	Far West Ski Patrol Assoc.	3 day Workshop	40
2/10	Kimbrough	Squaw Valley	Avi Rescue	400
2/13-15	Lowe	Alaska Mnt. Safety Center	3 day Workshop	30
2/17	Kimbrough/ Lees	Utah State Univ	Avi Awareness	75
2/19	Tremper	Moab public	One day course	20
2/26	Kimbrough	Utah State Univ	UAFC Operations	30
3/6-8	Lees	Alaska Mnt. Safety Center	3 day Workshop	32
3/20	Soucie	Brighton, Avi Rescue Dogs	Avi stability/ beacons	15
<b>Total</b>				<b>2110</b>

## Media

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Our office telephone number is well known to the local media. Whenever there's any kind of significant avalanche action in the mountains, you can count on a steady stream of calls from newspapers, radio and television reporters. In fact, after a significant avalanche accident, we try to have two people staffing the office--one to hold down the regular duties, and the other to talk to the media.

Local contacts include almost every single newspaper, magazine, radio and television station. National contacts often include some of the major television networks, National Public Radio, several national magazines and newspapers. In previous seasons, we laboriously tallied each media contact and individually listed them in the season report. But this season, we finally gave up. We estimate about one hundred media contacts per season.

# Budget

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**"The Utah Avalanche Forecast Center is at a crucial turning point in its history."**

## Fundraising Efforts

The Utah Avalanche Forecast Center is at crucial turning point in its history. In an effort to reduce the national deficit, Forest Service-wide cutbacks will also affect the UAFC. The Wasatch-Cache National Forest management team decided to dramatically reduce UAFC funding for the coming season. Forest Service funding for the 1994 fiscal year will be \$40,000, which is about 60% of our current level of \$68,000, and may drop to 25% for 1995.

To put these funding cuts in perspective, although the UAFC receives nearly twice the call rate of the other two regional avalanche advisory programs in Colorado and Washington, these cuts will reduce the UAFC to less than a quarter of their budgets.

Because the UAFC is such a popular and integral part of the community, it was felt that the UAFC stands a good chance of receiving community financial support. Although it may be difficult to make up for this shortfall, we hope that a more diversified funding source will ultimately make the UAFC stronger because of a greater community involvement in the program.

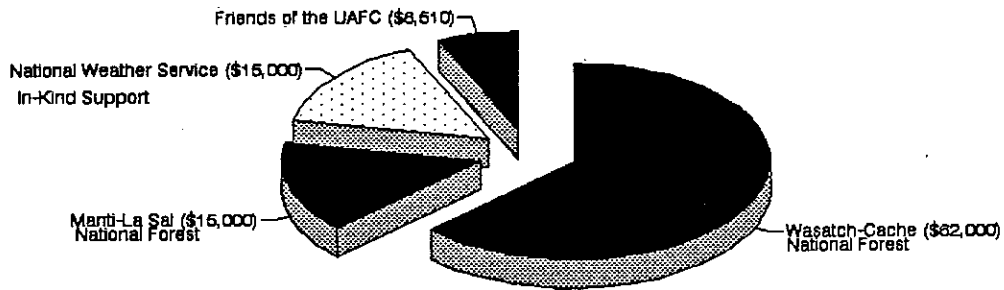
Fortunately, several years ago the Friends of the Utah Avalanche Forecast Center was set up as a tax-exempt, non-profit organization to raise funds for the UAFC. The Friends of the UAFC has evolved into an effective organization and with the greater urgency from recent budget cuts, it has pushed it into overdrive. As of this writing, the Friends of the UAFC has had a series of meetings to plan strategy and delineate tasks. These meetings have included several of the most influential and respected members of the community. Marilee Latta, whose son Roman was killed in an avalanche this winter, has agreed to spearhead the fund raising effort. Through her previous fund raising experience and her influential community connections, she hopes to help the Friends of the UAFC make up for any funding shortfalls.

In the short term, the Friends of the UAFC is looking at grants, donations, sponsors and sales of money-making promotional items. In the long term, the Forest Service hopes to develop partnerships with the State of Utah and County governments. We view this diversified community ownership in the UAFC as a positive development which will ultimately create a stronger program.

Looking at the worst-case scenario, if the funding does not materialize, we will be forced to cut back services. Leading candidates for cuts include: avalanche advisories for areas outside of the Salt Lake area, avalanche education, weather forecasting services for our cooperators, and the volunteer observer program. We believe all these services contribute to Utah's low fatality rate and we hope not to have to make any of these hard choices. The UAFC is clearly one of the most effective avalanche advisory services in North America, and we believe that if the Forest Service and the community work together, we can keep it that way.

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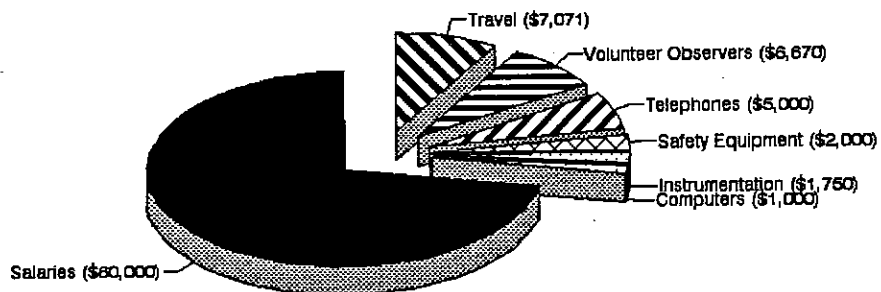
### UAFC Budget Where the Money Comes From



Total cash funding is \$83,500 which includes both Wasatch and La Sal branches

National Weather Service contributes various in-kind support

### UAFC Budget Where the Money Goes



Includes both the Wasatch and La Sal Branches

# APPENDIX

## MONTHLY CALL RATE - SALT LAKE SHORT RECORDING

	NOV	DEC	JAN	FEB	MAR	APR
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

## 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

\* Numbers from 1987 to 92 for Logan, Ogden, Provo and Park City are very conservative estimates based on spot checks and yearly totals from past seasons. Accurate call counters were installed at all sites this season.

**TOTAL CALLS VERSUS TOTAL ALTA SNOW FOR THE SEASON**

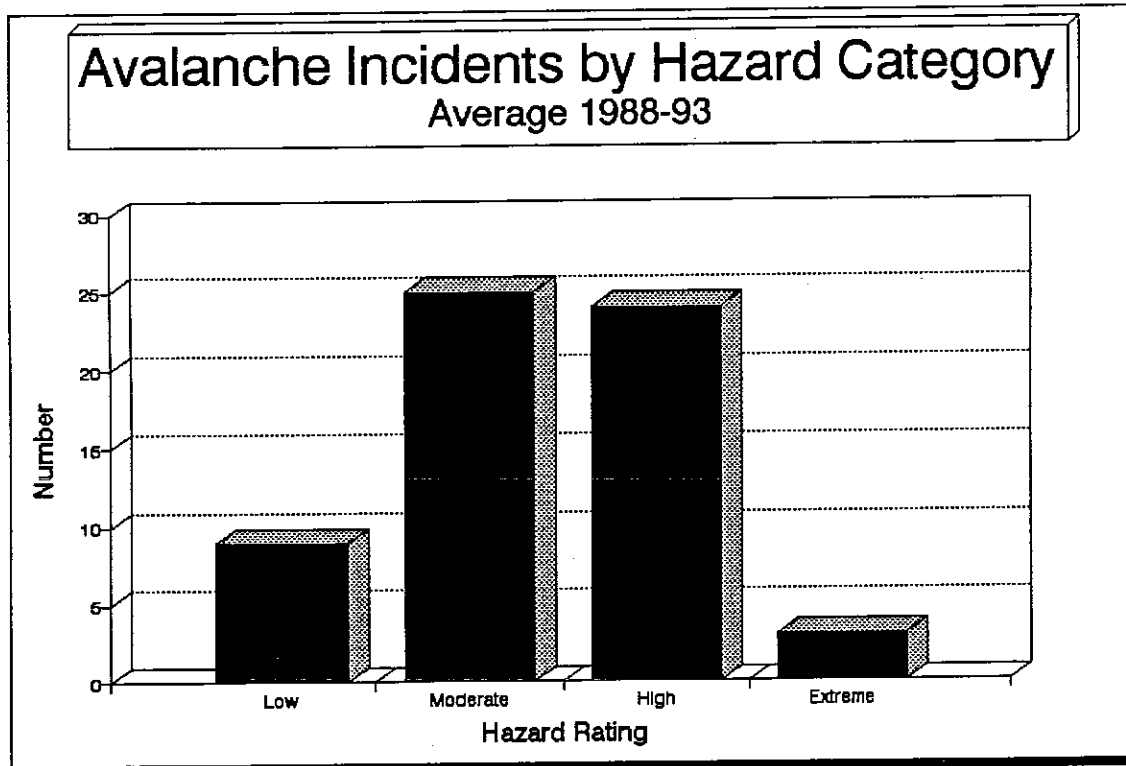
	<b>CALLS</b>	<b>ALTA SNOW (IN.)</b>
1976-77	6,522	314.5
1977-78	11,258	524.5
1978-79	9,924	588.0
1979-80	14,469	514.0
1980-81	30,736	391.0
1981-82	41,610	696.0
1982-83	53,315	637.0
1983-84	54,325	743.5
1984-85	43,498	457.0
1985-86	52,322	599.0
1986-87	50,760	378.0
1987-88	53,000	410.3
1988-89	67,621	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

**BACKCOUNTRY AVALANCHE INCIDENTS**

<b>YEAR</b>	<b>TRIGGERED</b>	<b>AT LEAST</b>		<b>TOTALLY</b>	<b>KILLED</b>
		<b>CAUGHT</b>	<b>PARTLY BURIED</b>	<b>BURIED</b>	
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

## Avalanche Incidents by Hazard Category

	LOW	MODERATE	HIGH	EXTREME
1988-89	16	37	11	0
1889-90	4	25	35	1
1990-91	11	15	15	0
1991-92	4	20	36	8
1992-93	10	26	23	6
5 YEAR AVG (1988-93)	9	25	24	3



*Most avalanche incidents occur in terrain rated as moderate hazard. In low hazard terrain there's simply not enough human triggered potential. People tend to stay away from terrain we rate as extreme hazard. But in the vast middle ground of high hazard and especially moderate hazard, the snow is stable enough to allow a person to cross some slopes but there's just enough booby traps around where someone without good avalanche skills will quickly get into trouble.*



# Examples of Avalanche Advisories

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ZCZC SLCWRKSNW SLR  
TTAAOO KSLC DDHHMM

GOOD MORNING, THIS IS TOM KIMBROUGH WITH YOUR BACKCOUNTRY AVALANCHE AND MOUNTAIN WEATHER INFORMATION. TODAY IS SATURDAY, FEBRUARY 27, AT 7:30 A.M. THE UTAH AVALANCHE FORECAST CENTER IS BROUGHT TO YOU BY THE WASATCH-CACHE NATIONAL FOREST IN PARTNERSHIP WITH THE NATIONAL WEATHER SERVICE.

I HAVE A LITTLE STORY FOR YOU THIS MORNING..... YESTERDAY, THREE OF THE MOST EXPERIENCED AND AVALANCHE WISE BACKCOUNTRY SKIERS IN THE WASATCH WERE OUT ON THE EAST SIDE OF THE RANGE. THEY WERE CHECKING OUT THE SNOW PACK STABILITY AND ALSO LOOKING FOR A LITTLE POWDER SKIING. IN AN AREA THAT THEY ARE VERY FAMILIAR WITH, THEY CAREFULLY EVALUATED THE CONDITIONS WITH SEVERAL SNOWPITS, THEN STARTED WORKING ONTO THE SLOPE. ALL INDICATIONS WERE OK. THE FIRST PERSON PUT A HARD SKI CUT INTO THE TOP OF THE SLOPE. STILL OK. THEY EASE IN A LITTLE FARTHER AND POKE AROUND A LITTLE MORE. STILL OK. THEN THEY SKIED ONE AT A TIME. NO PROBLEMS. THEY HEAD BACK UP, STILL KEEPING THEIR EYES OPEN. THEY MAKE ANOTHER CAREFUL RUN. NO PROBLEM. THEY ARE GOING BACK UP THEIR SKIN TRACK FOR A THIRD RUN WHEN THE SLOPE PULLS OUT BIG TIME. IT BROKE VERY WIDE, TAKING OUT THE NORTH, EAST AND SOUTH SIDES OF THE RIDGE THEY WERE WORKING UP. THE BROKE 2 TO 4 FEET DEEP AND WELL ABOVE THEM. IT RAN ABOUT A 1,000 VERTICAL FEET, BREAKING TREES AS IT WENT. WELL, THIS STORY DOES HAVE A HAPPY ENDING. THESE GUYS FOUGHT THAT SLIDE FOR THEIR LIVES AND THIS TIME THE GOOD GUYS WON. THE PERSON THAT WENT THE MOST DISTANCE FINALLY MANAGED TO GET STOPPED BY CLINGING TO THE BED SURFACE AND THE SNOW WASHED OVER HIM. HE WAS STRIPPED OF ALL HIS GEAR, HAT, GLOVES, GLASSES, POLES, SKIS AND SLIGHTLY INJURED, BUT HE STILL HAS HIS LIFE.

IS THE SNOW MORE STABLE THAN IT WAS A FEW DAYS AGO? SURE. CAN A PERSON STILL GET KILLED A SLIDE IN THE BACKCOUNTRY? YOU BET. IS THE HAZARD OBVIOUS? NO IT IS NOT. IF THESE GUYS CAN GET FOOLED, SO CAN YOU AND I. MY ADVICE IS TO BE VERY CAREFUL AND PLAY A CONSERVATIVE GAME IN THE BACKCOUNTRY THIS WEEKEND.

THE NEW SNOW HAS SETTLED SEVERAL INCHES NOW, EASING THE TRAIL BREAKING AND IMPROVING THE SKIING ON LOW ANGLED SLOPES. THE POWDER WILL BE EXCELLENT ON SLOPES LESS THAN 30 DEGREES STEEPNESS, ABOUT AS STEEP AS AN ADVANCED RUN AT A SKI AREA. THERE IS NO REASON TO TAKE A CHANCE ON STEEPER RUNS UNDER THE CURRENT TRICKY AND POTENTIALLY UNSTABLE CONDITIONS.

MOST SOUTH FACING SLOPES WERE BAKED YESTERDAY AND WILL HAVE SHIN BANGING BREAKABLE CRUST.

---

MY PARTNER, BRUCE TREMPER, WENT UP TO LOOK AT THE PINE CREST AVALANCHE YESTERDAY. THIS SLIDE KILLED A BACKCOUNTRY SKIER THURSDAY AFTERNOON. HERE ARE THE STATISTICS: ESE FACING SLOPE AT ABOUT 7,500 FEET. IT WAS A MID SLOPE ROLLOVER OF 36 DEGREES STEEPNESS. THE FRACTURE WAS 2.5 TO 3 FEET HIGH AND ABOUT 100' WIDE. THE VICTIM WAS DUMPED INTO A GULLY AND BURIED ABOUT 3' DEEP. THE SLIDE INVOLVED RECENT ACCUMULATIONS OF SNOW AND RAN ON AN ICE CRUST. BRUCE COULD NOT FIND A DISTINCT WEAK LAYER.

THE HAZARD OF WET SLIDES WILL INCREASE AS THE DAY PROGRESSES. EAST FACING SLOPES WILL BE THE FIRST TO FEEL THE SUN THIS MORNING, FOLLOWED BY THE SOUTH AND WEST FACING SLOPES LATER IN THE DAY.

THE HAZARD OF LARGE AND VERY DANGEROUS HUMAN TRIGGERED AVALANCHES REMAINS HIGH AT MOST ELEVATIONS ON SLOPES STEEPER THAN 35 DEGREES. ON SLOPES BETWEEN 30 AND 35 DEGREES THE HAZARD IS MODERATE.

**MOUNTAIN WEATHER:**

SKIES WILL BE MOSTLY FAIR TODAY WITH LIGHT TO MODERATE SOUTHEAST WINDS. HIGHS AT 8,000 FEET WILL BE NEAR 30 DEGREES AND IN THE TWENTIES AT 10,000 FEET. A STORM SYSTEM WILL PASS THROUGH ARIZONA ON SUNDAY AND COULD GIVE US A FEW SNOW SHOWERS LATER IN THE WEEKEND, BUT ACCUMULATIONS, IF ANY, WILL BE LIGHT.

FOR MORE DETAILED INFORMATION ON SNOWPACK AND MOUNTAIN WEATHER CONDITIONS, CALL 364-1591.

TO REPORT BACKCOUNTRY AVALANCHE CONDITIONS CALL 524-5304 (1-800-662-4140).

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

KIMBROUGH  
NNNN

ZCZC SLCWRKSNW SLR  
TTAAOO KSLC DDHHMM

GOOD MORNING, THIS IS TOM KIMBROUGH WITH YOUR BACKCOUNTRY AVALANCHE AND MOUNTAIN WEATHER INFORMATION. TODAY IS THURSDAY, MARCH 18, AT 7:30 A.M. THE UTAH AVALANCHE FORECAST CENTER IS BROUGHT TO YOU BY THE WASATCH-CACHE NATIONAL FOREST IN PARTNERSHIP WITH THE NATIONAL WEATHER SERVICE.

SNOW AND RAIN SHOWERS CONTINUED THROUGH THE NIGHT, WITH THE ALTA GUARD STATION GETTING ANOTHER 5 INCHES OF WET SNOW OVER NIGHT. THE 24 HOUR TOTAL IS A LITTLE OVER A FOOT. THE STORM TOTAL AT ALTA SINCE SUNDAY IS 32 INCHES, CONTAINING ABOUT 3.5 INCHES OF WATER. THIS IS HARDLY THE GREATEST SNOW ON EARTH. MAYBE THE GREATEST SNOW THIS SIDE OF THE AMAZON RAIN FOREST! THE PARK CITY SIDE HAS RECEIVED ABOUT HALF THAT AMOUNT OF SNOW AND WATER. THE SNOW LEVEL WAS BETWEEN 7 AND 8 THOUSAND FEET YESTERDAY SO WE ARE TALKING WET SNOW EVEN AT 9 AND 10,000. THIS WHOLE WEEK HAS BEEN MUCH MORE LIKE APRIL OR EVEN MAY THAN MARCH.

THE SNOWPACK IS QUITE SENSITIVE. IN ADDITION TO SLIDES PRODUCED BY CONTROL WORK, THERE WERE SEVERAL LARGE SPONTANEOUS AVALANCHES. THE LARGEST THAT I KNOW OF WAS STAIRS GULCH IN BIG COTTONWOOD. THIS ONE WAS ABOUT A QUARTER OF A MILE WIDE AND ABOUT 2 FEET DEEP. I TIPTOED AROUND IN THE BACKCOUNTRY YESTERDAY AND WAS ABLE TO TRIGGER SEVERAL SLIDES ON SMALL TEST SLOPES. YOU DIDN'T NEED A FANCY UNIVERSITY DEGREE TO TELL WHAT THE PROBLEM WAS. THE SNOW WAS UPSIDE DOWN. THERE WERE HEAVY LAYERS ON TOP OF LIGHTER LAYERS. PUSHING A SKI POLE INTO THE SNOW, YOU COULD FEEL UNEVEN RESISTANCE. THERE WAS SOME CRACKING AND OCCASIONAL COLLAPSES. I WAS QUITE UNEASY AND FELT RELIEVED TO GET BACK INTO THE SKI AREA.

DOWN IN THE RAIN ZONE, THE SNOW IS WATER SOAKED. ALTHOUGH SOME CRUSTS MAY HAVE FORMED OVERNIGHT, THE LOW ELEVATION SNOWPACK IS NOT TO BE TRUSTED. ESPECIALLY WHERE THE SNOW IS SITTING ON SMOOTH ROCK SLABS OR SMOOTH GRASSY SLOPES THE WHOLE MESS COULD PEEL OFF.

ONE TROUBLE WITH WET SNOW AVALANCHES IS THAT A BURIED PERSON HAS LITTLE OR NO CHANCE OF SURVIVING DUE TO THE WEIGHT OF THE SNOW AND THE DIFFICULTY OF DIGGING THROUGH THE COMPACTED DEBRIS.

BETWEEN SHOWERS TODAY WE COULD GET SOME CLEARING. THIS COULD QUICKLY TRIGGER WIDESPREAD ACTIVITY ON SUN EXPOSED SLOPES.

AN AVALANCHE WARNING CONTINUES IN EFFECT FOR THE NORTHERN WASATCH MOUNTAINS FROM THE IDAHO BORDER TO SPANISH FORK CANYON NEAR PROVO. THE HAZARD OF HUMAN TRIGGERED AND SPONTANEOUS AVALANCHES IS HIGH ON ALL SNOW COVERED SLOPES STEEPER THAN 35 DEGREES. PEOPLE WITHOUT EXCELLENT ROUTE FINDING SKILLS SHOULD AVOID BACKCOUNTRY TRAVEL. AS SPONTANEOUS AVALANCHES ARE POSSIBLE, ALSO STAY OUT OF RUNOUT AREAS.

MOUNTAIN WEATHER:

SNOW AND RAIN SHOWERS WILL CONTINUE TODAY WITH CLEARING TONIGHT. WINDS WILL BE 10 TO 20 MPH FROM THE NORTHWEST. TEMPERATURES WILL BE IN THE MID TO UPPER 30'S AT 8,000 FEET AND AROUND FREEZING AT 10,000. FRIDAY SHOULD BE MOSTLY FAIR BUT ANOTHER STORM MAY REACH UTAH BY SATURDAY.

FOR MORE DETAILED INFORMATION ON SNOWPACK AND MOUNTAIN WEATHER CONDITIONS, CALL 364-1591.

TO REPORT BACKCOUNTRY SNOW AND AVALANCHE CONDITIONS, PLEASE CALL US AT 524-5304 (1-800-662-4140).

I WILL UPDATE THIS FORECAST BY 7:30 ON FRIDAY MORNING.  
THANKS FOR CALLING.

KIMBROUGH  
NNNN

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# Examples of Avalanche Warnings

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ZCZC SLCSABSLC CSW  
TTAA00 KSLC DDHHMM

UTAH AVALANCHE FORECAST CENTER  
NATIONAL WEATHER SERVICE, SALT LAKE CITY, UTAH

1030 HRS, FRIDAY, JANUARY 8, 1993

## AVALANCHE WARNING

12 TO 18 INCHES OF NEW SNOW IN THE CENTRAL AND SOUTHERN UTAH MOUNTAINS HAS PRODUCED WIDESPREAD AVALANCHE ACTIVITY IN MANY AREAS. THERE IS AN AVALANCHE WARNING IN EFFECT FOR THE WASATCH MOUNTAINS, SOUTH OF SALT LAKE CITY, THE WASATCH PLATEAU, AND THE SOUTHERN MOUNTAINS, INCLUDING THE LA SAL MOUNTAINS. THE HAZARD OF SPONTANEOUS AND HUMAN TRIGGERED AVALANCHES IS HIGH ON ALL SLOPES STEEPER 30 DEGREES. PEOPLE SHOULD AVOID STEEP SLOPES AND AVALANCHE RUNOUT AREAS. BACKCOUNTRY TRAVEL IS NOT RECOMMENDED AT THIS TIME.

THIS ADVISORY DOES NOT APPLY TO HIGHWAYS OR SKI AREAS WHERE AVALANCHE CONTROL IS NORMALLY CONDUCTED.

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)

KIMBROUGH  
NNNN

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ZCZC SLCSABSLC CSW  
TTAA00 KSLC DDHHMM

UTAH AVALANCHE FORECAST CENTER  
NATIONAL WEATHER SERVICE, SALT LAKE CITY, UTAH

0600 HRS, TUESDAY, JANUARY 12, 1993

#### AVALANCHE WARNING CONTINUED

THE AVALANCHE WARNING IN EFFECT FOR THE UTAH MOUNTAINS FROM THE IDAHO BORDER TO THE ARIZONA BORDER WILL CONTINUE. STORM TOTALS OF 3 TO NEAR 5 FT. OF SNOW HAVE BEEN PUT DOWN IN MOST MOUNTAINS AND VALLEYS OF THE STATE. THE HAZARD OF SPONTANEOUS AND HUMAN TRIGGERED AVALANCHES IS HIGH ON ALL SLOPES STEEPER THAN ABOUT 30 DEGREES, EVEN AT LOWER ELEVATIONS. AVALANCHES ARE POSSIBLE ON ANY STEEP SLOPE, INCLUDING THE ROOFS OF HOUSES OR STEEP HILLSIDES IN VALLEY LOCATIONS. IN PREVIOUS HEAVY SNOW EPISODES PEOPLE HAVE BEEN BURIED AND KILLED FROM SNOW SLIDING OFF OF ROOFS. THIS ADVISORY DOES NOT APPLY TO HIGHWAYS OR SKI AREAS WHERE AVALANCHE CONTROL IS NORMALLY CONDUCTED.

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.....IN MOAB, 259-7669. TO CONTACT OUR OFFICE.....524-5304.

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

SOUCIE  
NNNN

## Examples of Mountain Weather Advisories

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ZCZC SLCWRKMTN SLR  
TTAA00 KSLC DDHHMM

\*\*\*\*MOUNTAIN WEATHER FORECAST\*\*\*\*

UTAH AVALANCHE FORECAST CENTER  
THURSDAY DEC. 31, 1992  
1200 HRS.

THE FIRST BANDS OF HIGH CLOUDS ARE JUST REACHING UTAH AND WE MAY GET A

---

CLEAR SECTION BEFORE MORE HIGH CLOUDS COME IN FOR LATER THIS AFTERNOON AND EVENING. THE RIDGETOP WINDS HAVE ALREADY PICKED UP. I WAS HOPING IT WOULD WAIT UNTIL THIS EVENING BUT I SHOULD KNOW BETTER IN A YEAR LIKE THIS. THE RIDGETOP WINDS SHOULD INCREASE TONIGHT AND CONTINUE TO BLOW HARD TONIGHT AND ON FRIDAY FROM THE SOUTHWEST. THE LATEST MODELS SHOW THAT THERE'S A PLENTY OF MOISTURE COMING IN TONIGHT AND ESPECIALLY ON FRIDAY IN WHAT WE CALL AN "OVER RUNNING" SITUATION--WARM AIR COMING IN OVER THE TOP OF COLD AIR--WHICH USUALLY DOESN'T PRODUCE AS MUCH PRECIP AS A NORMAL STORM. BUT WITH ALL THIS MOISTURE WE ARE CERTAIN TO SEE SOMETHING. SO THE STORM LOOKS TO GO SOMETHING LIKE THIS: GOOD MOISTURE ON A STRONG SOUTHWEST FLOW WITH HIGH SOUTHWEST RIDGETOP WINDS THURSDAY NIGHT, FRIDAY AND INTO SATURDAY. THEN A COLD FRONT SHOULD COME IN FROM THE WEST BY SATURDAY MORNING TURNING RIDGETOP WINDS FROM SOUTHWEST TO NORTHWEST AND GETTING MUCH COLDER. THE PRECIP SHOULD CUT OFF FAIRLY RAPIDLY ON SATURDAY NIGHT AS THE FLOW TURNS MORE NORTHEAST-ERLY. TEMPERATURES DURING THE FIRST HALF OF THE STORM SHOULD BE WARM AND SNOW DENSITIES SHOULD BE AROUND 10% OR HIGHER--COULD BE LOOKING AT A SIGNIFICANT REVERSE DENSITY SITUATION. A FIRST GUESS GIVES AREAS FAVORED WITH SOUTHWEST FLOW ABOUT 6 INCHES TO A FOOT OF SNOW ON THE PRE-FRONTAL PART OF THE STORM WITH ADDITIONAL SNOW AS THE FRONT PASSES ON SATURDAY.

	5AM-5PM TODAY	5PM-5AM TONIGHT	5AM-5PM TOMORROW
RIDGE TOP (10,000')			
WIND DIRECTION	220	210	220
WIND SPEED(MPH)	30	35	38
TEMPERATURE	21	22	24
TEMPERATURE(8,000')	19	28	25
WEATHER	S-	S	S
CLOUD COVER	OVC	OVC	OVC
SNOW LEVEL	7K	7K	6K
SNOW DENSITY		10%	10%
LIGHTNING			

QUANTITATIVE PRECIPITATION FORECAST (INCHES OF SNOW):

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

TREMPER  
NNNN

ZCZC SLCWRKMTN SLR  
TTAA00 KSLC DDHHMM

\*\*\*\*MOUNTAIN WEATHER FORECAST\*\*\*\*

UTAH AVALANCHE FORECAST CENTER

WEDNESDAY JAN. 20, 1993  
1400 HRS.

OUR DIRTY RIDGE HAS CLEANED IT'S SELF UP FOR THE NEXT 24 HOURS. THE PACIFIC COAST LOW IS TRACKING NORTHEASTWARD TOWARDS VANCOUVER, AND THE TAIL END WILL PROBABLY JUST GIVE US CLOUDS AND A FEW SNOW FLURRIES TONIGHT.

TOMORROW, THE WINDS AND CLOUDS SHOULD BE INCREASING AHEAD OF ANOTHER FEATURE THAT THE MODELS WANT TO BRING IN LATE THURSDAY NIGHT OR FRIDAY MORNING, AND WHICH LOOKS MORE SIGNIFICANT. ANY PRECIPITATION WE GET BEFORE THE FRONT WILL BE VERY WARM AND HEAVY, WITH SNOW LEVELS 6500-7000. ONCE THE FRONT PASSES, TEMPERATURES SHOULD COOL DRAMATICALLY, BUT THE TEMPERATURE DIFFERENCE WILL GIVE CHANCE OF LIGHTENING WITH THE FRONTAL PASSAGE. NO SNOW ESTIMATES FOR THIS ONE, BUT THERE WILL BE NORTHWEST FLOW FRIDAY INTO SATURDAY. SUNDAY AND MONDAY LOOK DRIER.

	5AM-5PM TODAY	5PM-5AM TONIGHT	5AM-5PM TOMORROW
RIDGE TOP (10,000')			
WIND DIRECTION	W	W	W
WIND SPEED(MPH)	15-30	20-40+	20-40+
TEMPERATURE	15	24	18
TEMPERATURE(8,000')	18-20	33-35	28-30
WEATHER	S-	S-	
CLOUD COVER	SCT>OVC	OVC	OVC
SNOW LEVEL		6500	6000
SNOW DENSITY		9-12%----->	
LIGHTNING		NO ----->	

QUANTITATIVE PRECIPITATION FORECAST (INCHES OF SNOW):

	TODAY 5AM-5PM	TONIGHT 5PM-5AM	TOMORROW 5AM-5PM
SNOWBASIN/POWDER MTN	T	3	2-4
PARK WEST	T	2	2-4
PARK CITY/DEER VALLEY	T	2	2-4
SOLITUDE/BRIGHTON	T	2	2-4
ALTA/SNOWBIRD	T	2	2-4
SUNDANCE	T	1	1-3

LEES  
NNNN



# Letters of Support

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**BLACK DIAMOND**  
EQUIPMENT, LTD.

2084 East 3900 South  
Salt Lake City, UT 84124 USA  
TEL (801) 278-5552  
FAX (801) 278-5544

April 16, 1993

Evelyn Lees  
Tom Kimbrough  
Al Soucie  
Utah Avalanche Forecast Center  
337 North 2370 West  
Salt Lake City, Utah 84116

Dear Evelyn, Tom & Al:

Thanks for your gracious note. It's our pleasure and honor to work with you three and though I only know Tom, I feel like I've met Evelyn & Al having heard you both on the telephone so frequently this past winter.

You folks do a wonderful job and one that all of us at Black Diamond appreciate.

Very best regards,  
BLACK DIAMOND EQUIPMENT, LTD.



Peter Metcalf  
C.E.O./President

PM:eh,

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# NOVA

Produced for PBS by  
WGBH  
125 Western Avenue  
Boston  
Massachusetts  
02134

Telephone 617-492-2777  
Telex 710-330-6887  
Fax 617-787-7843

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January 21, 1993

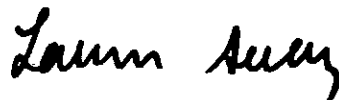
Bruce Tremper  
Tom Kimbro  
Avalanche Forecast Center  
National Weather Service/Forest Service  
337 North, 2370 West  
Salt Lake City, UT 84116

Dear Tom and Bruce:

Thank you for the useful, though brief, visit earlier this month. It was definitely a great week to have been in Little Cottonwood Canyon researching avalanches. The only down side was that the snow slowed us down; we had hoped to have time to go out in the field with one of you. Still, it was very helpful to at least meet with you, and to see the story from the point of view of protecting back country skiers.

We hope to return next winter for filming, but will be in touch before then to let you know how we're progressing with the project. Thanks again.

Sincerely,



Lauren Seeley  
Producer, NOVA



David Breashears  
Producer, Arcturus Motion Pictures



State of Utah  
DEPARTMENT OF NATURAL RESOURCES  
UTAH GEOLOGICAL SURVEY

Norman H. Bangertter  
Governor

Dee C. Hansen  
Executive Director

M. Lee Allison  
State Geologist

2363 South Foothill Drive  
Salt Lake City, Utah 84109-1491  
801-467-7970  
801-467-4070 (Fax)

October 5, 1992

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

Dear Bruce:

A formal letter of thanks for your editorial assistance in the avalanche portion of "Utah Natural Hazards Handbook." Long over due thanks. Seeing as I haven't been in your area to drop a copy of the handbook off to you, I finally am getting around to sending you a copy. Actually, two copies are enclosed for you.

Thanks again Bruce for all your valuable and valued help! (See acknowledgements in handbook).

Fred May has extra copies of the handbook if you need more.

Best regards,

A handwritten signature in cursive script that reads "Sandy".

Sandy Eldredge  
Information Geologist

P.S. OK, OK, informally - thanks tons and I promise to stop by your new abode!!!!

P.P.S. Good luck with your writing!

Susan Adams  
605 N. Almon #31  
Moscow, ID 83843  
(208) 883-0676

January 14, 1992

Susan Giannettino  
Forest Supervisor  
Wasatch-Cache N.F.  
8230 Federal Building  
125 S. State St.  
Salt Lake City, UT 84138

Dear Ms. Giannettino:

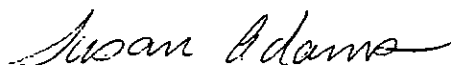
I am writing to inform you of the outstanding job done by Doug Abromeit and Bruce Tremper in conducting the avalanche awareness clinic in McCall, Idaho on December 18 and 19, 1992. The clinic was the best U.S.F.S. training session of any kind that I have attended in my seven years with the agency. Doug and Bruce were informative and enjoyable. I believe that the clinic greatly increased the avalanche awareness of all participants.

The professional yet humble manner with which Bruce and Doug approached the topic of avalanches was impressive. They continuously expressed their respect for the power of avalanches. They taught us things which could save a life and scared us just enough to encourage caution but not enough to preclude our enjoyment of winter recreation.

Little comfort comes with learning about avalanches if the people with whom one skis do not share the same knowledge. Herein lies the real virtue of this clinic; because Doug and Bruce have excellent reputations as avalanche "gurus" and because the clinic was free, almost everyone with whom I ski sacrificed a day of powder skiing to attend the clinic. Everyone felt it was a worthwhile day. I feel much better knowing that my friends were learning along with me.

Thank you for lending us Doug and Bruce for this fine clinic. I hope to see them here for more clinics in the future.

Sincerely,



Susan Adams

United States  
Department of  
Agriculture

Forest  
Service

Sulphur  
Ranger  
District

P.O. Box 10  
Granby, CO  
80446  
303-887-3331

---

Reply to: 2390

Date: February 3, 1993

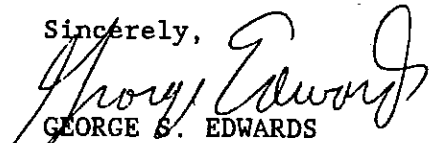
Bruce Tremper  
National Avalanche Forecast Center  
337 North 2370 West  
Salt Lake City, UT. 84116

Dear Bruce:

I would like to express our thanks and appreciation to you for the successful avalanche courses that you taught to our Forest Service employees, Division of Wildlife personnel, and the public seminar that you participated in. The classes heightened our awareness to the potentially dangerous environment that we all work and play in. Although Doug Abromeit could not attend we appreciate his help organizing these classes.

I would like to express our condolences for your friend who was killed in the ice climbing accident. I realize that it was difficult for you to teach the field session on Wednesday due to the circumstances. Your professionalism and commitment to avalanche awareness education is commended. I hope you will visit the Sulphur Ranger District in the future.

Sincerely,

  
GEORGE S. EDWARDS  
District Ranger

# Thank You

Dear Utah Avalanche Forecast  
Center,

Thank you for organizing  
an avalanche training clinic  
for snowboarders. We sincerely  
appreciate your effort to educate  
all backcountry mountain users and  
hope participants in these clinics  
increase! We are looking forward  
to working with you in the  
future!

Sincerely,  
Shannon Smith

Melissa P. Smith  
Utah Snowboard Assoc.

# Examples of Press Articles

## — Outdoor Facts from REI —

### Avalanche forecast center makes backcountry use safer

By Marlin Stum  
*Outreach coordinator  
 Salt Lake City REI*

Five people were buried and killed by avalanches in the Utah backcountry last year. Although they were all skiers, avalanche hazard is a concern for all who venture off the beaten path in winter — including hunters, trappers, show-shoers and snowmobilers.

In its 13th year of operation, the Utah Avalanche Forecast Center continues to help save lives. Its extensive public information network includes phone lines from Logan to Moab. This is the backbone of the operation — issuing backcountry avalanche advisories via pre-recorded phone messages. These hotlines will tell you how much new snow has fallen; what the mountain winds are like; where there may be weak layers in the snowpack; where recent slides have occurred; what aspects, slope angles and elevations have the highest hazard; the mountain weather forecast; and you can expect a little humor thrown in too — after all, these people like their jobs!

The phone advisories generally are updated twice each day. According to Evelyn Lees, a UAFC employee who lives in Alta, forecasters get up at 4 a.m. and head out in what is sometimes terrible weather to determine current conditions.

Its mandate requires the UAFC to issue mountain weather forecasts to the public, as well as to ski areas, the Utah Department of Transportation, and other agencies.

The charter also states that the UAFC will provide avalanche education to the public through lectures

and short field courses.

Operated as a cooperative effort between the U.S. Forest Service and the National Weather Service, the Center issues an annual report that is full of details about avalanche accidents, a seasonal snow summary, budget information, etc.

Last year's "Snow and Avalanches in Utah" report was written by UAFC Director Bruce Tremper and Forecaster Brad Meiklejohn. The report discloses that there were 80 reported avalanche accidents and incidents in Utah during the 1991-92 winter in which 29 people were caught and 10 completely buried. The five skiers who died were trapped in two separate accidents; four were killed when a single slide swept over them in the La Sal Mountains in southeastern Utah.

The UAFC received 90,615 calls last year! No wonder they wanted to raise extra funds to purchase a new

digital voice announcer for their phone messages.

Supplementing operating funds from the U.S. Forest Service are private donations and money generated by a non-profit organization called Friends of the Utah Avalanche Forecast Center. Wendy Zeigler is the main force behind this group. Last year, Wendy and Friends generated nearly \$3,000 from a ski swap held at REI. In November, 1992, REI again donated the space and helped with advertising for the third annual Friends ski swap. About \$2,500 was collected this year.

Five years ago the UAFC opened a second base of operations in the La Sals to complement its northern Utah base in the central Wasatch. The hard, conscientious work of staffers has created a consistently reliable network of public information. Anyone seeing "anything interesting" in the way of current avalanche activity is asked to share the information with the forecasters by calling them at 524-5304.

Information regarding upcoming lectures and avalanche classes is also available by calling the 524-5304 number.

A free UAFC multimedia lecture at REI in November packed the clinic room with 272 people. The clinic will be repeated on Tuesday, January 12, 1992, beginning at 7:00 p.m. at REI, 3285 East 3300 South, Salt Lake City. Please come early and get a good seat!

#### Avalanche forecast center

To reach a Utah Avalanche Forecast Center avalanche advisory message from your area before heading into the Utah backcountry, call:

Salt Lake City (2.5 minute message)....	364-1581
Salt Lake City (5 minute message).....	364-1591
Park City .....	649-2250
Logan.....	752-4146
Ogden.....	621-2362
Provo.....	374-9770
Moab .....	258-7669

**Step 1:** Attach tying thread and position at the bend of the hook. Tie in a small clump of grizzly hackle fluff on the bend forcing the fiber to angle down around the bend. Next tie in a peice of gold wire and a 1/8 inch strip of 4 mill. plastic. Wrap over these back onto the bend. Make sure that these materials are quit far back on the bend. Notice the proportions in the photos, in that the body starts far back behind the barb of the hook. Select a filoplume and tie in by the stem at this same point

**Note:** Filoplume is the soft downy feather found at the base of ring-neck pheasant rump feathers. It will be found in several lengths, but always about the same shade. This is a marvelous soft hackle type feather and should be saved when ever found. As I tie with pheasant, I am always on the lookout for these feathers and set them aside for future use.

**Step 2:** This is the most critical step in getting the body to flatten

out. If you use lead on your flies this technique will work as well. Move the tying thread to the front of the hook leaving only enough room for the head. Using several inches of sparkle yarn for control, tie down one end at this point on the far side of the hook. Make sure the yarn is tied on the side of the hook — not top or bottom. Using your thread, wrap over the yarn towards the back of the fly while holding the yarn on the side of the hook. At the bend of the hook, trim the sparkle yarn and return the thread to the front. Repeat this process on the other side. In all you will repeat a total of six times, each time trimming the sparkle yarn a little closer to the front, more for convenience than anything else. On smaller flies less build up is required to get the flat appearance.

**Step 3:** Move the thread to the section left for the head, and fold the filoplume down over the underbody taking care to lay it flat with the center stem showing. Next the plastic is laid over the plume and both

are tied down with a minimum amount of wraps. Bring the ribbing forward. Do your best to keep the wire from tying down the filoplume fibers or forcing them underneath. You want them to stick out as straight as possible from the sides of the body. Tie off the wire, trim and form the head. Whip finish and cement.

Keep your guides clear,  
Tom Nokes

Next time you're in your favorite sporting goods store buying flies, fly tying material or floatant — be sure to buy Troutsmen products!

# Avalanche Safety Clinic



**Spectacular slide show and video**

**Tuesday, January 12  
7:00 p.m.**

Experts from the Utah Avalanche Forecast Center return with their spectacular slide show and video on the history and assessment of avalanche conditions in Utah. (Limited seating)

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# A Natural Detective

by Jeff Schmerker

**W**hen you're an avalanche forecaster, and the snow starts falling, it's like a child is born," says Bruce Tremper of the Utah Avalanche Forecast Center (UAFC). "You have to care for that child every single day, 24 hours a day. There's a part of my brain that is always worried about that snowpack. It never leaves my mind."

The Center issues backcountry avalanche advisories to the public via a network of "avalanche hotlines." Its five members forecast mountain weather for both the public and those within the UAFC network, which includes the ski areas, the Utah Department of Transportation, and any other agencies in need of accurate mountain weather information. They also provide avalanche education to the public. This year's staff includes Evelyn Lees, Alex Lowe, Tom Kimbrough, Al Soucie and Bruce Tremper.

The program, funded in part by the Wasatch-Cache National Forest and the National Weather Service, concentrates its efforts on the two highest use areas in Utah, the Wasatch Mountains from the Utah-Idaho border to Spanish Fork Canyon south of Provo, and the La Sal Mountains near Moab.

Bruce lives at the Alta Guard Station across the street from Alta Ski Lifts. "If it's storming, a lot of the time it's hard for me to sleep. I'll wake up in the middle of the night and look out the window and see what the storm is doing. I'll often get on my computer and call around to the automated stations and see what's happening there. Sometimes I can go back to sleep again."

Bruce gets up early in the morning, and before he even goes to the bathroom he looks out the window to see what's happening. He then turns on the NOAA weather radio to see what is being forecasted.

When he goes outside he looks at the snow and feels it and sees how cold it is. He gets a lot of information from his senses "that you can't really put data on."

An avalanche forecaster observes, tests, puts together clues, and discerns the patterns of nature.



Bruce Tremper, Avalanche Forecast Center

Being out in the snow is not the same as sitting in his office looking at data on the computer.

"If I get out there and poke around all day and dig lots of snow pits, and ski lots of slopes, I have a pretty darn good feel of exactly what the pattern is. I couldn't get that feel if I were sitting in an office."

A snow pit determines how the different snow layers are bonded to each other, and, consequently, how easily they will slide on each other to produce an avalanche.

When the avalanche forecasters are skiing in the backcountry they pay attention to everything. Says Bruce, "I always have my eye out for recent avalanches. I'm putting pieces of the puzzle together. I think of myself as being a natural detective: It's just putting together the clues, but I'm doing it in the natural world. It's like a giant game of Concentration: You turn over one panel here and one there, and the more knowledge you have, the more experience, the quicker you can guess what the phrase is. That's how it is for me. I can go out sometimes and just by driving up the canyon and looking at things and knowing the history of the weather, I'll know what's going on."

It takes a lot of looking around if the pattern is very complex. A forecaster may spend all day observing and digging snow pits and finally at the end of the day the pattern is seen.

**"I always take a few steps back from where I think the edge is."**

"When I'm skiing I like to find test slopes, slopes very similar to the one I want to ski but much shorter and without any cliffs underneath, and I go jump on it and see if it slides. By the time you get to the big steep killer slope, you had better have a real good idea about what the stability of the snowpack is like. If I'm at all shaky about a slope and the possibility of it sliding, there's no way I'm going to ski it."

Bruce believes thinking "like a human" is how many people get caught in slides. "You have to think like an avalanche. Take all your human and cultural heritage and throw it out the window, because it doesn't do you any good in the backcountry. That's not an easy thing to do. Like my friend says, if you want to know about dragons you have to go into the den of the dragon, and it's much the same with avalanches. If I'm doing everything right I'm gonna stay out of danger almost 100% of the time. I always take a few steps back from where I think the edge is.

"Avalanches aren't everything for me," Bruce continues. "I have lots of friends

who don't ski. I love to go to concerts or dance performances. I read lots of books and write a lot." He has been working on two books for three years now, both about avalanches. ("Avalanche Dragons," by Bruce Tremper, appeared in the February, 1991 issue of *Catalyst*.)

"The first few years I was with the forecast center here, I worked 12-hour days, not taking any days off. I was running myself into the ground, because I had such a passion for the job. But I began to burn out. I cut back to about 40 hours a week. When I did that our forecasts really suffered.

"Sometimes, especially in the middle of winter, when I have been skiing for several days at a time, I just hate it, I wish I were home. I get sick of being cold and wet all day long, and I catch myself day-dreaming about doing something on my computer.

"I've been skiing powder since I was a kid, so it's not like I have this thirst to ski powder. I can take it or leave it. I'm out there not for the skiing, but because I'm a natural detective. I like going out and figuring out the patterns. When I'm out on the snow, and in avalanches, figuring it all out, everything's perfect. I know that's what I'm good at, and that's what I was born to do."

Every day from the end of October to the beginning of April, and sometimes later, the Utah Avalanche Forecast Center issues avalanche updates to the public and the increasing number of people who ski, snowboard and snowmobile in the Wasatch. Six people have died in Utah's avalanches in the last five seasons, and 25 in the last 22 years. This number is lower than in other areas, such as Colorado, even though there is a high number of backcountry users in Utah, especially in the Wasatch. Bruce Tremper and the others at the UAFC believe people are listening to their reports.

So if it's snowing one night, know that there is one man living at the Alta Guard Station who is having trouble sleeping, and probably many others like him; all who are tied indefinitely and indiscriminately to snow, and what snow is doing.

Jeff Schmerker is a freelance writer, substitute teacher, fulltime student and avid backcountry skier.

**Avalanche Hotline numbers**  
Salt Lake City, 364-1581. Park City, 649-2250. Logan, 752-4146. Ogden, 621-2362 • Provo, 374-9770. Moab, 258-7669.

## Rash skiers increase risk of avalanche

By Brooke Adams  
Deseret News staff writer

SUNDANCE — Glistening slopes of untouched snow are luring skiers outside the boundaries at Sundance Ski Resort, where they're endangering their own lives as well as those of other people.

“  
People keep going under the rope line at the ridge and skiing that area. That's incomprehensible to me when the word is out that we lost a life there.

Corey Child  
Sundance publicist

”  
But other than confiscating ski passes, a Sundance spokesman says, there is little the resort can do to reckless skiers.

According to a Utah County or-



Please see SKI on B2

Although this avalanche in Slide Canyon was intentionally set off and endangered no one, skiers imperil lives by ignoring resort boundaries

## SKI

Continued from B1

dinance, it is against the law for a person to ski into areas the county sheriff declares unsafe. The sheriff's office and Sundance have a written agreement outlining what areas the resort may close and under what conditions.

But the ordinance says nothing about people who ski onto public or private land outside a resort's boundary. Also, it doesn't give the ski patrol authority to designate closed areas.

"Nobody knows better than we do which areas up here are safe and which are not," said Corey Child, Sundance publicist.

The ordinance also lacks a specific penalty for breaking the law, although the county applies a class B misdemeanor penalty in such cases.

Sundance wants the county to adopt a tougher, more detailed ordinance to help curb the risky behavior, which seems to be a greater problem this year because of the heavy snowfall.

"It's opened up all our boundary areas that normally don't have snowfall on them," Child said.

For example, a pair of skiers recently rode the Arrowhead lift to the top west ridge of the resort and then skied into Slide Canyon. They traversed the slope to the Provo Canyon road, Child said.

Slide Canyon has earned its name. The area is prone to massive snow slides that have been known to cover the old Provo Canyon road with snow as deep as 30 feet.

Another problem area is the Far

## Ordinances

Salt Lake and Summit counties have ski-area ordinances that allow the sheriff, Forest Service, National Park Service or ski patrol to close or designate any area as unsafe.

The ordinances also include a misdemeanor penalty of up to \$299 and six months in jail.

East Ridge within the resort. Earlier this year, a skier died when an avalanche broke from the ridge. Resort officials say the area was closed at the time the accident occurred.

The area remains closed. But neither the tragedy nor signs declaring the area closed are deterring some skiers, Child said.

"People keep going under the rope line at the ridge and skiing that area," Child said. "That's incomprehensible to me when the word is out that we lost a life there."

Since Jan. 1, members of the Sundance ski patrol have confiscated 12 season passes and an uncounted number of day passes from people who ventured outside the resort's boundary markers to ski untracked snow.

"We have a no-tolerance policy," Child said. "We don't give you your pass back in a week. When people break through those rope lines, they're putting themselves in danger as well as the ski patrol if they have to go rescue them if something goes wrong."

Most of the violators have been teenagers who ski into a closed

area and then re-enter the resort, Child said. However, a few adults have been caught in out-of-boundary areas.

In addition to taking away a skier's pass, patrol members escort the skier to the base of the resort, contact the sheriff's office and hold the skier until a deputy sheriff arrives.

Teenagers are referred to juvenile court, while adult cases are handled in Justice Court.

So far this winter, only one adult citation has crossed the desk of Deputy County Attorney Ben Davis. But the person is not being charged with violating the ski-area ordinance.

Davis plans to prosecute the skier on a disorderly conduct infraction for creating a "hazardous or physically offensive condition." The county also could use a state trespassing law to prosecute violators, Davis said.

The county prefers to base its prosecutions on state code, but the Utah Code doesn't include a provision related to violating a closure in a ski area.

"They (the county) need to look at rewriting or creating an ordinance just for the ski area," Child said. Sundance tried to get the county to adopt a more stringent ordinance about five years ago but was unsuccessful, Child said.

Sheriff Dave Bateman agrees the county's ordinance is "extremely cumbersome, and because of that it is very difficult to enforce."

The ordinance should include a specific penalty and outline a better procedure for determining closures, Bateman said.

# Record-Setting Snowstorm S.L.'s Longest, Heaviest

## Wicked Storms Give U.S. Coast-to-Coast Thumping

TRIBUNE NEWS SERVICES

Powerful winter storms continued to pound the nation from coast to coast Sunday, bringing heavy rain, record snowfalls and freezing temperatures, and closing highways and causing traffic accidents.

A weather system that had brought more than a foot of snow to some areas of the central Plains earlier in the week moved toward the Northeast on Sunday, carrying snow and freezing rain to portions of the Great Lakes, the Ohio Valley and mid-Atlantic states. Temperatures dropped into the 20s in New York and New Jersey on Sunday, and as much as 3 inches of snow was expected to fall overnight.

In Wyoming, a foot of new snow was reported Sunday morning in the Evanston area.

Heavy snow also blanketed parts of northern Nevada and central and northern California. A foot of new snow was reported Sunday morning in the Mammoth Lakes area, in California's eastern Sierra, and 6 to 8 inches of new snow fell on Lake Tahoe, on the California-Nevada line.

In Southern California, which was flooded by heavy rains last week, there were scattered showers. But most of a tropical storm once headed for the area never arrived, said Gary Neumann, a forecaster with the National Weather Service in Los Angeles. Instead of the 4 to 6 inches that was forecast and expected to cause new flooding, Los Angeles got only .03 of an inch.

Arizona, already facing its worst flooding since 1983, was hit with another storm Sunday, and state officials braced for more torrential rains that could swell

Salt Lake City's Record-setting storm	
	Inches
Wednesday	2.0
Thursday	6.0
Friday	5.8
Saturday	8.4
Sunday	1.1
<b>94 hour total</b>	<b>23.3</b>

The Salt Lake Tribune Graphic

rivers and reservoirs and force more evacuations.

Waters raging into southern Arizona's normally dry Salt River since Wednesday have forced an estimated 700 people from their homes

But Tijuana, Mexico, deluged by heavy rains late last week which killed at least 11 people and made 2,800 homeless, woke to clear skies Sunday.

Armando Rabago, national editor of the Tijuana daily *Diario 29*, said a storm expected for late Saturday had failed to materialize, giving rescue workers time to sort through the wreckage of two days of flooding.

"It isn't raining now. The situation is under control," Rabago said.

Meanwhile, Topeka, Kan., was covered Saturday by its biggest snowfall in 93 years, as 17.2 inches fell between Friday evening and Saturday evening, the weather service said.

The Lumber River in North Carolina continued to rise Sunday after several days of rain, flooding nearly 75 homes during the weekend.

Some residents were being evacuated by boats, but it wasn't clear how many, said Mary Hunt, manager of a shelter.

## New System Could Dump Up to 8 More Inches

By Mike Gorrell  
THE SALT LAKE TRIBUNE

Sunday was not a day of rest for northern Utahns weary of snow.

Shovels and snow blowers were hauled out in the morning to again clear another inch or two of snow left by a four-day storm that set records in Salt Lake City for duration and production.

Just two hours after that storm officially ended — at 11:05 a.m. Sunday — the snow returned from a new storm the National Weather Service said could last into Tuesday and add 4 to 8 inches of snow in many valleys and up to 2 feet in the mountains.

Avalanches closed Provo Canyon, stranding skiers at Sundance Resort. Snow piled deep against two homes on Salt Lake County's east bench after sliding down a hillside Saturday night.

Other avalanches closed roads through Huntington and Indian canyons in eastern Utah. Blowing and drifting snow kept Weber Canyon and U.S. 89 in Davis County closed all day.

All the while Sunday, steady rain in parts of southern Utah and northern Arizona produced flooding that required aerial evacuations of three isolated communities on the Navajo Reservation, and raised concerns about water levels in the Virgin River.

Phoebe Watchman, spokeswoman for the Navajo tribe, said 51 people must be evacuated from an area around Bird Springs, Loop and Indian Wells due to flooding along the Little Colorado River. But National Guard helicopters were having a hard time reaching the area because of poor weather.

■ See A-2, Column 5

## Provo Canyon Avalanche Strands Sundance Skiers

■ Continued from A-1

Throughout Utah, weather is a main topic of conversation.

After all, weather-service meteorologist William Alder said the 23.3 inches of snow that fell at Salt Lake City International Airport between 1:10 p.m. Wednesday and 11:05 a.m. Sunday, was the longest and heaviest storm in the city's history. It also set a new monthly record, one augmented by every flake that falls.

Even heavier amounts along the foothills generated a slide Saturday night that plowed into the residence of Neal and Carol Sorensen, 3616 Cascade Circle.

"We're buried. We have about 100 tons of snow in our back yard," Ms. Sorensen said before a party of friends helped them dig out enough Sunday to relieve the pressure exerted by the cement-like snow on their home's walls.

Ms. Sorensen's one consolation was that the slide came down minutes after her husband had come inside after taking their dog out for its nightly walk.

"If it had happened five minutes earlier, they would have been buried. We were blessed."

That incident reflected the high hazard of avalanches at all elevations, said Evelyn Lees of the Utah Avalanche Forecast Center.

Ms. Lees also encouraged people to be wary of slides off slanted roofs and not to harass deer seeking forage in the foothills — "don't spook them into running because they need to conserve their energy."

The prodigious amounts of snow have prompted some to attempt to lighten the burden on the roofs of their homes. But shovel-wielding homeowners need to be

ware of overhead power lines as they clear snow from their roofs because — as Utah Power spokesman David Mead put it — "God forbid someone use a metal shovel up there."

"We need to remind people to treat electricity as if every line is alive and with the utmost respect," he said.

Power-company officials had a dozen reports Sunday from homeowners who severed overhead service lines while shoveling snow off their roofs. They were unhurt due to insulated wires. But others might not be so lucky if they're unfortunate enough to be using metal shovels. Utah Power officials dispatched repair personnel to hook the homeowners' power back up.

Utah County received the most snow from the record-setting storm's final burst Saturday. The 14 inches that fell in Provo prompted Utah Valley Community College officials to cancel classes today, but did not cause many traffic problems after Saturday night's Utah-BYU men's basketball game.

Ute fan Russell Oki said the return drive to Salt Lake City was easy until he reached Draper, where the slush began freezing. "That means people on this side of the Point of the Mountain are cooler than people south of the Point," he boasted, figuring most Salt Lakers favor Utah.

The rains troubling the Navajo reservation also have Mexican Hat residents closely watching the San Juan River, which is partially blocked by ice floes.

"If it freezes and thaws, we could be in trouble," said weather-service observer Doris Valle. "I don't know what's happened to our weather. It never does this in Mexican Hat."

**WINTER FURY**

# Slide in canyon claims cross-country skier

*Avalanches close roads. Home destroyed above Sundance resort.*

**By Amy Donaldson  
and Dennis Romboy**  
Deseret News staff writers

**EMIGRATION CANYON** — An avalanche buried and killed a cross-country skier early Thursday evening. The avalanche was one of about eight slides throughout the Wasatch Front.

Patrick Ellsworth, 30, a resident of Emigration Canyon, and two friends were skiing above Pinecrest road at the top of the canyon. Ellsworth skied down the slope first, and about halfway down, the snow rushed down the mountain burying him, said Salt Lake County deputy sheriff Rod Norton.

His friends located him using electronic beepers they were wearing, Norton said. After digging him out from under 6 feet of snow, they tried unsuccessfully to resuscitate him. The other two men skied for help, leaving Ellsworth's dog with the body.

Norton said the dog tried to protect the man when rescuers attempted to recover the body, but no one was hurt and they eventually got around the dog.

A massive avalanche wiped out one home

and damaged two others Thursday evening near Stewart Falls above the Sundance ski area.

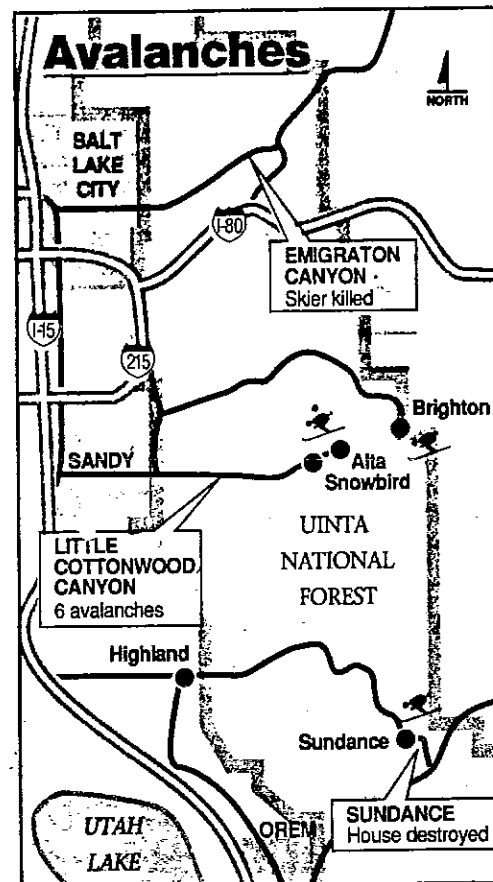
The house, unoccupied after an avalanche five years ago, was scattered over a 200-yard-long path, said Utah County Sheriff's Lt. Dick Casto. It was valued at \$500,000. Damage to the other two homes was estimated at \$250,000 each. No one was injured in the snowslide.

A resident trying to flee the area in a vehicle was caught on the fringe of the half-mile-long, 100-yard-wide slide. The snow jumped about 1,700 vertical feet. Snow, trees and other debris were scattered around the vehicle, Casto said. The driver escaped without injury.

Propane leaked from the two damaged homes. Because of the heavy damage and deep snow, county search-and-rescue workers were unable to shut off the utilities except for water running in the home from a demolished kitchen, Casto said.

The potential for further avalanches remains high. Only a portion of the slide area came down and a large amount of snow may be released at any time, Casto said.

"Various layers in the snowpack are responsible for this activity," said Tom



Kimbrough of the Utah Avalanche Forecast Center. He said avalanches could be quite large, fast-moving and extremely destructive.

Casto said the area will be closed for the next 36 hours.

Please see **SLIDES** on A2

## Alex Lowe Joins the Utah Avalanche Forecast Center

After seven seasons with the Utah Avalanche Forecast Center, Brad Meiklejohn decided that he was ready to move onto other (presumably more lucrative) arenas. He applied to several graduate schools and was accepted at all of them including Yale. After accepting at the University of Vermont, the UAFC was faced with the overwhelming task of trying to replace someone like Brad Meiklejohn—someone with an ivy league education, an excellent skier, an impeccable avalanche sense and a superhuman cardiovascular system. There was only one person—Alex Lowe.

Anyone even remotely in tune with the climbing community will know the name of Alex Lowe. Although most people assume that Alex is part of the famous Lowe family of climbing (most notably Jeff Lowe and George Lowe), there's actually no relation. But the rest of the Lowe clan doesn't advertise the fact. The family joke is that Alex is the best climber in the family.

Alex is generally considered to be the best all-around climber in the country. In the climate of specialization so common in modern climbing, Alex is unique to say the least. Not only is he one of the top rock climbers in the country (he routinely does on-sight flashes of 5.12d routes and often with natural protection) he is the nearly undisputed king of alpine climbing with a number of bold and creative first ascents to his credit.

His alpine resume goes includes Mt. Everest (he will return again this March), the Southwest Boreas of Peru's Taulliraju (first alpine-style ascent with Jeff Lowe), the North Face of Nepal's Kwangde (first ascent with Steve Swenson) and Kusum Kanguru (first ascent, solo), and the fist



solo winter ascents of both the North Ridge and the North Face of the Grand Teton (each in one day from the valley floor). In the past couple months Alex has been featured in no less than three national magazines including *Outside*, *Rock and Ice* and *Climbing*.

Whenever Alex has lived he has become a local legend. As one in a long series of examples, the Grand Traverse in the Tetons involves climbing six summits in one day—Tewinot, Owen, the Grand, Middle and South Tetons, Gilkey's Tower and Nez Perce. Previous time records for the Grand Traverse were around 22 hours. Alex did it solo in 9 hours and 20 minutes, then later lowered his record to 8:40.

At 34 Alex is more than a cardiovascular freak who also happens to be one of the top climbers in the world. He grew up in Missoula Montana and quit school for financial reasons just short of a Master's degree in Engineering from Montana State University where he worked with the MSU snow and avalanche program. He is also fluent in four computer programming languages, has a degree in applied mathematics. He is presently making the transition from his former job as the quality control engineer for Black Diamond (formerly Choinard Equipment) in Salt Lake City. Alex is married to his Missoula sweetheart Jeni, an artist in high demand, and they have two children.

## Utahn Climbs to the Top of the World — Again

By Judy Fahys  
THE SALT LAKE TRIBUNE

Alex Lowe stowed his son Max's knitted baby cap on the top of world three years ago.

As the youngster slept early Monday, his mountaineer father reached the summit of Mount Everest again and brought along a cap worn by his second son, Sam.

Mr. Lowe, 34, was leading the first Everest ascent this year, the 40th anniversary of Sir Edmund Hillary's pioneering climb and the 30th anniversary of the first American reaching the 29,028-foot summit.

Three Americans paid a Washington-state expedition firm \$65,000 to have Mr. Lowe and a Colorado guide lead them up the South Col route. Three Nepalese Sherpa mountaineers accompanied them. About 350 people have reached the summit during the past 40 years.

Friends of Mr. Lowe, a Salt Lake City avalanche forecaster, reveled in the news, but none was surprised. Mr. Lowe has a long record of joyfully tack-

ling the highest and toughest climbs in the Western Hemisphere, they say.

Jack Tackle, a climber from Bozeman, Mont., became friends with the Salt Lake City man as they scaled the icy rock faces of Wyoming's Grand Tetons in the winter.

"He's the best climber I've ever climbed with," said Mr. Tackle, who has enjoyed the sport for 20 years. "He is one of the best climbers the States has."

Andrew McLean, a fellow Salt Lake City climber, noted it was Mr. Lowe's second successful ascent on a mountain famous for turning away nine of every ten who try it.

"He was able to do it the first time he tried," Mr. McLean said. "And that he has been able to do it twice in a row is pretty spectacular."

Mr. McLean, who worked with Mr. Lowe at Black Diamond Equipment in Holladay, said Mr. Lowe did little more than his usual routine of skiing, climbing



Alex Lowe  
"An Incredible Athlete"

■ See A-2, Column 3

# Skiers Were Prepared for Avalanche But Couldn't Get to Friend in Time

By Jim Woolf  
THE SALT LAKE TRIBUNE

Patrick L. Ellsworth died Thursday while making his fifth ski run down a slope above his Pinecrest Canyon home east of Salt Lake City.

"We had taken four runs, and it seemed pretty good," said Rick Whitson, 37, Salt Lake City. "We were going to take one more. The fifth was going to be the last. Pat skied first, and the avalanche broke loose about halfway down the slope."

Mr. Whitson and Richard Hagio could only watch as a foot-and-a-half-deep layer of snow sloughed off the mountain and swallowed Mr. Ellsworth as it slid about 100 yards down the hillside.

All three men were experienced skiers who were aware of the risk of avalanches. Each wore a small device that emits an electronic signal to allow rescuers to discover them if buried under the snow. They all carried a shovel to dig someone else out.

The equipment worked — but not fast enough.

It took Mr. Whitson and Mr. Hagio 10 minutes to home in on the electronic signals and locate where Mr. Ellsworth was buried. It took another 10 to 15 minutes to dig through the 4 feet or so of snow.

"It appeared he was dead when we got to him," said Mr. Whitson. Even so, he and Mr. Hagio spent the next 15 minutes in a futile attempt at resuscitation. Mr. Whitson then skied out for help.

The men started the day skiing "more cautious lines" down the hillside to reduce the risk of avalanches, said Mr. Whitson. When they saw no signs of snow instability, they became a little bolder and moved to slightly steeper and more dangerous slopes. The last run was the steepest.

*"We were going to take one more [run]. The fifth was going to be the last. Pat skied first, and the avalanche broke loose about halfway down the slope."*

— Rick Whitson, Salt Lake City

"They pushed the slope angle just a couple degrees too far," said Tom Kimbrough, avalanche forecaster for the U.S. Forest Service.

He said the avalanche danger is high because a thick blanket of new snow is sitting on an icy, slippery layer within the snowpack. It is liable to slide off slopes steeper than 30 degrees. The avalanche danger is much less in developed ski areas where snow-safety crews regularly knock down unstable layers of snow.

Pinecrest was not the only place where avalanches caused problems.

Three backcountry skiers were caught Friday in an avalanche near the ParkWest Ski Area. The only injury was a twisted knee. "Those guys were really lucky, and they know it. That was a nasty slide," said Tim Hagan, director of the ParkWest ski patrol.

Avalanches Thursday damaged two cabins near the Sundance Resort and damaged several cars parked near the Alta Ski area. "A couple of the cars were really scrunched," said Onno Wieringa, Alta's general manager.

Mr. Kimbrough urged backcountry users to be careful this weekend. Hard-to-identify pockets of unstable snow remain in "nooks and crannies" of northern Utah's mountains, he said.

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 Science and Medicine Desl
 

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**SCIENCE  
UPDATES**

**DON'T FEED THE DINOS:** This summer, Hollywood will ask millions of filmgoers a thrilling question: Can we reconstruct living dinosaurs from their fossilized genes? That's the subject of the forthcoming film version of Michael Crichton's science-fiction novel *Jurassic Park*. Dinosaur cloning is possible



**Keay  
Davidson**

The Science Guy

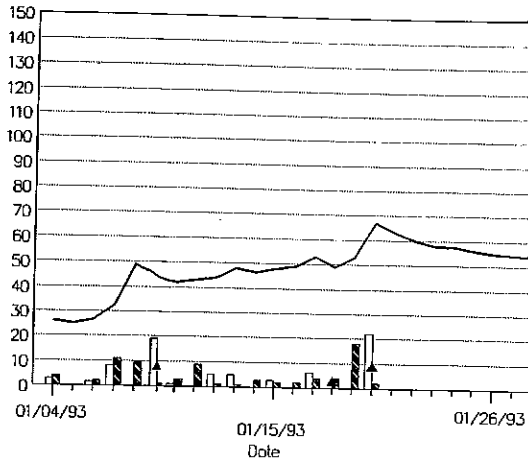
in principle, but it should prove incredibly difficult in practice. The trick is to find a big enough fragment of dinosaur genes. True, intact genes from humbler organisms — e.g. insects and plants — have been entombed for millions of years in fossilized tree resin, called amber. In recent years, scientists have managed to extract genetic material from amber samples. For example, California researchers George Poinar and Roberta Hess have recovered the DNA of extinct bees from amber. However, they've extracted only very tiny amounts — so tiny that “the residue from a fingerprint is far more than enough to taint any findings,” John F. Ross writes in *Smithsonian*. Or, to put it another way, they've gathered only hundreds of “base pairs” (chemical building blocks of genes), whereas a single bacterium contains 10 million base pairs! So reconstructing an entire dinosaur — or bacterium, for that matter — is a remote possibility, at least for the foreseeable future.

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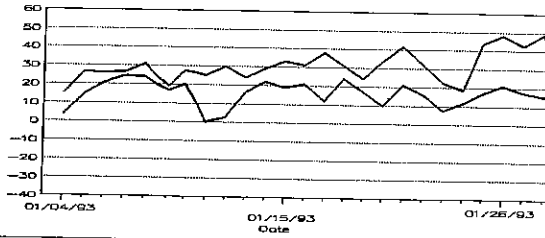
**BURIED ALIVE:** They don't get as much attention as regular weather forecasters. They're avalanche forecasters, and their work is portrayed in the March issue of *Earth* magazine. They study snow conditions and try to predict when and where a snowfield is likely to collapse, gush downhill and bury anything in its path. “In a moist snowpack, tiny beads of liquid water collect in the nooks and crannies between snow grains, and the resulting surface tension in the multitude of water beads adds up to a significant force holding the snowpack together,” writes Bruce Tremper, head of the Utah Avalanche Forecast Center in Salt Lake City. “But when meltwater floods the caverns between the grains, suddenly there's no more surface tension because there's no more surface, just millions of tiny icebergs floating in a sea of meltwater. The resulting frozen ‘margarita’ suddenly loses all its strength, and large, wet slab avalanches break out and grind their way down the mountain ... They can easily mow down forests or buildings.”



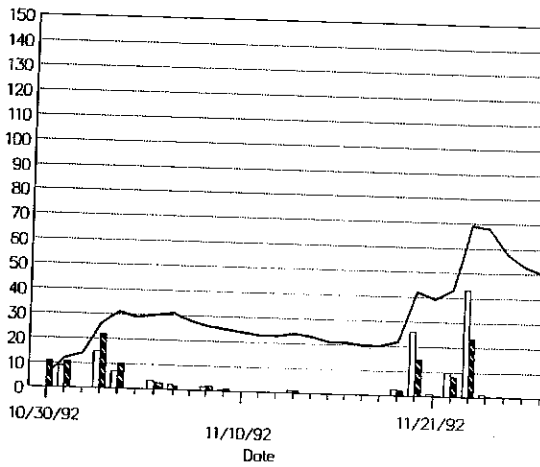
Depth, New Snow, Water x 10, Awd.



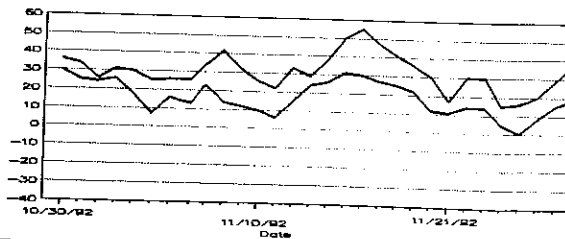
Temp. Min & Max



Depth, New Snow, Water x 10, Awd.



Temp. Min & Max

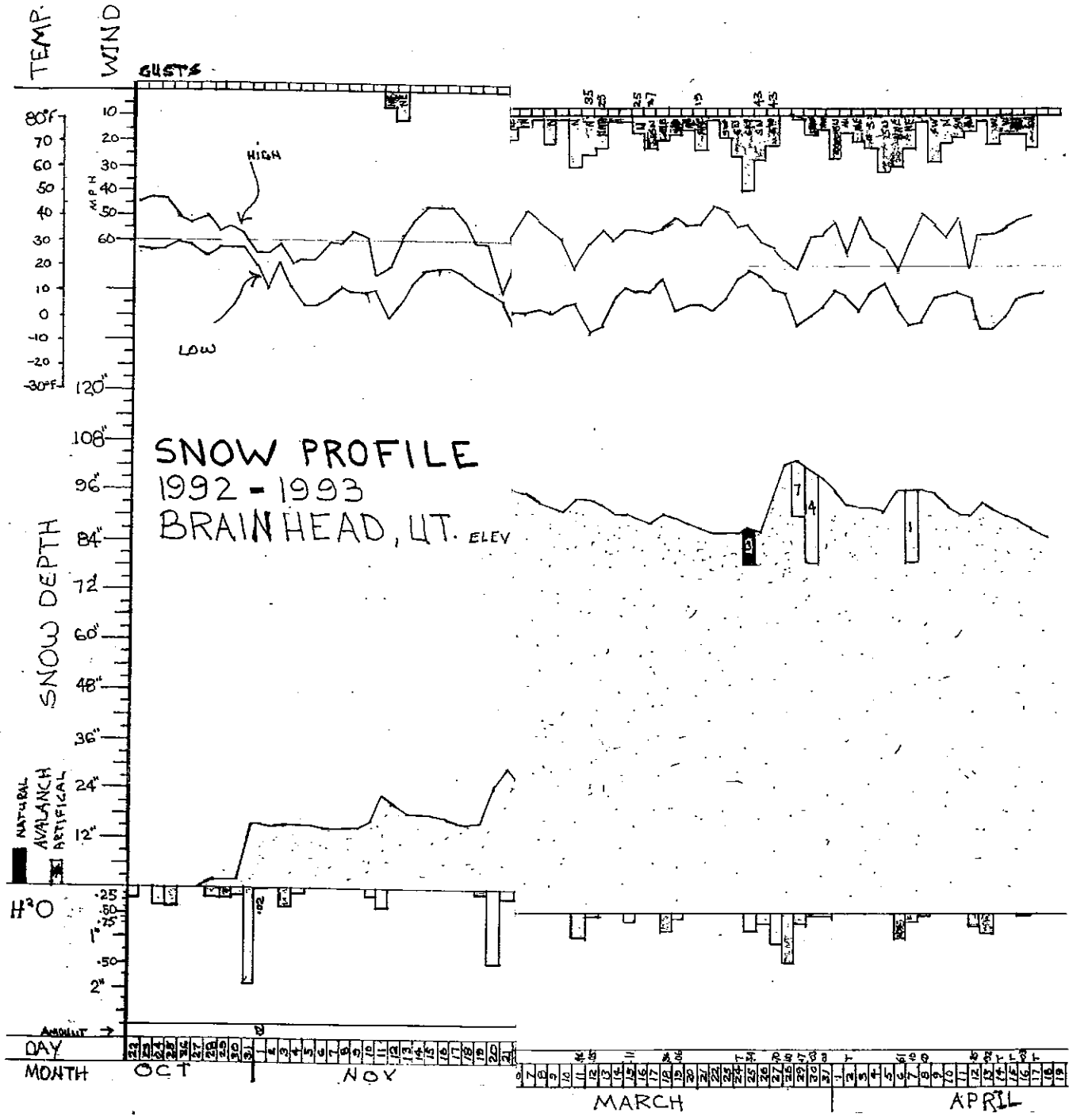


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