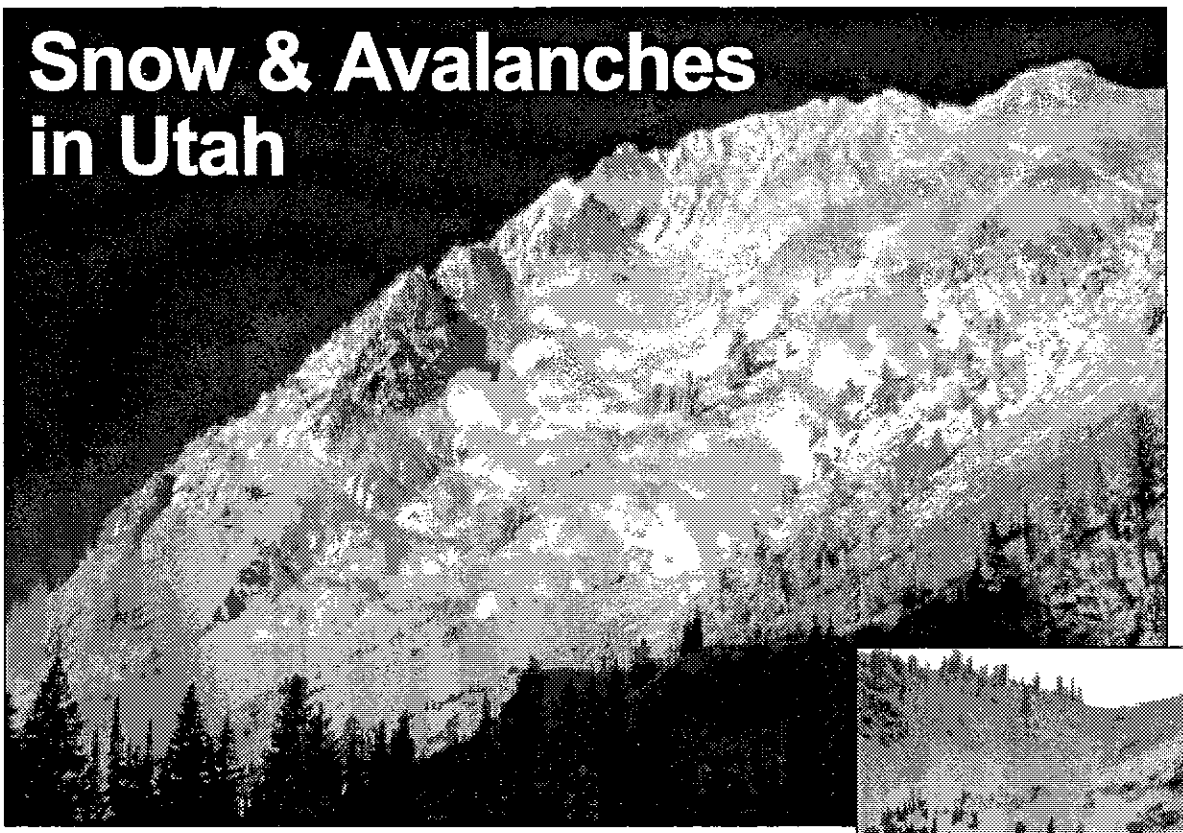
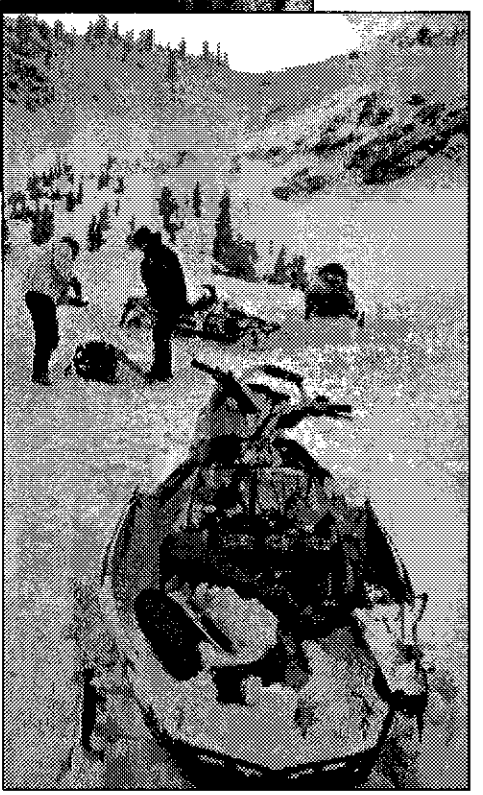
Annual Report 1996-97





USDA Forest Service

Utah Avalanche Forecast Center

Forest Service Intermountain Region
in partnership with
Friends of the Utah Avalanche Forecast Center
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NOAA National Weather Service
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Superior slidepath: Craig Dillon
Avalanche on Superior slidepath in Little Cottonwood Canyon

Bountiful Peak: Bruce Tremper
The December 7th Bountiful Peak avalanche accident which took the life of a snowmobiler. Six people died in avalanches in Utah and another just north of the Utah border near Montpilliar.

The Utah Avalanche Forecast Center is a Forest Service program under the Intermountain Region Office and the Manti-La Sal National Forest, in partnership with the
Friends of the Utah Avalanche Forecast Center
Utah Department of Public Safety Division of Comprehensive Emergency Management
Salt Lake County, Cache County
National Weather Service and
Utah State University

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Table of Contents

The Utah Avalanche Forecast Center

An Overview

Our goal:

Help keep people on top of the Greatest Snow on Earth instead of buried beneath it.

Where do avalanche accidents occur?

Almost all avalanche accidents happen in the backcountry—outside of ski area boundaries where no avalanche control is done. Ski areas and highway avalanche control crews routinely knock down avalanches with explosives before the public arrive each morning. They have done their jobs so well that they have almost completely eliminated avalanche deaths at ski areas and on highways. (Since 1980 only 2 percent of the people killed in avalanches have been general public on open ski runs or on highways.)

What kind of people get caught in avalanches?

They are almost always recreationists who are very skilled at their sport. In Utah they are usually backcountry snowmobilers, climbers, skiers, snowboarders, showshoers or hikers, in that order (U.S. statistics 1992-97). In almost all cases, their skills at their sport significantly outpace their avalanche skills. The larger the gap, the more likely they will get caught.

How do people get caught?

Over 95 percent of avalanche accidents, are triggered by the victim or someone in the victim's party. In other words, we have met the enemy and the enemy is us. And that's good because 95 percent of the time, we can avoid avalanche accidents through our routefinding and snow stability decisions.

In summary, avalanche accidents almost exclusively occur in the backcountry, they are almost always recreationists and they almost always trigger the avalanche which catches them.

How we help to solve the problem:

We help to arm backcountry travelers with the weapon of knowledge. In order to avoid triggering avalanches, backcountry travelers need:

1) Avalanche education. We teach about 25 free basic avalanche awareness classes each season. These not only give the public an overview of the avalanche problem but some basic avalanche skills and these classes encourage them to take a more advanced avalanche class offered by the private sector.

2) Critical real-time avalanche information. We issue twice daily recorded avalanche bulletins which give the public critical up-to-date avalanche information and forecasts the stability trends into the future. We help the public to decide what kind of terrain is safe, what is dangerous and we tell them how to recognize the problems on their own, for instance, clues and signs of instability.

We provide information on current avalanche conditions primarily through our avalanche advisories. People access these either by calling a recorded message, hearing it live each day on two different radio stations, or they access it online through the Internet. In times of extreme or unusual avalanche conditions, we issue an avalanche warning over the wire services. These succinctly worded warnings go out to all the television, radio, newspapers and are on NOAA weather radio.

Finally, we "preach the avalanche gospel" as much as possible to the local, national and international media. This season, for instance, a number of different international film documentaries on avalanches were aired repeatedly throughout the winter (National Geographic, Discovery Channel and PBS). Program director, Bruce Tremper was featured in these films.

Our Philosophy:

But just because people hear it doesn't mean they listen. In other words, if it sounds like a government recording, people get bored, they won't remember what you say, and they just quit calling after awhile. Our philosophy has long been to present these advisories in an entertaining way so that people will most likely remember what they hear. We have become rather well known for making our advisories fun to hear. We try and use all the standard tools of effective writing and speaking such as using active voice and first person, using examples and stories to illustrate points, using humor where appropriate, and reading the advisories in a natural voice, like talking to a friend. They're informal, chatty and funny yet informative. It also makes our work fun.

We also believe in diversified avalanche forecasting. In other words, local forecasts recorded by local people. Avalanche forecasting is much more of an art than it is a science. And because of this, computers never have, and most likely never will, be able to forecast avalanches. For instance, how are you going to design a robot which can ski around in avalanche terrain, dig snowpits, feel the snow, smell the wind, feel the mood of the day, make friends with all the other people in the backcountry and get them to call in important information to you, make friends with all the other avalanche workers and cooperate closely with them, access 40 years of personally-stored data, integrate all the pieces of data together and creatively write and deliver an avalanche advisory? This is a job that only a human can handle, and not by sitting in an office all the time.

We believe that whoever records the avalanche advisory must have been in the backcountry looking at the snow in the previous day or two. We also do not forecast for places which we do not visit on a regular basis for the same reason that a bowler won't be very good if they can't see the pins. In both Logan and Moab, local people record the local advisories. The Salt Lake based staff of four simply can not visit Logan and Moab often enough to know what's going on. The Salt Lake staff covers from Ogden to Provo—about an 80 mile section of the Wasatch and Uinta Mountains and by far the most heavily used section. A part time staff of three records the bulletin in Logan three times per week and the Salt Lake based staff records it the remainder of the week. In Moab one full time forecaster issues bulletins for the La Sal Mountains.

This is our philosophy and it seems to be working. More people call the UAFC advisory each year than any other avalanche advisory in North America, and the number keeps increasing each season. The number of people getting killed in avalanches is increasing proportionally more slowly than the number of people going into the backcountry each year. There is an increasing demand for avalanche education and information by not only Utahns but by the national and international media.

We are very passionate about our work because it's more than just a job, it saves lives.

Nuts and Bolts

The UAFC is operationally separated into three entities, the Logan area mountains, the La Sal Mountains near Moab, and the Wasatch and Uinta mountains near the cities of Ogden, Salt Lake City, Park city and Provo.

Mike Jenkins, Kevin Kobe and Bruce Engelhard record the avalanche advisory in the Logan area mountains three days per week and the Salt Lake staff records it on the remaining days. Mike Jenkins has taught an avalanche class for Utah State University for a number of years and he has organized a fine consortium of local volunteers, graduate students and workers. Their office is located at Utah State University, Department of Forest Resources.

Doug Lewis, in his first season with the UAFC, issues the advisories for the La Sal Mountains near Moab. As the only full time worker, he has his work cut out for him. The Moab office is located in the Moab Ranger District on the Manti-Lasal National Forest.

Last, but not least, the vast majority of the backcountry use occurs in the Wasatch Range near Salt Lake City. A staff of six, four full time and two part time, cover an area from Ogden to Provo which also includes the mountains near Park City. This is about an 80 mile section of the Wasatch Range and the eastern half of the Uinta Mountains—arguably the most heavily used mountainous area in the country. Bruce Tremper, in his eleventh season, heads the operation along with an extremely capable staff of Tom Kimbrough, Evelyn Lees, Seth Shaw and Carol Ciliberti. Tremper also oversees the Logan and Moab areas. The Salt Lake office is co-located at the National Weather Service at the Salt Lake Airport.

The Utah Avalanche Forecast Center is a Forest Service program under the Intermountain Region Office, and the Manti-La Sal National Forest, and in partnership with the Utah Department of Public Safety, Division of Emergency Management, Salt Lake County, Utah State University, the National Weather Service and the private contributions from the Friends of the Utah Avalanche Forecast Center.

The public can access advisories in the following ways:

Recordings on local telephone lines in the following locations:

Salt Lake City 3-minute advisory (16 lines)	364-1581
Alta (multi-line system through the Town of Alta)	742-0830
Park City (one line)	649-2250
Logan (two lines)	797-4146
Ogden (multi-line PBX system at Weber State)	626-8600
Provo (multi-line PBX system at BYU)	378-4333
Moab (one line)	259-7669

Radio Stations (on the air live around 8:00 am each morning):
KRCL 91 FM
KPCW 92 FM

Internet:
http://www.avalanche.org

Season Highlights

■ Six people were killed in avalanches in Utah during the 1996-97 season. This breaks the modern record of five fatalities and we have to go all the way back to the mining days near the turn of the century to find more fatalities in a single season. The fatalities this season includes three campers, one climber, one snowmobiler and one snowboarder.

■ A record number of avalanche incidents occurred this season. 84 people unintentionally triggered avalanches in the backcountry, 62 of these were caught, 37 were partially buried, 9 were totally buried and six killed.

■ All the avalanche fatalities occurred during the very wild months of December and January, during which three nearly unprecedented rain events occurred. Rain fell to the highest elevations causing wet slides, and more important, provided a slippery bed surface for nearly all the fatal avalanches. This same weather pattern occurred throughout the Intermountain west including Canada which experienced a modern record of 18 avalanche deaths.

■ Property damage included the avalanche damage of two different houses at Sundance including one completely destroyed home worth about a million dollars. In Little Cottonwood Canyon several buildings were hit and several dozen cars were damaged. Total property damage was about a million and a half dollars.

■ The public called the UAFC recorded bulletin a record number nearly 130,000 times which averages nearly 800 calls per day and as many as 3,000 on busy days. This breaks all previous records and the numbers continue on a steep upward trend. More people call the UAFC recorded bulletin than for any other avalanche bulletin in North America.

■ Once again, the Utah Avalanche Forecast Center was one of the most visible part of the Forest Service during the winter months and always appeared in a "white hat" role.. UAFC Director, Bruce Tremper continued to be featured both national and international film documentaries about avalanches. These included National Geographic, CBS Forces of Nature, NBC Dateline, several programs which aired on public channels and Discovery Channel including Danger Zone and an hour-long British documentary aired for the first time two winters ago. In addition, Carol Ciliberti was filmed for Storm Warning, a program which will air on the Discovery Channel next winter.

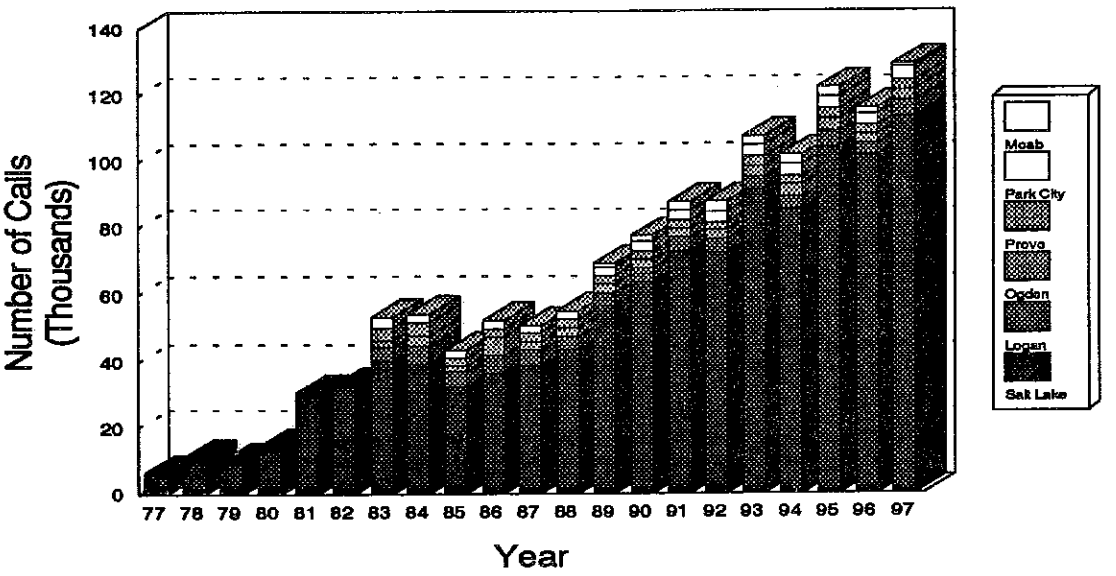
■ A number of national magazines did stories on avalanches which featured UAFC staff, including: Ski Magazine, Powder Magazine, Snowboard Life, Couloir, and a number of smaller publications.

■ The UAFC staff appeared on the local television at least 23 times, radio 10 times and in the newspapers 18 times.

■ UAFC staff gave a total of 29 avalanche education seminars ranging from one-hour avalanche awareness talks to 3-day workshops attended by a total of 1360 people.

Yearly Call Totals

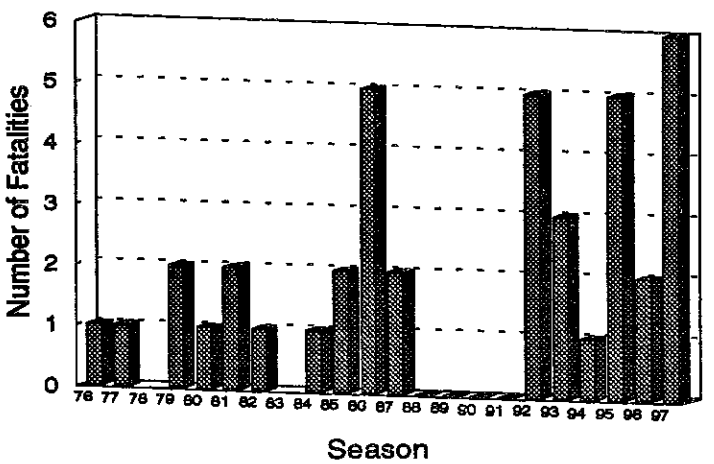
Avalanche Advisory



The number of calls to the recorded avalanche bulletin continues its rapid rise. Nearly 130,000 people called the bulletin which averages about 800 per day and as many as 3,000 on busy days.

Avalanche Fatalities in Utah

1976-97



Utah experienced a modern record number of six avalanche fatalities. This number has not been exceeded since the mining days around the turn of the century.

Season History

Northern Utah

People should pay less attention to averages ..... and more attention to the extremes that created them. - Ed LaChapelle

Ho hum .... according to the numbers '96 - 97 was just another average winter. There was plenty of snow but nothing like the 750 inches needed to reach record levels. None of the individual months broke any records. But one category tells the story. By the end of January six people had lost their lives in Utah avalanches.

While several accidents in the mining days of the late 1800s and early 1900s far exceeded this season's numbers, we have to drop all the way back to 1927 to find a season with more avalanche fatalities. The other important fact is that all these people were killed during just two months of the season. December and January, the months when it hardly ever stopped snowing, raining or blowing.

Almost twice as much snow fell during the first half of the winter than in the second half. Precipitation fell at Alta on 61 days during November, December and January. By the start of February, Wasatch avalanche workers were tired; short of sleep and short of temper. Fortunately, February eased off and March almost quit on us. Despite a return to winter in April, the end result was a little better than average season.

Another departure from the "norm" was the prevalence of that thankfully rare form of precipitation not recognized by Utah promoters....high altitude rain. Three separate rain events resulted in slippery crusts that had direct impacts on fatal avalanche accidents.

October and November

Winter began in mid October with a 20 degree decline in temperatures and the onset of precipitation after a hot, dry summer and early fall. Several storms in October and early November started building the snowpack with about 30 inches on the ground through most of November at the Alta Guard Station. The first of the winter's rain fell on November 22 at 20 percent density, in other words, almost 2 inches of water in less than 10 inches of snow—the greatest glop on earth. This storm changed to snow after forming a firm rain crust. Several days of clear, cold weather developed weak faceted crystals within the snow above the crust, a combination which would cause the first fatality of the season. The month ended with 78 inches of snow and 7.4 water at Alta.

December

A series of small storms began in late November and continued into December, shoving the total snow stake readings from 35 inches to 60 inches at Alta. This fresh snow was resting on the faceted crystals over the rain crust. Saturday, December 7, dawned clear. All the wrong ingredients: Saturday,

fresh snow, the first valley snowfall, clear skies. The perfect day to try out all that new winter equipment. Unfortunately, the mountain snowpack was one big land mine, waiting for those that couldn't or wouldn't recognize the obvious signs of instability. Our basic avalanche course for snowmobilers the evening before was canceled. No one signed up. On Friday and Saturday, eight people triggered avalanches and went for rides in four separate accidents, five people were buried and one snowmobiler on Bountiful Peak was killed. (see Avalanche Incidents and Accidents for more details).

Santa brought a rather strange present to the Wasatch on Christmas Day. Rain again; a light mist that coated goggles and the snow pack with a thin, glassy crust then changed to fluffy flakes and tapered off. January 26 dawned to another storm with rising wind and increasing snowfall. By afternoon the new snow was very sensitive; fresh wind slabs were popping out with the fluffy flakes as the weak layer and the thin crust providing the bed surface. Right into the teeth of the increasing danger, an experienced snowboarder that was known for solo trips into the backcountry, headed up Flagstaff Peak north of Alta for a quick run before picking up his girlfriend at the airport. She never got her ride. The next day people began to piece together the probable events but the continuing storm delayed an effective search until January 28, when, under the direction of the Salt Lake County Sheriff, Bruce Tremper of the Utah Avalanche Center and Dave Madera of UDOT located his body with a beacon search.

December finished with 164 inches of snow at Alta, 225% of average. January, true to form for the winter, began with warm temperatures and rain to the tops of the peaks.

This rainstorm formed such a strong crust that, as Tremper reported on the bulletin, "The ground level has effectively been raised." He meant that avalanches would not be breaking below this level for the foreseeable future. He was correct but the crust also provided another excellent bed surface.

January

On January 11th, a very unusual storm hit northern Utah. In fact, the University of Utah Department of Meteorology determined that those same combination of conditions had not occurred since the winter of 1968. It was no wonder that none of the weather forecasters in Utah predicted the intensity and magnitude of the storm. A moist and potent southwest flow combined with an unforecasted upper level disturbance coming down from the northwest and a mis-forecasted, powerful cold front coming in from the east, all came together over northern Utah in the same 12 hour period. All the weather forecasters in Utah expected 2-6 inches of snow that day, by mid morning it was snowing one to three inches each hour and it didn't let up for most of the day. Four thousand skiers were trapped overnight in Little Cottonwood. At least 40 cars were damaged or destroyed by avalanches but due to great good fortune and skilled work by avalanche and public safety professionals, no one was killed or injured. (See Incidents and Accidents for more details on all these accidents.)

But fortune was not so kind in the mountains near Logan where three very experienced mountaineers and backcountry skiers were out for on an overnight ski trip. Although they camped in mature trees, in a place anyone would have chosen as a safe place, they all died in their tent sometime during

the night when a long-running avalanche descended upon them. The January 3 crust played it's part in causing the slide to run farther and faster than usual.

Fate and fortune contended again on January 25. Another warm storm was laying down a few inches of dense snow up high with rain down low, while the weekend backcountry traffic headed out to meet the rising avalanche danger. Two experienced ice climbers headed out in mixed rain and snow to climb the "Fang" in Provo Canyon. They were hit from above by a slide that ripped the lead climber off his belay tree and sent him sailing into space. Similarly his partner was plucked off the vertical ice, both coming to rest at the base of the climb. Neither was totally buried but Doug Hall was killed by the fall and the other was seriously injured.

The same day, fortune was on the side of two novice snowshoers in Big Cottonwood Canyon. One woman was buried in a narrow gully an astounding six feet deep and an even more astounding 1 3/4 hours—and lived! Although the storm was less intense in the Salt Lake area mountains, it was still enough dense new snow to make shallow soft slabs, which were soft and shallow enough to just run past your ankles—unless, of course, you were in the bottom of a narrow gully.... (See Incidents and Accidents for details)

January was thankfully the last big snow month of the winter, ending with 207% of normal from 141 inches at Alta.

February

In desperate need of rest, the Wasatch avalanche workers welcomed the small storms and less dangerous conditions of February. The largest storm added only two feet of new snow with several others in the one foot range. The only major backcountry avalanche incidents of the month all occurred on the 24th. Despite a lack of new snow, strong east winds, an unusual direction for the Wasatch, resulted in three separate close calls in the Logan, Ogden and Salt Lake mountains. In the closest call, a Mt. Ogden snowboarder plummeted 2,000 vertical feet, through trees, over cliffs, down a gully..... and walked away unharmed!

At 91 inches for Alta snowfall, the month was dead-on 100% of normal.

March

The rest break for avalanche workers continued in March. With only 12 days of precipitation, 54 inches of new snow, the month ended at 66% of average.

Again there was little backcountry avalanche activity except for one serious accident. Three skiers found a sensitive wind loaded pocket in a very steep chute on Millville Peak. One skier took the whole ride, 2,000 vertical to the base of the peak, where he was totally buried. The other two performed what must have been a nearly flawless beacon search. They had him located and breathing within 15 minuets. He was seriously injured but a passing snowmobiler had a handy cell phone to call for the helicopter.

April

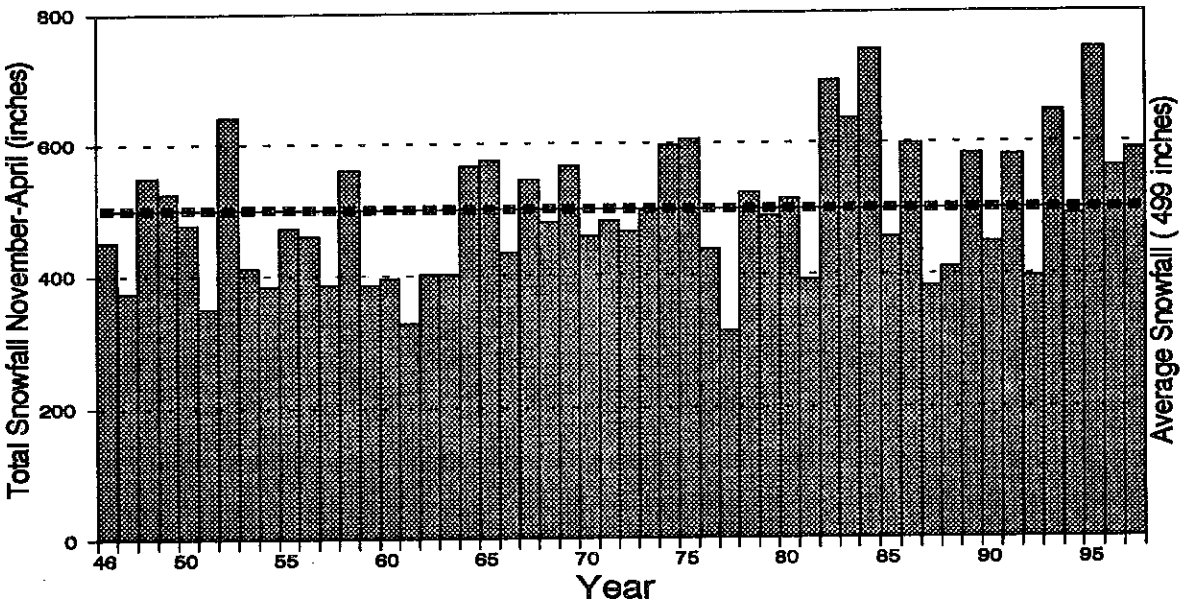
More typical spring weather returned to the Wasatch in early April, reviving fears of flooding. The seven out of the first 10 days had precipitation and temperatures were cold, setting April minimum records at Alta.

As of this writing, the Logan River is flooding over its banks but most of the other streams south of there had less late season snow and they are forecast to be only bank-full. But the biggest snows fell north of Utah. Idaho,

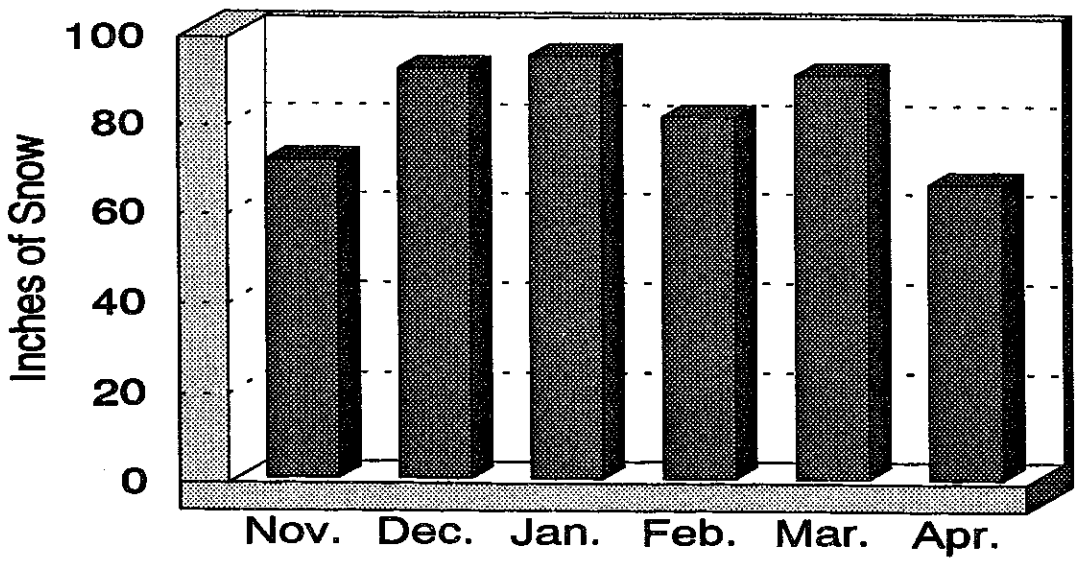
Wyoming and especially Montana have record snows and expect record flooding this Spring.

Here in Utah, like we say, it was just an average year, unless of course, you look at the extremes which created it.

Alta Snowfall (inches)
1945-97



Snow by Month
Alta Guard Station



Season History
Logan Area Mountains

by
Mike Jenkins

The winter of 1996-97 was one in which the Bear River Range, from Ogden Valley north to Soda Springs, Idaho, received up to 200% of normal winter precipitation. Abundant snow, combined occasionally with rain to over 10,000 feet, created snowpack conditions conducive to periodic large avalanches and tragic incidents. Six back country travelers were totally buried in the Bear River Mountains this winter. Four of them were killed. Snow totals at our Beaver Mt. study plot kept pace with Alta and Snowbird throughout the season, a fact that seldom occurs. The reason, especially during the early season, was that storms arrived on a southwest flow favoring the Logan area mountains.

November

Over two feet of snow fell in early November, but warm temperatures reduced the total to less than one foot by mid-November. Additional snow and rain to 9000 feet brought totals back to near two feet and formed the first prominent rain crust 20 inches above the ground before Thanksgiving. The presence of thick rain crusts would plague the snowpack throughout the winter to contribute to large avalanches and fatalities. Three feet of snow containing over two inches of water fell over three days in early December.

December

With the rain crust functioning as a bed surface natural avalanches occurred on the White Pine Knob and Mount Elmer. During the same cycle a snowmobiler was completely buried on the back of Providence Peak. Miraculously he was rescued by Boy Scouts who happened to be camping in the snowmobiler hut near where the burial occurred.

Another large storm cycle on a cold northwest flow arrived in our mountains several days before Christmas. Six and a half feet of snow, with a snow water content of 6.5 inches, fell between December 20th and the 29th. An avalanche warning was issued early in the storm and remained in effect for several days. Just after Christmas the flow shifted to the southwest and temperatures warmed. Finally on New Year's eve the snow level rose to near

January

9000 feet and rain, heavy at times fell through New Year's Day. The rain-on-snow resulted in several very large avalanches running to sizes not observed since 1986 including the Providence Couloir and Mendon Peak. Many other large avalanches were reported and observed from the New Years Day rain event. Total snow depth just prior to the rain reached 101 inches on December 31. Temperatures were near record highs during early January and finally became more seasonable by January 8. The result was the second prominent rain crust which set the stage and played a critical role in the tragedies to come.

Snow again began to fall on January 8 accompanied by strong winds.

January 10-11 avalanche cycle—three campers killed

A snowmobiler was buried and killed in Fox Canyon east of Montpelier, Idaho on January 10 after triggering a hard slab above him while high marking. While driving home from the mountains on Saturday, January 11, I encountered some of the worst winter storm conditions in memory. We were being hit by a surprisingly intense winter storm with northwest winds which eventually shifted to the east. Seventeen inches of snow fell, including 12 inches in about 6 hours during the evening and early morning of January 11 and 12. Temperatures dropped from +19 deg F to -17 deg F in a 12 hour period. An avalanche warning was issued at 3:00 p.m. on January 11. Logan Canyon was closed due to weather associated problems the evening of January 11. The east winds formed a slab approximately 30 inches thick on a southwest facing slope know locally as The Folly in Dry Canyon west of Logan Peak. A natural slide released and traveled far and fast on the New Year's Day rain crust and buried and killed three back country skiers sleeping in their tent. Other large avalanches occurred throughout the central and northern Wasatch during the cycle.

Mid January was warm and dry until the 20th when the next storm cycle began. Fifty two inches of snow fell between January 20th and the 26th containing over four inches of water. An avalanche warning was issued on the 23rd and remained in effect through the 27th. During the early morning of the 26th several large avalanches occurred on a variety of aspects in the Logan Canyon area. Among the slides was one that ran on a north west facing slope from the Day Glow path south for 2000 feet. The slide had a maximum debris depth of 12 feet and buried Highway 89 six feet deep in two fingers each about 30 feet wide. The highway was closed for about three hours. Fracture line profiles on several of these slides showed the bed surface to be the New Year's Day rain crust. On January 27 the total snow depth at the Beaver Mt. plot had reached the season maximum of 127 inches.

February

During February snowfall totals were a meager 32 inches in small storms averaging between and three and six inches each. March began with a medium storm producing 20 inches of low density snow. On March 8 six inches of snow fell accompanied by strong southwest winds. Then on March 9 three skiers and four dogs triggered a wind slab in the northeast facing Providence Couloir. All three skiers and all four dogs were caught. Two of the skiers were able to arrest near the crown, but the third was swept 2000 feet down slope and completely buried under one and one half feet of snow. His partners were able to locate him with a beacon even though they had no last seen point. The victim survived and was taken by Life Flight to McKay-Dee Hospital in Ogden where he recovered. One dog was lost and presumed killed in the avalanche.

March

The remainder of March was warm and dry with only small storms. The final incident of the season occurred near Mount Elmer when a lone skier triggered a small wind slab on April 3rd while skiing during a wind event with gusts to 75+ miles per hour.

Our study plot was taken off line in early April with 120 inches of snow on the ground. Good spring skiing continued well into June.

Season History
La Sal Mountains

by
Doug Lewis

The departure of the former full-time director Dave Madera in the spring of 1995, has led to a number of major changes for the La Sal Avalanche Forecast Center. During the winter of 1995-96, the forecast center was operated on a part-time basis with less than optimal results. After examining the needs of the La Sal Avalanche Forecast Center, it was decided to hire a full-time forecaster and try to utilize a number of volunteers to aid in field observations. After a long and arduous hiring process, I finally started on January 21, 1997 as the full-time forecaster for the La Sal Avalanche Forecast Center (LSAFC). Prior to this the former part-time forecaster, Brian Murray, was operating the forecast center on a limited basis. The forecasts were updated as snow conditions required with limited field observations. After a rather hasty introduction to the program, I was tossed into the conundrum of government service. During my internship, Brian answered a litany of questions as well as helping me with the more mundane tasks such as set up the weather station. We finally got the weather station up and operating with the help of Dan Judd and Bruce Tremper on January 31, 1997. It would have been an incredible struggle without their invaluable assistance. At the end of February, Brian retreated to warmer climes, leaving me to fend for my self, the honeymoon was over.

Being the sole forecaster, I focused on forecasting for the weekends or during big snow events and getting acquainted with office procedures and politics during the week. Due to the late start I was forced to focus my attention on getting the program up and running. This left many other aspects of the job far down the priority list. Fund raising, community awareness, and avalanche education as well as a number of other critical functions suffered due to the untimely start.

With such a late start, I had to interpolate what data was available to me to develop a summery of the winter. The data suggests that the first significant snowfall for the 1996-97 season arrived October 20, 1996 with about 3" of new. There after storms came through on a fairly regular basis through January. This helped prevent the formation of the usual deep slab instabilities that are common to the La Sal mountains. When I arrived on January 21, the La Sal mountains were 127% of normal. The latter half of the winter, snow fall started to decrease and by the end of February we were looking at a snowpack that was 97% of normal. This trend continued through the remainder of the winter season with the exception of a couple of major storms that blew through the first week of March and April. As of April 30th , the snow total for the Geyser Pass Trailhead study site at 9600' is 212", this is slightly above the average of 200". The snow water equivalent [6.7"] is

85% of normal while the total precipitation for the year is 129% of normal. During the 1996-97 winter season there were no reported close calls or fatalities.

October

Mild weather prevailed throughout the west till late October. The first snowfall that remained on the ground occurred on the 20th with 3" recorded at the Geyser Pass Trailhead study site. This was followed by a major snow event on the 25th that dropped approximately 14". Another storm on the 28th deposited an additional 8" for a total of 20" for the month and a base of 13".

November

Only one storm occured during early November with 4" of snow recorded on the 7th. Things started to pick up by mid month when a series of systems moved through southeast Utah. The strongest storm passed through on the 15th with 12" recorded at the SNOWTEL site, and then two more inches on the 17th. The month finished off with 9" on the 30th for a monthly total of 32" and a base of 17. Temperatures remained very mild throughout the month

December

Regular modest snowfalls fell throughout most of the month of December with very mild with temperatures around 30 degrees during much of the month. This set the stage for a stronger than normal snowpack in the La Sals. Depth hoar development seemed confined to the upper elevations where the early season snow remained unaffected by the mild temperatures at the lower elevations. At the end of December there was 30" of settled depth with 27" of accumulated snow.

January

A series of storms moved through southeastern Utah at regular intervals during the month of January, but none of them major snow producers. Mild temperatures continued thru January with highs regularly approaching or exceeding 30 degrees and only a few nights where temperature fell into the single digits. The lower snowpack remained reasonablely strong with only isolated deep slab avalanche activity at the higher elevations. These primarily occured with wind events following storm passage. Of course I didn't see any of this directly because I officially showed up in Moab and opened the La Sal Avalanche Forecast Center on the 25th with the help of Brian Murray.

Brian had been the part-time assistant till Dave Madera left, he then stepped into the part-time forecaster position for the 94-95 season. Brian continued to operate the center for the 95-96 season but on a part-time basis only. This season his he was nice enough to do some of the early season field work before my arrival and help me become familiar with the area and the center's operation. Dan Judd and Bruce Tremper came down at the end of the month to help us get the weather system up and to exercise the demons from the computer. With this task completed the center was fully operational. The month closed with a total of 38" of snow and a snow depth of 42".

February

In February, the pattern we saw in January of above average snowfall and mild temperatures began to break down. Storm systems became less frequent and temperatures began to slip toward a normal mid winter regime. As a result, the top 20-30 cm of snow began to recrystallize as a strong temperature gradient developed in the upper snowpack, especially on north facing slopes. Throughout the month, there were several relatively weak storm which put down between two and eight inches of new snow each time. The temperature gradient in the upper snowpack was unaffected by the infrequent shallow snowfalls and any new snow quickly metamorphosed into faceted crystals. The "reconstituted powder" made for good skiing during the month of February with the threat of avalanches confined to isolated wind slabs at the upper elevation or loose sluffs on steep protected northerly aspects near treeline. However, the stage was set for a major avalanche cycle as soon as we got enough load. I didn't have to wait long. The only major storm in February moved in on the evening of the 26th and continued till March 1st. This scenario resulted in the largest avalanche cycle for the La Sals this winter. Widespread avalanching on most of the northerly slide paths above treeline occurred early during the storm cycle. The sub alpine and some of the south facing alpine slopes released as the storm came to a close on March 1st. However, all the observed slides were confined to the mid and upper snowpack with no deep slab releases noted. As luck would have it, the storm coincided with the weekend when the county road crews are off. This effectively shut down the Geyser Pass road which kept everyone but the most determined and better educated skiers out of harms way. The month had started out at 125% of normal but the lack of any significant snowfall during February saw snow totals fell quickly to average levels by month's end. February closed with a snowfall total of 31" and a 54" snow depth at the snowtel site near the Geyser Pass Trailhead.

March

March opened with 11" of 5% density snow on the 1st at 9,600 ft., with 17" at the higher elevations, a real treat for the La Sals. Avalanche activity moderated shortly after this system moved out of the area and winter seemed to go out with a whimper and spring came on with a vengeance. After this first initial snow the precipitation faucet was turned down to a trickle. There were only three storms recorded during March, with 3" of snow on the 4th and 4" on the 24th and 29th. The highest peak gust for the winter season of 98 mph was recorded on the 24th , although this system wasn' t much of a snow producer. Some shallow slab avalanche activity was noted along ridge tops following these storms due to windloading. The snow depth peaked a month earlier than average with 60"on the 1st and rapidly declined to well below normal as balmy weather settled in for the rest of March.

The La Sals went from mid winter to spring almost overnight, especially at the lower elevations. Above treeline temperatures remained cool so the threat of isolated wind slabs avalanches continued through a good portion of the month. Below treeline things were very different, temperatures warmed into forties and fifties during the day and at times would remain above freezing overnight. The snow corned up rather quickly, with wet releases becoming the primary hazard thru most of the month. During March I saw the snow totals continue their downward trend with a snowfall total of 22" for month and a base of 23".

April

The first week of April saw winter trying to make a comeback as a winter like system stalled out over the four corners region. The La Sals received over 3" of water and 24" of snow from the first through the eighth. The system came in warm which helped the snow bond to the old snow surface but a number of weak layers in the new snow kept the hazard at high during this cycle. A few large naturals occured in the alpine regions but because of the stable pre-existing snowpack not many avalanches occured considering the amount of new snow. As the storm cleared, spring triumphantly returned to the La Sal mountains, although a little cooler than what we saw in March. The last major snow event was on the 24th with 9" recorded at Geyser Pass Trailhead. The month of April closed with a total of 36" of snowfall and a snow depth of 16". The La Sals with 5.5" of water are 80% of normal [6.9 "] for snow water equivalent for the season.

The La Sal Avalanche Forecast Center has undergone a number of changes in the past few years and this year was no exception. Last year the center operated on a part-time basis with less than desirable results. The center was able to issue advisories but with a noticeable decline in other areas such as maintaining records, public education, and training. With this in mind, a decision to operate the center on a full-time basis was made in order to maintain the center at a viable level. After reviewing the program it was determined that a full-time forecaster was needed at a minimum. An additional part-time forecaster was deemed too expensive and the center would need to rely on volunteers to assist with field work. This is a workable solution to a difficult budget problem. With the threat of future funding cutbacks lurking on the horizon, the future of the La Sal Avalanche Forecast Center may be uncertain in the long run.

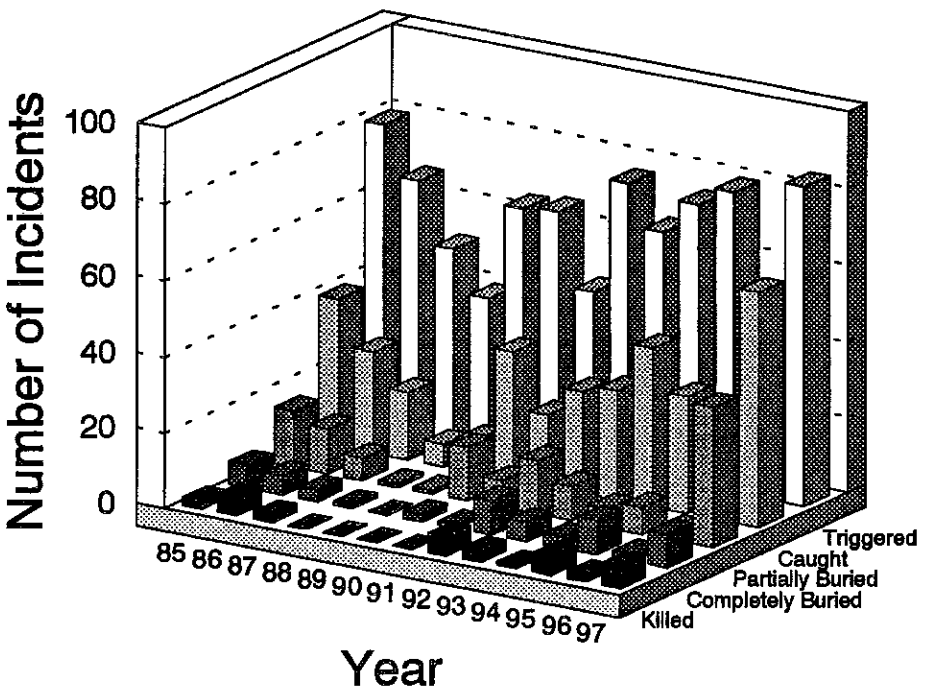
However, the one thing that is certain is the need for the center will only increase. Moab has become a desirable place to relocate with all of the recreational opportunities available as well as a relief valve for the backcountry skiers of the Wasatch looking for a degree of solitude they can no longer find in the mountains around Salt Lake City. Many of the people that move to Moab are from skiing climes and want to continue participating in winter recreation. They naturally look to the La Sals for winter sports, many of whom are avid skiers that want to push themselves as well as the limits. These people will need and expect reliable forecasts for more than just the limited area surrounding Gold Basin.

Another trend that is starting to apply pressure to the entire range is the increased use of snowmobiles by the locals to gain access to the backcountry. As this trend grows like it has elsewhere, it will only increase the need for the center's continued funding. With the population of backcountry skiers growing by leaps and bounds in the Salt Lake region, the demand for backcountry skiing will only increase in the La Sals due to its close proximity to Salt Lake City. The added recognition from the 2002 Winter Olympic Games will further increase the pressure on the Wasatch in the short term as well as the long term as people recognize the quality of life that Salt Lake City has to offer. This population surge will only increase the need for winter recreation in the La Sals.

Avalanche Incidents and Accidents

Avalanche Incidents in Utah

1985-97



In the 1996-97 season a record number of 84 people unintentionally triggered avalanches in the backcountry. Of those, 62 were caught, an incridible 37 were partially buried, 9 were totally buried and 6 killed.

As the winter and avalanche season comes to a deceptively quiet close in May, it's easy to forget that the 1996-97 winter was the deadliest on record for Utah since the mining days in the early part of the century of the century. In Utah, 6 backcountry users died in avalanches, breaking the old record of 5 fatalities set during 3 previous winters (1994-5, 1991-92 and 1985-86). Emulating recent national trends, the list of fatalities included a diverse group. One snowmobiler, one snowboarder, one ice climber and three campers (who skied to their camp, but we still list them as campers since we list them according to their activity at the time of the accident).

Interestingly enough, no skiers died in avalanches this season in either Utah or nationally. As of this writing, out of 19 fatalities none of them were skiers. In fact, if we look at the previous 5 years of data, snowmobilers lead the list followed by climbers, then backcountry skiers.

Snowmobilers are certainly the new kid on the avalanche block. True, snowmobiles have been going into the mountains for years, but in the past 5 years snowmobiles have made quantum leaps in power and traction. Nowadays, you can buy lightweight stock 900 cc machines with 2 inch paddle tracks, turbocharging and "nitro packs". Modern stock snowmobiles can go virtually any place a skier can go and they can cover 100 times the amount of terrain a skier can in a day. So it's no wonder that snowmobilers are the fastest growing category of avalanche victim. It's not that snowmobilers have never gotten into avalanche terrain, it's just that the new machines allow them to access the terrain right after the storm when the snow is unstable. After an accident, we often, we hear people say, "I've been riding that slope for years and I've never seen it slide before."

We've seen, through the years, that each new user group has to learn about avalanches the hard way. First, it was climbers, then ski areas, then backcountry telemark skiers, then snowboarders, now finally snowmobilers. When the next new contraption comes along, we can be sure that they will have to learn the hard way as well.

As forecasters, we have had to adjust to the contemporary mix of user groups. Although we're all skiers and climbers by training and choice, we've had to learn to snowboard and snowmobile. And as we increase in age, the soft seats of the snowmobile feels better and better.

We've also noticed an increase in crossover between the various user groups. In the past, skiers, snowboarders and snowmobilers had a segregated and antagonistic relationship at best. But nowadays, most skiers have also discovered the pleasure of snowboarding, some boarders have tried skiing, or at least own snowshoes too, and finally many skiers and boarders also own snowmobiles which they use to access the more remote skiing and boarding terrain. It's getting anymore that the old stereotypes don't work. It's not unusual for someone to ride a snowmobile into an area, then put on a split-apart snowboard, ski to the top, hook the skis together to make a snowboard, board to the bottom, then get out the ice climbing tools and go climb a frozen waterfall. Say if we dig up an avalanche victim laying next to their snowmobile with their split-apart snowboard on and an ice ax on their pack, what are we going to call them? Warren Miller solves the problem in this year's film by calling them all "snowriders."

In Utah, atypically, only two out of the six victims this season triggered the slide that killed them (In 95 percent of all fatalities since 1980, the avalanche was triggered by the victim or someone in the victim's party.) In addition, the number of reported backcountry incidents was the highest ever, the number of professional avalanche workers involved in close calls was up including three partial burials and two full burials, and the number of vehicles and pedestrians hit by avalanches on open highways was also up.

As the conventional wisdom goes, unusual weather creates unusual avalanches. And three unusual episodes of soaking rain at all elevations and aspects combined with two straight months of heavy snow, the unusual weather predictably created unusual avalanche conditions. In December and January, the weather and snow patterns caused the avalanche hazard to wildly fluctuate from low to high and back to low over short periods of time, cycling over and over. This pattern differed from the more usual pattern of longer lasting but obvious periods of high or extreme hazard. Many of the avalanche deaths and close calls occurred during times of rapidly increasing avalanche danger, mostly at the beginning of storms.

November

November started out with relatively average weather and a normal number of incidents. To eager, early season skiers, Baldy at the unopened Alta ski resort seemed to be a magnet, with two people going for rides early in the month. New snow mid month had snowboarders triggering slides in upper Big Cottonwood Canyon. On November 22nd, a soaking rain formed the first of three distinct rain crusts. Then a weak layer of facets developed on this crust—a combination which became the key player in the next avalanche cycle as subsequent storms piled on the weight.

December—The Rash of Avalanche Accidents Begins.

In December, winter began in earnest, and by the end of the month many recording stations had broken December snow records. There were 19 backcountry avalanche incidents, with 4 total burials resulting in 2 fatalities. Seven other people went for rides or were partially buried.

The first fatality came on December 7th culminating a furious 24 hours of avalanche accidents throughout northern Utah. Starting on Friday December 6th a snowmobiler in Providence Canyon in the Logan area mountains was totally buried for about 15 minutes. Despite the lack of a beacon, he was miraculously found by Boy Scouts who were camping in a nearby rescue shelter. They used the avalanche probes in the shelter to find the snowmobiler. (Snowmobilers the previous year had decided to create the cache when a snowmobiler was totally buried for 30 minutes on a nearby slope and found by random digging.)

Saturday December 7th dawned sunny and we knew that bad news wouldn't be far behind because it was a textbook day for an avalanche accident: It was Saturday, there was fresh powder, sunny skies and, most important, an unstable snowpack in an unusual pattern. Usually, avalanche danger is worse at higher elevations, but on December 7th it was just the opposite. The combination of a buried rain crust with weak faceted snow on top existed only below 9,000' in elevation with very little instability above that elevation. Even experienced backcountry travelers in Utah aren't used to seeing rain crusts and they definitely were not used to bad avalanche

danger at lower elevations—exactly where most people like to snowmobile, and where skiers usually find traditionally safer terrain. We knew it was exactly the kind of day which would catch people who don't normally call the avalanche bulletin. Consequently, we had an avalanche warning in effect.

Current Creek Peak

On Currant Creek Peak east of Heber, a group of 3 snowmobilers were high marking. Vern Cotterell got stuck half way up a slope, and after he got off his machine, triggered a large avalanche. Including two others waiting at the bottom, three snowmobilers were buried with just their hand sticking out of the snow. Nearby unburied snowmobilers dug two of them out, and then started looking for Cotterell. Since none of the three were wearing beacons, it was a needle-in-a-haystack situation. After about 20 minutes, they spotted his gloved hand sticking out of the snow, far above where the others were buried. When they uncovered his face, he was blue but still breathing. The party was able to complete their self rescue, and all were OK.

The same day at about the same time, an experienced backcountry skier in Broads Fork took a ride in some low elevation trees, suffered a lacerated kidney and lost some equipment. He was still able to ski out on one ski.

Bountiful Peak—Snowmobiler fatality

With so many close calls, one was bound to end tragically. On Bountiful Peak, Snowmobiler Rick Adams died when he triggered a slide while which partially buried his two friends below him and completely buried himself. The debris covered an area of 4 football fields, and once again with the victim not wearing an avalanche beacon, making an rescue in time to save his life a near impossibility.

After two days of searching complicated by high avalanche danger and high winds, the Davis County Sheriff decided to postpone the official search for the body until spring. His friends continued to search, though, over the next several days but without any luck. Twelve days after the accident, the Davis County Sheriff decided to resume the search, but this time using a sophisticated metal detector borrowed from University of Utah Geophysics Department. They found his snowmobile near the toe of the debris and quickly found his body by probing just uphill of the snowmobile.

Ironically, Bruce Tremper was scheduled to teach an avalanche class especially for snowmobilers the Saturday of the Bountiful Peak fatality. It was canceled due to lack of interest. After this well publicized fatality, an estimated 400 beacons were bought by the snowmobile community throughout northern Utah. With Christmas fast approaching, most stores sold out quickly. After the incident, many snowmobile groups asked for avalanche education classes. We taught several classes in the next couple months, all of them filled to capacity. Previous to this, we have never been able to attract more than about 10 snowmobilers to attend classes, at the same time classes directed towards skiers and snowboarders were often standing room only.

We have had a difficult time, through the years, reaching the Utah snowmobile community. They have never shown much interest in avalanches despite a double fatality on Ben Loomed Peak two seasons ago. For some reason this event, finally got everyone's attention. The snowmobile community seems to have turned the corner and they now realize the grave danger of

playing in avalanche terrain without the proper training or equipment. Fortunately, some tragedies can help to save other lives.

Snowboarder Fatality—Flagstaff Peak near Alta

Steady storms continued through December, and Utah's second avalanche fatality of the winter occurred on December 26th. A rain/mist crust had formed on December 25th, with a thin layer of weak, light density snow on top. As a storm moved in on the 26th, wind and snow loaded this crust-weak layer combination and the avalanche hazard rose rapidly to high in a matter of hours. Snowboarder, and nationally ranked mountain biker, Greg Dress (36) left the town of Alta at about 3 PM to hike up Flagstaff ridge. He was just going out by himself to take a quick ride before he picked up his girlfriend from the airport that night. By the next day, his friends had pieced together the story and notified the authorities. They also said that he always wears his beacon, even when he went out alone. Weather hampered the search that day. But with clear weather on the 28th, under the direction of the Salt Lake County Sheriff, UAFC Director Bruce Tremper and UDOT forecaster Dave Madera found his body by searching obvious avalanches in the area with beacons. He had been carried over 1000 vertical feet by the avalanche he most likely triggered and ended up buried near the toe of the debris only about 400 yards above the town of Alta.

As the new year arrived, snow conditions and numbers of avalanche incidents went from bad to worse. In January there were 25 reported incidents, including 4 fatalities in Utah and one more snowmobiler fatility near Montpelier, just north of the Utah state line. There were avalanche incidents on fully half the days of the month. All the avalanche professionals in Utah ran on nothing but adrenaline. Luckily the rest of the winter was relatively uneventful because it took that long to recover.

Snowmobiler Fatality near Montpelier Idaho

On January 8th, a an avalanche killed a snowmobiler in the mountains near Montpelier Idaho, not far north of the Utah-Idaho border. Although this is technically outside of the UAFC forecast area, the information in the Logan bulletin also accurately describes conditions in southern Idaho since neither weather nor avalanches seem to care about these straight lines which across mountain ranges.

The Unforecasted January 11th Storm

On January 11th, a very unusual storm hit northern Utah. In fact, the University of Utah Department of Meteorology determined that those same combination of conditions had not occurred since the winter of 1968. It was no wonder that none of the weather forecasters in Utah predicted the intensity and magnitude of the storm. A moist and potent southwest flow combined with an unforecasted upper level disturbance coming down from the northwest and a mis-forecasted, powerful cold front coming in from the east, all came together over northern Utah in the same 12 hour period. Three experienced backcountry snow campers died in an avalanche near Logan and several dozen cars and some pedestrians were hit in Little Cottonwood Canyon where 4000 people had an unplanned overnight stay in the canyon but were otherwise OK.

The forecast that morning by nearly all the meteorologists in Utah was for 2-6 inches of snow that day. By noon Little Cottonwood Canyon had well over a foot and it was still snowing hard. Twice they tried to control

the slopes above the road and open the road to downhill traffic and each time more avalanches closed the road, sometimes involving occupied cars. One large avalanche descended into a nearly full parking lot which damaged or totaled 40 cars but miraculously there were no injuries. With no hope of opening the road that day, 4000 unplanned guests spent the night on whatever floor space was available at Alta and Snowbird. Everyone went home the next day with good stories to tell but thanks to the efforts of the avalanche professionals and public safety staff in Little Cottonwood Canyon, no one lost their life.

Three Very Experienced Campers Killed near Logan

But there was no happy ending in Logan. Three well known and very experienced local skiers decided to ski up Dry Canyon on Logan Peak to camp overnight. They set up their tent in a grove of mature trees as the storm increased in intensity. During the night the cold front arrived, depositing 16 inches of new snow, the winds switched to the east and began to blow hard. A large, natural, soft-slab avalanche descended from the slopes above and ran into the mature trees killing all three people in their tent.

Mike Jenkins, the UAFC Logan area avalanche forecaster and a professor at the Utah State University Department of Forest Resources determined that the area where they camped probably gets hit by an avalanches at most every 50-100 years. It was the kind of place most people would camp without a second thought. It was simply an extreme case of being in the wrong place at the wrong time.

On January 12th, Al Soucie was caught and completely buried in an avalanche just above the town of Alta. Al is a 15 year avalanche professional, an ex UAFC forecaster and presently the Little Cottonwood Canyon Snow Ranger. In other words, if Al can get caught, then anyone can get caught. Al and Steve Conger, the UDOT lead forecaster went up on Flagstaff Shoulder, just above the town of Alta to check out the avalanche conditions. On a very low elevation and low angled slope they triggered a stubborn wind slab in a place no one can remember an avalanche occurring before. Al was carried into a narrow gully below and buried with just a hand sticking out. Conger got to him quickly and dug him out without injuries.

The Miracle Avalanche Story of the Winter—the Miracle of a Lifetime

The happiest avalanche story of the winter, in fact one of the happiest avalanche stories on record, occurred on January 25th. It was a miracle, something which defies all the odds and makes a mockery of statistics. Two snowshoers were descending a deep, narrow gully in Buttler Fork of Big Cottonwood Canyon. Neither of them wore beacons and neither had much avalanche training. Camile Coyle had noticed several very shallow, very soft avalanches which had started to occur because of heavy snowfall on top of a thin ice crust. She remarked to her niece about the avalanches and her niece remembered hearing that if buried you should make an air pocket in front of your mouth. And lucky she passed on that advice because a couple minutes later Camile, who was traveling out front, was buried in an avalanche six feet deep.

Her niece searched the small debris pile but without a beacon had no chance of finding her. A few minutes later, a group of skiers from Seattle happened upon the scene, assembled their ski pole probes and began to probe.

But Camile was buried too deeply for their probes to reach. Finally, and luckily, UAFC forecaster Carol Ciliberti also happened upon the scene. She was descending Buttler Fork while doing field work. Carol's heart sank when she interviewed the witnesses and learned that Camile had been buried over an hour at that point and that their probes were not long enough.

Carol always carries a collapsible probe as did her other two partners that day UAFC Intern Noah Maze and Carol's friend, Nancy King. They assembled their probes, Carol organized everyone into a probe line and they quickly located Camile. By the time they had dug the six feet to her head, an hour and three quarters had passed. Carol was astounded to see her moving and alive when they reached her. In fact, she was well enough to walk out on her own.

The statistics say that half of all completely buried avalanche victims are dead in the first 20-30 minutes. Only 12 percent are still alive after 45 minutes and an insignificant number are still alive after two hours. Almost all of the people who survive more than an hour under the snow are buried either very shallowly or are protected by a building or a car. It's nearly unheard of to survive a six foot burial, and just as unlikely to survive for nearly two hours. Combining these two together puts this case solidly into the statistical stratosphere.

She was lucky because the avalanche descended only about 60 feet and was composed of very soft new snow. It didn't travel far enough to grind up the snow or to heat it up. So the debris was uncharacteristically soft and fluffy. Although she couldn't move her arms, Camile was able to wiggle around and form an air space around her head and body which undoubtedly saved her life.

Just the week before, Carol Ciliberti did the investigation on the triple fatality on Logan Peak, one of whom was a friend and former climbing partner. What a week. Two accidents, both extreme statistical aberrations, one astoundingly unlucky and the other astoundingly lucky. From extreme sadness to extreme happiness. It's been the winter from both Hell and Heaven.

Houses Destroyed at Sundance—a Million Dollars of Damage

But the month wasn't over yet. The Provo mountains got disproportionately slammed at the end of the month as storm after storm piled up snow and water. On the 23rd, the new General Manager of Sundance and his family were temporarily staying in a house near Sundance. They had just come from Hawaii. He was outside of the house to get some fire wood when an avalanche slammed the house. He rushed back inside and was able to get the rest of his family out who were partially buried. Welcome to Utah.

Ice Climber Killed in Provo Canyon

On the 25th Utah's last fatality of the winter occurred on a stormy, wet day. Mixed rain and snow were falling, once again in the Provo area mountains. Two ice climbers neared the top of the "Fang" in Provo Canyon when an avalanche broke loose 1,200' above them. Ripped both off the climb, and deposited them at the base. When nearby ice climbers arrived to help, Doug Hall was dead from injuries sustained from the fall, his partner was partially buried and seriously injured. The week finished off with four

more houses near Sundance being hit by avalanches, 2 of which had already been condemned from direct hits by avalanches in previous years.

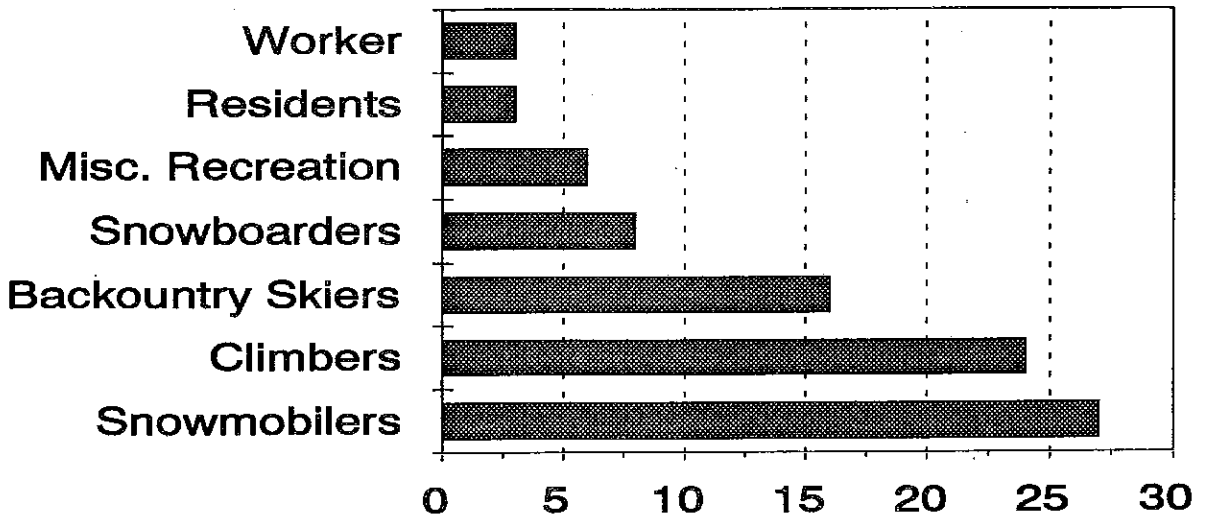
In February, the avalanche incidents finally began to taper off to a dull roar, so to speak. Only 11 people got caught and 4 went for rides in the entire month. The closest call came on February 24th, when a snowboarder went for a 1,800' ride down Hells Canyon, off the shoulder of Mt. Ogden. He ended his ride buried to the waist, but amazingly unhurt. The same day a skier in Stairs Gulch narrowly missed certain death when he grabbed a tree after triggering a large, long running slide. The next day, a Logan snowmobiler was lucky to escape being caught when he triggered a slide that left debris 8 feet deep.

March was relatively warm and dry, and the deep snow pack stabilized. It was a welcome change to be forecasting new snow avalanches only, which are also more obvious to back country users. Despite of 15 incidents for the month, including 1 partial burial and 2 total burials, all had good outcomes. The most serious incident occurred in the Logan mountains which had received more snow from several storms tracking a bit north of Utah. Three skiers and four dogs triggered a wind loaded slope late in the day in Providence Couloir. Two were able to get out of the slide, while the third went for a long ride and was totally buried. All three were wearing beacons, and a search by the party was able to locate the buried skier who survived, but was hospitalized for several days. One of the four dogs, however did not survive. There was another close call in March when a skier near North Ogden Divide was buried, but dug out OK by his partner and a passing motorist.

A Close Call near Logan

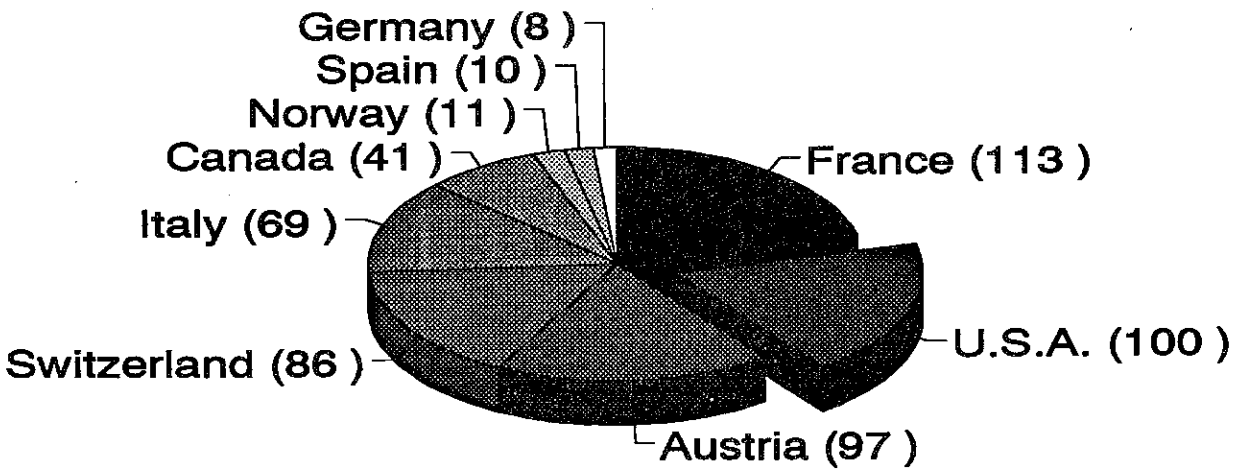
April and May were quiet, with only a few backcountry users caught, but with no serious consequences.

U.S. Avalanche Fatalities
1993-97



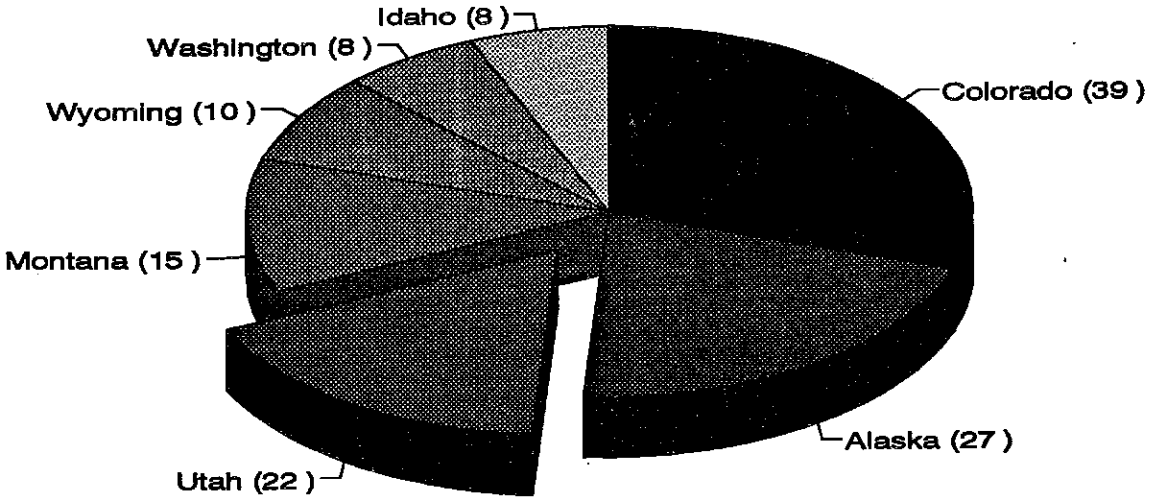
In recent years, snowmobilers lead the list. Skiers used to lead the list but have dropped recently.

Avalanche Fatalities
By Country 1992-96



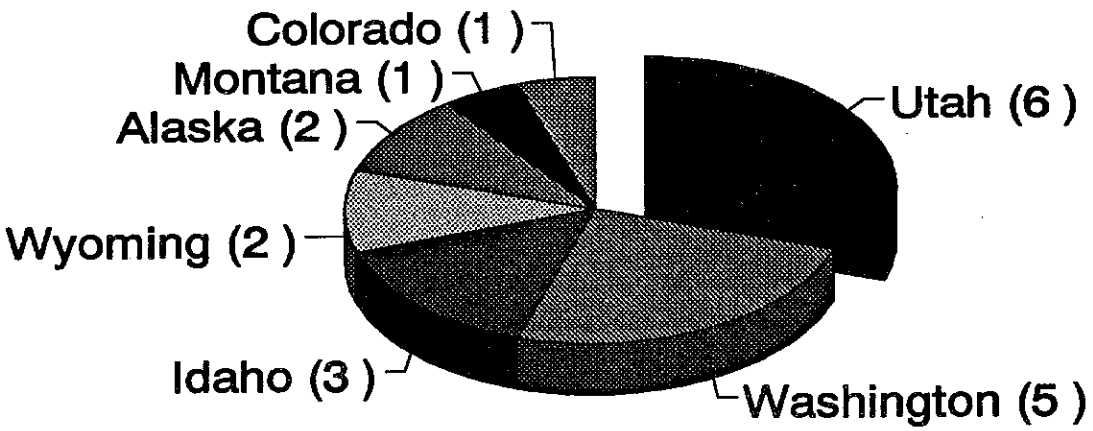
In recent years, the U.S. is second only to France in avalanche fatalities. At the present rate, the U.S. should lead the world in about 5 years.

U.S. Avalanche Fatalities
By State 1991-97



In recent years Utah and Alaska run neck and neck for the second most avalanche fatalities in the nation.

1996-97 U.S. Avalanche Fatalities
By State



This past season, Utah led the country in avalanche fatalities.

Incidents and Accidents 1996-97

This list includes only unintentional backcounty avalanche incidents. The list would be about twice as long it it contained intentional backcountry human-triggered slides or unintentional incidents by avalanche professionals such as ski patrollers. In addition, perhaps another 100 avalanche incidents per year go unreported in Utah especially in more rural areas and especially by the snowmobile community. **In total, there was a record number of 85 incidents. Of these, 62 were caught were 37 partially buried, 9 were totally buried and 6 killed in Utah with 1 killed in southern Idaho near Montpilier in the mountains covered by the Logan area forecast.**

Date	Location	Details
11/4	Baldy, Perlas (Alta)	Person took ride, uninjured
11/5	Baldy, (Alta)	Skier triggered
11/7	Reynolds Pk. (BCC)	Skier triggered
11/18	Claytons Pk. (near Brighton)	2 snowboard triggered slides
11/18	Hidden Canyon (near Brighton)	Snowboard triggered
11/19	Slide Canyon (Provo area)	Skier triggered
11/26	Hidden Canyon (near Brighton)	Snowboarder took ride
11/28	West Monitor Bowl (PC ridgeline)	2 skiers took ride, OK
12/1	Wilson Ridge (BCC)	Triggered sympathetically
12/1	Wilson Fork (BCC)	Triggered sympathetically
12/1	Wilson Pk area (BCC)	Several triggered by ski cuts
12/1	Gobblers Knob (BCC)	Ski cut
12/1	Bunchgrass (Logan area)	Skier triggered
12/3	Slide Canyon (Provo area)	Sympathetic to skier
12/6	Providence Canyon (Logan area)	Skier caught, bruised, lost gear
12/7	Bountiful Peak (near Farmington)	3 snowmobilers caught, 1 killed
12/7	Porter Fork (Mill Ck.)	Skier triggered
12/7	Currant Creek Pk. (near Heber)	3 snowmobilers caught, 1 buried, OK
12/7	Broads Fork (BCC)	1 Skier caught, injured, lost gear
12/8	Wilson Chutes (BCC)	Skier triggered
12/12	Little Water (BCC)	Skier triggered
12/23	Tibble Fork (near Box Elder Pk.)	Sledder partially buried
12/23	Rocky Pt, Dog Lake (BCC)	Human triggered
12/23	Greens Basin (BCC)	Human triggered
12/26	**Flagstaff Gully (near Alta)**	**Snowboarder fatality**
12/29	Wilson Saddle (BCC)	Skier triggered sympathetically
12/30	Wolverine Cirque (BCC)	Cornice broke, took ride
1/3	Alta backcountry	6 slides with ski cuts
1/4	Cardiff Bowl (BCC)	Skier triggered
1/4	Toledo Chute (LCC)	Skier triggered
1/4	White Pine, PC (Park City ridgeline)	Skier triggered
1/7	Clayton's Peak (near Brighton)	Snowboarder triggered
1/8	**near Montpilier, Idaho**	**Snowmobiler killed**
1/10	Hell's Kitchen Cyn	Skier triggered
1/11	LCC, Superior lot	6 people trapped in cars, OK
1/11	LCC Highway	3 pedestrians hit, 14 people trapped in cars, 1 vehicle rolled, all OK, 40 cars hit.
1/11	Snake Creek (near Brighton)	Skier went for ride

1/11	Dry Canyon (near Logan)	Skier triggered
1/11	**Dry Canyon (near Logan)**	**3 camping skiers killed**
1/12	Flagstaff (LCC)	Skier totally buried, OK
1/15	Tibble Fork (near Box Elder Pk.)	Skier triggered sympathetically
1/15	Iron Mnt. (near Park City)	Sympathetically triggered
1/18	Park City Ski Area	Snowboarder triggered in closed area
1/21	No Name (near Park City)	Skier triggered
1/21	Hell's Kitchen Cyn	3 slides skier triggered
1/22	Monitor Bowl (near Park City)	Skier triggered
1/23	near Sundance	Cabin hit, 2 people caught, partially buried, OK
1/25	Patsy Marley (LCC)	Skier went for short ride
1/25	Butler Fork (BCC)	Snowshoer buried 1 ½ hours, OK
1/25	**Fang, Provo Canyon**	**2 ice climbers swept off ice, 1 killed, 1 injured**
1/26	near Sundance	4 cabins hit
1/27	Rocky Point (near Alta)	Human triggered
1/31	Silver Fork (BCC)	Skier triggered
2/3	Cinder Chutes (near Wolf Mtn)	Boarder triggered
2/3	Homerun (near Wolf Mtn)	Boarder triggered
2/6	Alta Guard (LCC)	Skier took ride
2/20	Phifferhorn (LCC)	Skier triggered
2/21	Long John Silver	Skier triggered sluff
2/24	Mt Ogden, Hells Cyn	Snowboarder went for 1,800' ride, OK
2/24	Stairs Gulch (BCC)	Skier triggered, grabbed tree
2/25	Little Baldy, (near Logan)	Snowmobile triggered
2/27	North Sinks (near Logan)	Skier triggered
2/27	Wood Camp (near Logan)	Skier triggered
2/28	No Name Bowl (near Park City)	Snowboarder took ride
3/1	Tuscarora (BCC)	Skier triggered
3/1	Patsy Marley (LCC)	Human triggered
3/1	Upper Red Pine (LCC)	Human triggered
3/2	Mt. Elmer (Logan Area)	Skier triggered
3/5	Arrowhead (near Sundance)	Skier triggered
3/5	Patsy Marley (LCC)	Skier went for short ride
3/5	Sound of Music (near Wolf Mtn)	Snowboarders triggered 2 slides
3/5	Meadow Chutes (BCC)	Skier triggered sympathetically
3/5	North Ogden Divide (Ogden area)	Skier buried, OK
3/7	Daley Bowl (Park City area)	Skier triggered
3/7	Cardiac Ridge (BCC)	Snowboarder took ride, partially buried
3/7	Box Elder Pk.	Skier triggered
3/9	Providence Couloir (Logan Area)	3 skiers caught, 1 skier buried, hospitalized, dog killed
3/17	Cinder Chute (near Wolf Mtn.)	Skier triggered
3/17	Tuscarora (BCC)	Skier triggered
4/2	Blind Hollow Mnts	Skier caught, escaped
4/5	Cardiff Fork (BCC)	Skier triggered
4/5	Park City ridgeline	Skier triggered
4/6	Pointy Peak (near Wolf Mtn.)	6 human triggered slides, one took ride, partial burial
4/10	McDonalds Draw (PC Ridgeline)	Sympathetic to skier
5/3	near Alta??	Snowboarder caught in wet slide

Avalanche Education

Avalanches are dangerous. And the more you know about them and the more you know about current avalanche conditions before you go out, the more likely you will return safe and happy at the end of the day. Because of this, we try to educate the public about avalanches, both through our regular avalanche bulletins and also through special avalanche awareness classes. We often hear people say that calling the bulletins on a regular basis is an avalanche class on its own.

But we also offer a number of classes and workshops each season to provide more in-depth, detailed education. Our goal in avalanche education is to give people an overview of how to recognize dangerous avalanche terrain, how to evaluate dangerous snow conditions, and what weather factors may lead to an increasing avalanche hazard. Often, just a little bit of information can save someone's life, for instance, how to recognize a wind slab.

To accomplish this, we frequently put on free, basic avalanche awareness classes. In these two hour lectures we show slides, videos and use models to explain the basics of the avalanche phenomenon, rescue, safe travel in avalanche terrain, snowpack stability evaluation, and the human factors which lead to avalanche accidents. We do not charge for these classes in order to encourage all people who need the information to attend. The always popular REI lectures always draw standing room only crowds of about 250 people. We especially try to provide talks to especially high risk user groups like snowboarders and snowmobilers, in an attempt to counteract their rapidly rising fatality numbers. We also give free avalanche awareness talks on university campuses, at high schools or private businesses, or any place where a large number of people have expressed interest. This season we taught 29 classes which reached 1,360 people.

In addition to the basic two hour lecture, as time permits, we sometimes teach at three-day intensive avalanche workshops taught by the private sector. This type of workshop involves several hours of lectures in the morning, then a full afternoon in the field each day. These workshops give people a solid foundation to begin their career or avalanche education. Although the public regularly asks for us to put on 3-day workshops of our own, we lack the time and personnel to do so. It's probably best left to the private sector. But we also feel that because of our leadership position in avalanche education, both nationally and locally, we should at least stay somewhat involved in these courses in an attempt to keep the quality high.

For instance, because of rapidly changing demographics of avalanche victims, we feel that teaching snowboarders and snowmobilers is a big priority. There's plenty of quality avalanche classes taught for skiers but few for snowboarders and absolutely none for snowmobilers. We would like to help establish a tradition of high quality courses for these user groups.

For instance, Evelyn Lees worked with the FUAFC to organize the second annual advanced avalanche workshop for snowboarders, which took

place in February. The workshop featured lectures from several members of our staff, as well as a few of the local snowboarding avalanche professionals. Three writers from national snowboarding magazines attended and will write about avalanches in upcoming issues of their various magazines. In this way, sewing a few well-placed seeds can yield a future crop of well educated snowboarders and snowmobilers.

Bruce Tremper devoted a considerable about of time throughout the season developing classes especially for snowmobilers. In the past we have never been able to attract more than about 10 snowmobilers at a time to attend a basic avalanche awareness class. But the well publicized snowmobile fatality on Bountiful Peak catalyzed the snowmobile community to finally begin learning about avalanches. In the following couple weeks snowmobilers purchased about 400 beacons from all the local shops. And we were flooded with requests from snowmobile groups for avalanche talks. After the fatality, Bruce Tremper was able to find time to give four different talks, each one very well attended by snowmobilers eager for avalanche information.

The well publicized snowmobile fatality on Bountiful Peak catalyzed the snowmobile community to finally begin learning about avalanches.

Bruce is also working with Utah State Parks to develop avalanche education courses especially for snowmobilers. State Parks personnel will teach the classes.

Finally, Bruce Tremper and Carol Ciliberti presented lectures at the National Ski Patrol Intermountain Division Advanced Avalanche Class in February. In an effort to reach out to younger members of the population, Tom Kimbrough and Carol Ciliberti presented basic avalanche awareness seminars to local high school and grade school students.

Avalanche Education by UAFC Personnel

Date	Staff	Event	No.People
11/5	Staff	REI Avalanche Awareness	100
12/3	Staff	REI Avalanche Awareness	250
12/5	Kimbrough	Rockreation-Beacon Drill	20
12/5	Shaw	Forest Service Avalanche Awareness	25
12/8	Lees	Snowboarder Beacon Clinic	18
12/11	Tremper	REI Avalanche Awareness-Orem	80
12/16	Tremper	Warren Miller Films Avalanche Class	8
12/19	Tremper	REI Snowmobiler Avalanche Class	20
12/20	Tremper	Avalanche Awareness-Snowbird	20
1/2	Tremper	Utah Co. S.A.R. Avalanche Class	40
1/2	Kimbrough	Alta View H.S.-Avalanche Awareness	15
1/7	Tremper	REI Level II Avalanche Class	220
1/9	Tremper	Snowmobiler Avalanche Class-Provo	90
1/10	Ciliberti	Realms of Inquiry H.S. Avalanche Class	12
1/16	Tremper	Wasatch Mountain Club Avalanche Awareness	50
1/17-19	Staff	3-Day Advanced Avalanche Workshop	27
1/24	Tremper	Snowmobiler Avalanche Awareness-Davis Co.	60
1/24	Ciliberti	Realms of Inquiry H.S. Avalanche Class	12
1/24	Kimbrough	Washington G.S. Avalanche Awareness	25
1/27	Kimbrough	Granite G.S. Avalanche Awareness	25
2/2	Kimbrough	Washington G.S. Avalanche Awareness	25
2/8	Tremper/Ciliberti	National Ski Patrol Advance Avalanche Class	50
2/15-17	Lees/Kimbrough	3-Day Avalanche Workshop for Snowboarders	21
2/28	Kimbrough	Washington G.S. Avalanche Awareness	25
3/2	Shaw	Avalanche Class-Black Diamond Employees	6
3/6	Tremper	Avalanche Awareness-Snowbird	40
3/7	Tremper	Univ. of Utah Engineering Dept. Seminar	45
3/10	Tremper	Forest Service Regional Presentation	20
4/7	Tremper	Forest Service Winter Sports Meeting	30
		Total Talks 29	**Total People 1360**

Media

Once again, the Utah Avalanche Forecast Center was one of the most visible part of the Forest Service during the winter months. UAFC Director, Bruce Tremper continued to be featured in both national and international film documentaries about avalanches. These included National Geographic, CBS Forces of Nature, NBC Dateline, several programs which aired on public channels and Discovery Channel including Danger Zone and an hour-long British documentary aired for the first time two winters ago. In addition, Carol Ciliberti was filmed for Storm Warning, a program which will air on the Discovery Channel next winter.

A number of national magazines did stories on avalanches which featured UAFC staff, including: Ski Magazine, Powder Magazine, Snowboard Life, Couloir, and a number of smaller publications.

Dealing with local media is also a part-time job. The UAFC staff appeared on the local television at least 23 times, radio 10 times and in the newspapers 18 times. The actual numbers are no doubt higher because many of these interviews occur during times with avalanche warnings or avalanche accidents—times when it's so busy that we sometimes don't have time to enter them on our Media Contacts clipboard.

In any case, once again the UAFC was an extremely visible part of the Forest Service and always appeared in a "white hat" role.

Media Contacts 1996-97

Date	Forecaster	Agency	Subject
12/3	Shaw	Reese Stein	Avalanche Forecast Center
12/7	Tremper	Channel 2	On Camera - Bountiful Peak Fatality
12/7	Tremper	Channel 5	On Camera - Bountiful Peak Fatality
12/7	Tremper	Channel 13	On Camera - Bountiful Peak Fatality
12/7	Tremper	S.L. Tribune	Bountiful Peak Fatality
12/8	Tremper	Channel 4	On Camera - Bountiful Peak Fatality
12/8	Tremper	Standard Examiner	Bountiful Peak Fatality
12/8	Ciliberti	Channel 5	On Camera - Avalanche Warning
12/9	Ciliberti	KSL Radio	Avalanche Safety
12/9	Tremper	KSL Radio	Avalanche Safety
12/9	Ciliberti	S.L. Tribune	Avalanche Warning/Safety
12/9	Ciliberti	Deseret News	Avalanche Warning/Accident
12/9	Kimbrough	Deseret News	Avalanche Warning/Accident
12/10	Shaw	KSL Radio	Current Conditions
12/10	Shaw	Dateline NBC	Avalanche Fatality/Awareness
12/10	Shaw	BYU Newspaper	General Avalanche Information
12/10	Shaw	S.L. Tribune	Snowmobiler Avalanche Awareness
12/24	Shaw	Deseret News	Current Conditions

12/28	Tremper	Channel 2	On Camera - Snowboarder Fatality
12/28	Tremper	Channel 4	On Camera - Snowboarder Fatality
12/28	Tremper	Channel 5	On Camera - Snowboarder Fatality
12/30	Tremper	Channel 2	On Camera - Avalanche Awareness
12/30	Tremper	Channel 4	On Camera - Avalanche Awareness
12/30	Tremper	S.L. Tribune	Snowmobiler Avalanche Education
12/31	Shaw	Standard Examiner	Current Conditions
12/31	Shaw	KBRE Radio	Avalanche Awareness
12/31	Tremper	KBER Radio	Avalanche Awareness
12/31	Tremper	KBRE Radio	Avalanche Awareness
1/13	Ciliberti	KSL Radio	Current Conditions
1/14	Shaw	S.L. Tribune	Logan Avalanche Fatality
1/14	Shaw	Deseret News	Logan Avalanche Fatality
!/14	Shaw	Standard Examiner	Logan Avalanche Fatality
1/21	Shaw	Channel 4	On Camera - Current Conditions
1/25	Lees	S.L. Tribune	Avalanche Accidents
1/25	Ciliberti	S.L. Tribune	Butler Fork Rescue
1/25	Ciliberti	Channel 5	On Camera - Butler Fork Rescue
1/26	Ciliberti	Channel 5	On Camera - Avalanche Accidents
1/26	Ciliberti	Channel 2	On Camera - Avalanche Accidents
1/27	Tremper	KSL Radio	Avalanche Awareness
1/27	Ciliberti	KBRE Radio	Avalanche Awareness
1/27	Shaw	Craig Muller	Current Conditions
1/28	Shaw	Daily Universe	Avalanche Awareness
1/31	Ciliberti	Discovery Channel	On Camera - Avalanche Forecasting
2/18	Shaw	Channel 4	Avalanche Bulletin
2/11	Tremper	Ski Magazine	Avalanche Forecasting
2/20	Lees	Deseret News	Avalanches
2/20	Tremper	S.L.Tribune	Avalanche Balloons
2/27	Kimbrough	Channel 5	On Camera - Current Conditions
2/27	Kimbrough	Channel 4	On Camera - Current Conditions
2/27	Kimbrough	KSL Radio	Current Conditions
3/2	Tremper/Ciliberti	Deseret News	Avalanche Activity 1996-97
3/19	Tremper	Channel 4	On Camera - Wet Slides
3/31	Ciliberti	Channel 13	On Camera - Spring Conditions
4/6	Ciliberti	Channel 2	On Camera - Spring Conditions

42 Total media contacts

Observers

With cost overruns in 1995-96 due to unstable federal funding, the observer's budget was cut back to only $1,400, exclusive of the Friends of the Forecast Center's employee, Bob Athey. Despite fewer available dollars, the volunteers performed admirably, as usual. We expect more dollars to be available in the years to come.

The Salt Lake area is well covered by Bob Athey, Scott Carr, and Shawn Wagner. Greg Dollhausen and Bruce Engelhart also take time from their UDOT duties to let us know what they are seeing in the backcountry. Eric Trenbeath of the Alta Ski Patrol is also feeding in good information.

In recent years Provo has gone from an information black hole to one of our better covered areas. Joey Dempster, Phil Lowrey and Rip Griffith are indefatigable in their efforts. All three of them perform prodigious feats of vertical endurance to extract the secrets of the Provo snowpack. Joey also earned our enduring gratitude by arranging for arranging for us to record and distribute our bulltins on the BYU telephone system instead of the cranky old answer machine which used to sit in the Uinta National Forest Supervisor's Office.

We are lucky to have our long-time Ogden observers still active. Brad Bodily and Brian Smith are out regularly, even in the most heinous conditions, cutting turns and digging pits. Their information is seasoned by many years of skiing in the Ogden area. Brad again organized and taught several avalanche education efforts in Ogden.

For several years the Park City side of the range has suffered from a lack of good access. Private property and closed ski area boundaries has limited the number of backcountry travelers coming in from the east side and also the amount of snowpack information that we receive. Some of this is changing. New lifts at Wolf Mountain and a more liberal boundary policy, have resulted in increased backcounty traffic along the crest of the Wasatch. To meet the need for more Park City information, Scott Burch of Wolf Mountain Snow Safety has agreed to become a contract observer for the '97-98 season.

Bob Athey continues to be a tremendous resource for the UAFC. He provides an enormous volume of information. He is reliable, articulate, courageous and determined. His nightly report is a great comfort to the forecasters who begin typing the bulletin at 6:00 in the morning. The mid-afternoon cell phone calls clarify many an afternoon bulletin. From all of us: thanks, Bob.

Due to the budget limitations this year, the number of observations is not directly related to the cost.

Bob Athey continues to be a tremendous resource for the UAFC. He provides an enormous volume of information

FUAFC Observers (Central Wasatch)

Observer	Observations	Cost
Joey Dempster	31	$170
Shawn Wagner	36	$210
Scott Carr	29	$160
Totals	96	$540

USFS Contract Observers (Central Wasatch)

Observer	Observations	Cost
Brad Bodily	22	$150
Bruce Engelhard	28	$200
Phil Lowery	31	$200
Rip Griffith	30	$204
Greg Dolhousen	21	$100
Totals	132	$854
Grand totals	228	$1,394

Logan Observers (in addition to regular staff)

Fredrick Norsell	12
Stu Reynolds	11
Wally McFarlane	8
John Louviere	8
Spencer Logan	7
Mike DuPree	5
Craig Olsen	4
Rob Moss	3
Darin McAvoy	3
Brent Shaw	2
Jim Groom	2
Barr Bently	2
Various other single observations	21
Total	**89**

Budget

Once again, the Forest Service has made out like a bandit. The Forest Service can take credit for a white hat service like the Utah Avalanche Forecast Center while only contributing 37 percent of the UAFC budget statewide and only 30 percent in northern Utah. What a deal.

Because so many entities in Utah benefit from the services provided by the UAFC, several other partners have stepped up to the plate in recent years to help fund the program. Friends of the Utah Avalanche Forecast Center, a private, non-profit corporation, contributed $28,321 this season. The State of Utah Department of Public Safety Division of Comprehensive Emergency Management contributes $25,000 per season, Salt Lake County contributes $20,000 and Utah State University contributed around 13,000 mostly in for form of salary for Mike Jenkins, a professor in the Department of Forest Resources. This makes the total budget for northern Utah around $124,000 and around $15,000 for the Moab area.

In short, the UAFC is the epitome of an organization which has benefited from the formation of partnerships with other interested parties.

UAFC Funding Partners - Northern Utah

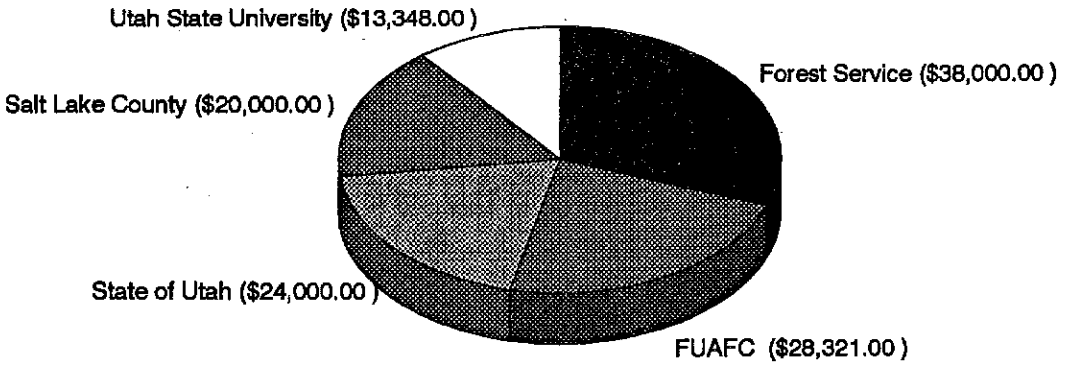
Forest Service	$38,000
Friends of Utah Avalanche Forecast Center (private)	$28,321
State of Utah (Dept. of Pub. Safety, Div. of Emerg. Mgt.)	$25,000
Salt Lake County	$20,000
Utah State University	$13,348
Sub Total	**$123,669**

UAFC Funding Partners - Moab Area

Forest Service	$14,540
Total Statewide	**$142,258**

Northern Utah Revenues

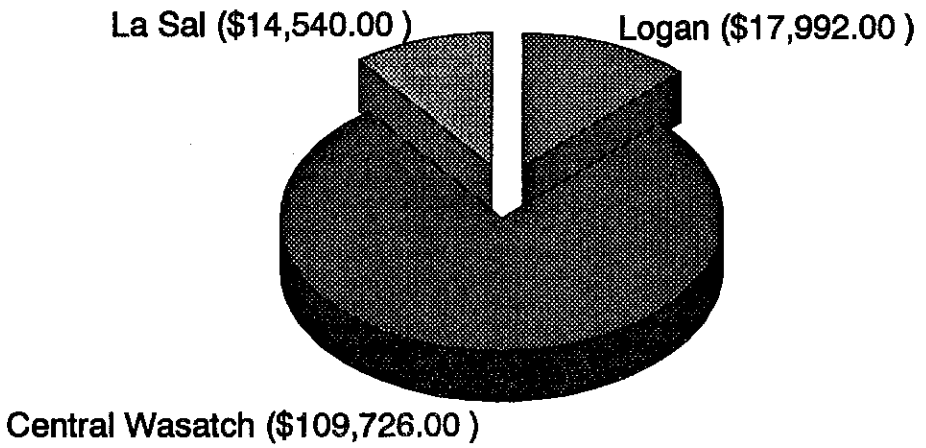
1996-97



Northern Utah Total $123,669
In-kind support is provided by the National Weather Service and Utah State University.

Expenditure by Region

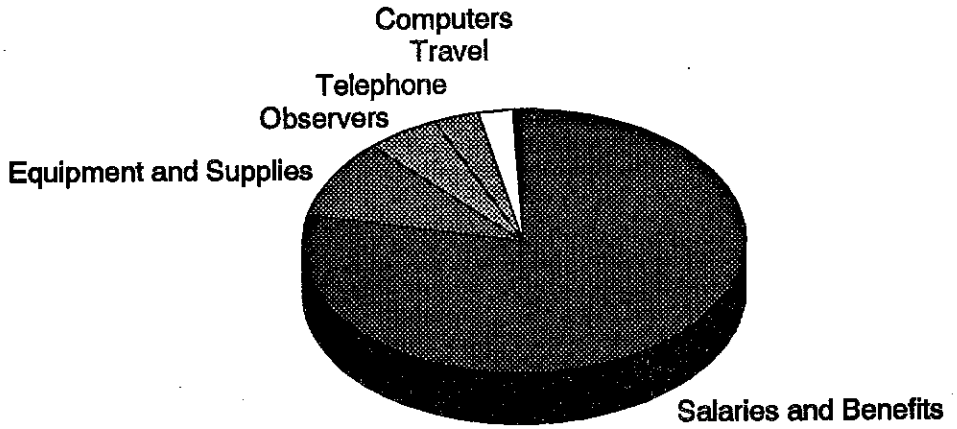
1996-97



Total Statewide $142,258.00

Total Utah Expenditures

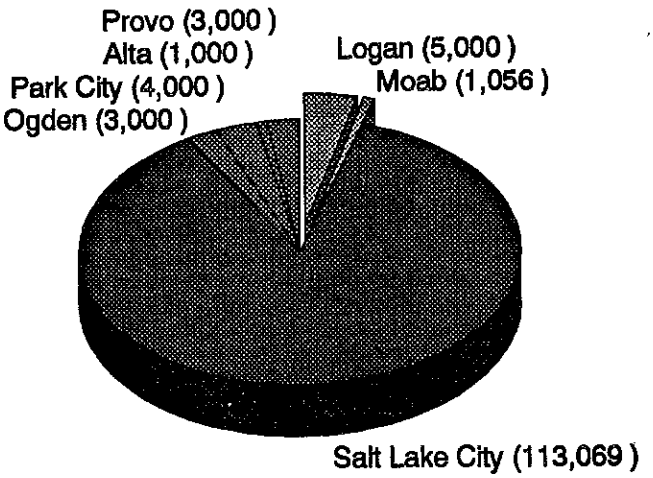
1996-97



Total Utah Expenditures: $142,258

Calls by Region

to Recorded Bulletin



130,125 total calls statewide. The core areas of Salt Lake, Park City, Ogden and Provo account for 95 percent of the calls statewide, Logan 3.8% and Moab 0.8%.

Appendix

Monthly Call Rate
Total Calls for Salt Lake City, (combined short and long recordings)

Year	November	December	January	February	March	April	Total
1980	714	1,514	4,274	2,967	3,389	1,313	14,171
1981	2,200	4,800	6,257	7,277	6,887	3,135	30,556
1982	1,761	6,879	8,522	5,485	6,361	3,416	32,424
1983	2,741	6,804	7,614	7,731	9,911	5,339	40,140
1984	3,216	10,708	7,073	7,032	5,983	4,393	38,405
1985	2,827	5,704	5,260	8,399	7,122	3,021	32,333
1986	4,119	4,703	6,298	10,628	6,225	3,706	35,679
1987	3,902	3,911	10,022	8,201	8,364	3,406	37,806
1988	2,646	7,235	11,296	8,080	10,196	4,186	43,639
1989	7,229	13,390	10,031	11,285	10,552	4,048	56,536
1990	4,651	9,204	17,049	15,120	13,072	4,747	63,843
1991	7,250	14,766	15,986	11,080	16,359	7,455	72,896
1992	12,670	9,365	11,970	17,396	15,200	5,799	72,399
1993	**17,621**	17,622	19,421	17,676	12,651	6,369	91,358
1994	6,663	12,251	19,743	**22,517**	14,615	9,281	85,072
1995	13,310	16,442	24,414	18,170	**18,838**	**12,647**	103,821
1996	7,685	16,785	**29,074**	22,398	16,189	9,338	101,469
1997	15,689	**23,769**	28,431	18,537	15,998	10,645	**113,069**

Numbers which look like rounded numbers are estimates of call counts based either on previous years when call counters were installed or on spot checks during the season. During the 1996-97 season, both the 3-minute and 5-minute forecast were combined into one recording with general information on the beginning of the recording and more detailed information at the end. Moab's low call count this season was because a forecaster was not hired for the position until mid season.

Year	SLC 3-min	SLC 5-min	SLC Total	Logan	Ogden	Provo	Park City	Moab	Total
77	6,522		6,522						13,044
78	11,258		11,258						11,258
79	9,924		9,924						9,924
80	14,469		14,469						14,469
81	30,736		30,736						30,736
82	33,099		33,099						33,099
83	40,355		40,355	4,357	1,890	3,671	3,042		53,315
84	39,647		39,647	5,300	2,725	4,076	2,577		54,325
85	32,476		32,476	4,652	1,706	2,276	2,386		43,496
86	36,535		36,535	5,469	5,464	2,292	2,562		52,322
87	38,841		38,841	4,693	2,587	2,518	2,121		50,760
88	39,614	4,020	43,634	4,000	2,500	2,500	2,500		55,134
89	48,488	8,033	56,521	4,000	2,500	2,500	2,500	1,100	69,121
90	52,898	10,947	63,845	4,000	2,500	2,500	3,000	1,693	77,538
91	62,814	10,160	72,974	4,000	2,500	2,500	3,000	2,811	87,785
92	62,429	9,970	72,399	4,000	2,500	2,500	3,000	3,216	87,615
93	79,248	12,136	91,384	3,676	3,034	3,134	3,419	2,763	107,410
94	71,880	13,204	85,084	4,110	3,500	2,610	3,663	3,000	101,967
95	90,052	13,770	103,822	5,044	3,746	3,000	3,640	2,842	122,094
96	89,965	11,529	101,494	3,566	2,744	2,813	3,338	1,794	115,749
97	113,069		113,069	5,000	3,000	3,000	4,000	1,056	129,125

Total Calls versus Total November-April snow at Alta

	Calls	Alta Snow (Inches.)	
1976-77	6,522	314.5	
1977-78	11,258	524.5	
1978-79	9,924	588.0	
1979-80	14,469	514.0	
1980-81	30,736	391.0	
1981-82	41,610	696.0	
1982-83	53,315	637.0	
1983-84	54,325	743.5	
1984-85	43,498	457.0	
1985-86	52,322	599.0	
1986-87	50,760	378.0	
1987-88	53,000	410.3	
1988-89	67,621	581.5	
1989-90	80,297	448.0	
1990-91	90,785	580.2	
1991-92	90,615	395.0	
1992-93	107,410	647.0	
1993-94	101,470	490.3	
1994-95	122,092	**745.4**	**- 50 Year Record High**
1995-96	115,749	562.0	
1996-97	**129,125**	599.1	
	51 year average snowfall	499	

Backcountry Avalanche Incidents

Year	Triggered	Caught	At Least Partially Buried	Totally Buried	Killed
1996-97	84	62	37	9	6
1995-96	51	15	3	2	2
1994-95	79	31	7	9	5
1993-94	74	42	5	3	1
92-93	65	29	9	5	3
91-92	76	27	14	9	5
90-91	46	19	7	1	0
89-90	65	34	14	2	0
88-89	64	9	1	0	0
87-88	39	6	(1)	(1)	0
86-87	50	18	6	3	2
85-86	66	27	12	5	5
84-85	79	39	15	6	2
83-84	M	24	M	M	1
82-83	M	M	15	M	0
81-82	M	M	M	M	1
80-81	M	M	M	M	2
79-80	M	M	M	M	1
78-79	M	M	M	M	2
77-78	M	M	M	M	0
76-77	M	M	M	M	1
75-76	M	M	M	M	1

Snowfall at Alta DOT Study Plot 1944-Present

Season	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Total
1944-45	—	57.0	19.5	67.0	—	57.0	
1945-46	109.0	83.0	84.5	50.0	69.0	55.5	451.0
1946-47	69.0	63.0	61.0	53.0	68.0	60.0	374.0
1947-48	118.0	80.0	46.0	66.0	165.0	74.0	549.0
1948-49	71.0	160.0	132.0	58.0	97.0	5.0	523.0
1949-50	39.0	137.0	133.0	34.0	109.0	25.0	477.0
1950-51	60.0	66.0	112.0	58.0	53.0	0.0	349.0
1951-52	67.0	156	115.0	105.0	163.0	35.0	641.0
1952-53	44.0	65.0	112.0	40.0	93.0	57.0	411.0
1953-54	50.0	107.0	54.0	57.0	101.0	14.0	383.0
1954-55	37.0	53.0	134.0	129.0	60.0	59.0	472.0
1955-56	86.0	112.0	103.0	72.0	33.0	54.0	460.0
1956-57	36.0	50.0	86.0	41.0	97.0	76.0	386.0
1957-58	74.0	79.5	83.5	131.5	80.0	111.0	559.5
1958-59	38.0	47.5	81.0	107.0	84.5	28.0	386.0
1959-60	22.0	39.5	59.0	**155.0**	92.0	28.0	395.5
1960-61	75.0	40.0	1.0	62.0	113.0	35.0	326.0
1961-62	46.0	82.5	86.0	110.0	35.0	42.0	401.5
1962-63	31.0	17.0	85.0	39.0	93.0	136.0	401.0
1963-64	55.0	53.0	108.0	68.0	**183.0**	99.0	566.0
1964-65	95.0	141.0	150.0	66.0	44.0	77.0	573.0
1965-66	69.0	69.0	73.0	103.0	70.0	49.0	433.0
1966-67	53.0	84.0	168.0	72.0	61.0	106.0	544.0
1967-68	22.0	131.0	39.0	84.0	70.0	133.5	479.5
1968-69	87.5	132.6	113.0	148.0	35.0	50.0	566.1
1969-70	56.0	70.0	103.5	60.5	79.0	90.0	459.0
1970-71	79.0	142.0	58.0	73.5	87.0	42.0	481.5
1971-72	64.5	159.0	94.5	45.0	47.0	56.6	466.6
1972-73	——	122.0	64.5	77.0	124.0	109.0	496.5
1973-74	90.9	128.2	104.5	91.0	45.0	136.0	595.6
1974-75	25.5	146.5	104.0	88.0	151.0	90.0	605.0
1975-76	94.0	67.0	74.5	69.0	93.0	42.0	439.5
1976-77	13.5	17.0	50.5	73.5	129.0	31.0	314.5
1977-78	53.0	106.5	99.5	92.5	85.0	88.0	524.5
1978-79	62.5	96.0	78.5	86.0	71.0	94.0	588.0
1979-80	79.5	27.0	143.0	112.5	123.0	29.0	514.0
1980-81	40.0	34.0	73.0	82.0	110.0	52.0	391.0
1981-82	47.0	184.0	143.0	85.0	164.0	73.0	696.0
1982-83	66.0	165.0	75.5	68.0	150.0	112.5	637.0
1983-84	143.5	**244.5**	42.0	104.0	85.0	124.5	743.5
1984-85	112.5	105.0	44.0	61.5	99.5	34.5	457.0
1985-86	132.0	62.0	56.0	112.7	100.0	135.7	599.0
1986-87	73.0	12.3	96.0	73.0	104.0	23.5	381.8
1987-88	30.0	91.0	105.1	39.75	115.5	29.0	410.3
1988-89	172.5	124.5	70.75	97.5	64.75	52.0	581.5
1989-90	76.0	49.0	107.5	100.5	84.0	31.0	448.0
1990-91	109.5	91.0	82.8	49.7	110.9	**136.3**	580.2
1991-92	133.4	57.2	41.8	85	50.1	27.5	395.0
1992-93	118.8	119.2	165.3	102.9	63.0	81.2	650.4
1993-94	40.7	64.85	122.7	134.05	47.2	80.8	490.3
1994-95	**205.9**	73.8	**199.7**	56.3	128.9	80.7	**745.4**
1995-96	57	53	187	104	82	79	562
1996-97	78.3	164.8	141.5	91	53.8	69.7	599.1
Average	71.1	90.7	94.2	81.0	91.4	66.1	497.2
Maximum	205.9	244.5	199.7	155	183	136.3	745.4
Year of Max	94	83	95	68	64	91	95

Utah Avalanche Deaths - 1950-present

Season	Date	Deaths	Sex	Location
1950-51	-	-	-	-
1951-51	-	-	-	-
1952-53	-	-	-	-
1953-54	-	-	-	-
1954-55	-	-	-	-
1955-56	-	-	-	-
1956-57	-	-	-	-
1957-58	3/9/58	2	Males	Snowbasin
1958-59	-	-	-	-
1959-60	-	-	-	-
1960-61	-	-	-	-
1961-62	-	-	-	-
1962-63	-	-	-	-
1963-64	3/29/64	1	Male	Snowbasin
1964-65	-	-	-	-
1965-66	12/31/65	1	Male	Park City
1966-67	2/12/67	2	Males	Pharoah's Glen
1967-68	2/19/68	1	Male	Rock Canyon
1968-69	-	-	-	-
1969-70	1/29/70	1	Male	Alta
1970-71	-	-	-	-
1971-72	-	-	-	-
1972-73	1/29/73	1	Male	Park West
1973-74	-	-	-	-
1974-75	-	-	-	-
1975-76	1/6/76	1	Male	Alta
1976-77	3/3/77	1	Male	Snowbird
1977-78	-	-	-	-
1978-79	1/19/79	1	Male	Helper
1978-79	4/2/79	1	Male	Lake Desolation
1979-80	1/11/80	1	Male	Evergreen Ridge
1980-81	2/1/81	1	Male	Cardiff
1980-81	3/1/81	1	Male	Millcreek
1981-82	3/22/82	1	Male	near Park West
1982-83	-	-	-	-
1983-84	1/2/84	1	Male	Superior
1984-85	2/22/85	1	Male	Near Powder Mountain
1984-85	3/19/85	1	Female	Park City (wet slide)
1985-86	11/13/85	2	Males	Sunset Peak
1985-86	1/6/86	1	Male	Provo Canyon
1985-86	2/17/86	1	Male	Big Cottonwood Canyon
1985-86	2/19/86	1	Male	Alta
1986-87	11/20/86	1	Male	Sugarloaf, Alta (unopened)
1986-87	2/15/87	1	Male	Twin Lakes Reservoir
1987-88	-	-	-	-

1988-89	-	-	-	-
1989-90	11/25/89	1	Male	Tony Grove Lake, Logan
1990-91	-	-	-	-
1991-92	2/12/92	4	3-M/1-F	Gold Basin, La Sal Mtns
1991-92	4/ 1/92	1	Male	Mineral Basin, near Snowbird
1992-93	1/16/93	1	Male	Sundance (closed area)
1992-93	2/25/93	1	Male	Pinecrest, Emig. Cyn.
1992-93	4/3/93	1	Male	Wolverine Cirque
1993-94	2/18/94	1	Male	10,420 Peak, B.C.C.
1994-95	11/7/94	1	Male	Snowbird (unopened)
1994-95	1/14/95	2	Males	Ben Lomond, Ogden (snowmobiler)
1994-95	1/23/95	1	Male	Midway
1994-95	2/12/95	1	Male	Gobbler's Knob, B.C.C.
1995-96	2/2/96	1	Male	Solitude patroller
1995-96	3/27/96	1	Male	Maybird Gulch, L.C.C.
1996-97	12/7/96	1	Male	Bountiful Peak (snowmobiler)
1996-97	12/26/96	1	Male	Flagstaff Peak (snowboarder)
1996-97	01/11/97	3	Males	Logan Peak (Three campers)
1996-97	01/25/97	1	Male	Provo Canyon (climber)
Total Deaths since 1950:		**50**	**48 Males** **2 Females**	

Avalanche Fatalities in the U.S. -1996-97

As of August 1st

Date	Location	Number	Type of Activity
December 7 1996	Bountiful Peak, UT	1	Snowmobiler
December 23, 1996	Chair Peak WA	2	Two Climbers
December 26, 1996	Flagstaff Peak, UT	1	Snowboarder
December 28, 1996	Mt. Index, WA	3	Three Climbers
January 8, 1997	near Montpelier, ID	1	Snowmobiler
January 11, 1997	Logan Pk, UT	3	Three Campers
January 17, 1997	Resurrection Pass, AK	1	Hiker
January 25, 1997	Provo Cyn, UT	1	Climber
February 1, 1997	near Casacade ID	1	Snowmobiler
February 21, 1997	near Jackson MT	1	Snowmobiler
March 3, 1997	Yellowstone N.P.	2	Two workers on skis
March 8, 1997	near Priest Lake ID	1	Snowmobiler
April 11 1996	Gakona Glacier, Alaska	1	Snowmobiler
July, 1997	San Juan Mtns, CO	1	Climber
	Total	**20**	

Climbers	7
Snowmobilers	6
Campers	3
Workers	2
Hunter	1
Snowboarder	1
Total	**20**

Example of an Avalanche Bulletin

ZCZC SLCWRKSNW SDC
TTAA00 KSLC DDHHMM

Good morning, this is Bruce Tremper with the Forest Service Utah Avalanche Forecast Center with your avalanche and mountain weather bulletin for the Salt Lake area mountains. Today is Wednesday, March 19 and it's 7:15 a.m. This bulletin is brought to you in part by a generous donation to the FUAFC from Wasatch Brewing, Utah's oldest and largest Microbrewery which has been a proud supporter of the UAFC for many years.

(Provo sponsorship: This recording is made available to you courtesy of BYU Outdoors Unlimited. The information contained in this bulletin is from the U.S.Forest Service which is solely responsible for its content.)

(Ogden sponsorship: This recording is made available courtesy of Weber State University Wilderness Recreation Center. The information contained in this bulletin is from the U.S. Forest Service which is solely responsible for its content.)

Bottom line:
Salt Lake, Park City, Odgen, Logan, Provo:
Moderate danger of wet sluffs on steep sun exposed slopes.

Current conditions:
Last night ridgetop temperatues were right around freezing and there was a bit of a temperatue inversion in the mountain valleys with some lower elevation temperatues just below freezing. Since snow temperature depends more on radiation balance than on air temperatue, because of the clear skies overnight, I think there's probably a decent refreeze of the snow surface in many areas this morning. But you have to get it quick because things are going to warm up in a hurry again this morning. You might even find some corn, or something resembling corn on the sun exposed slopes. The best corn will be in the Provo area mountains because they didn't get any new snow out of Monday's storm. Speaking of powder, there's still some soft, dry powder on upper elevation, steeper, due north facing slopes but flatter north facing slopes or slopes facing any other direction besides north have various kinds of sun crusts on them, some of which might even be supportable this morning until about two hours after the sun gets on them. The lower elevation snow is completely saturated and you just fall through the rotton snow. Snowmobilers might get stuck off of the trails today at lower elevations.

Avalanche conditions:
Yesterday, as forecast, there lots of point-release wet sluffs on all the steep slopes as they heated up in the sun. With the temperatues even warmer today I think we'll continue to see a fair number of wet sluffs on the steep slopes, even a lot of the north facing slopes. You're going to find wet activity at all different elevations and aspects today but the bottom line is to get off of and out from underneath steep slopes when they get wet and sloppy. Danger-wise, I would call it a mostly low danger this morning but rapidly escalating into moderate danger as the snow gets sloppy, and moderate to high danger if you're sinking into your knees in wet snow, or you find yourself in wet snow and also standing in a stupid place like above a big cliff or a terrain trap like a gully. Finally, at upper elevations, the wind created some wind slabs and sastrugi and on the extreme upper elevations you might even find a dry wind slab which is still sensitive, but in general I'm guessing that most of the wind slabs will have settled out and stabilized by today.

Mountain weather:
Hot and nasty again today but even more so. Sunny skies with ridgetop temperatues around 40 degrees, 8,000 temps above 50. Enjoy it while you can because we have some high clouds for Thursday and Friday as the ridge shifts easterly and the high clouds streaming up from Hawaii shifts over us. Temperatues, however, should still remain high, perhaps even reaching 42 degrees for ridgetop temperatues on Thursday. Cooling back closer to freezing on Friday.

Extended:
Next chance for snow looks like Monday or Tuesday.

To report avalanche activity and snow conditions call us at 524-5304 (or 1-800-662-4140) This bulletin and a detailed mountain weather forecast is available on the Internet at www.avalanche.org. For information on where the Powderbirds plan on flying, call their recording at 521-6040, extension 5280.

This bulletin offers only generalized avalanche information and you are ultimately responsible for your own safety.

The Utah Avalanche Center is brought to you by the Forest Service in partnership with the National Weather Service, the State of Utah, Salt Lake County and the Friends of the Utah Avalanche Forecast Center.

Tom Kimbrough will update this bulletin on Thursday morning by 7:15 am.
Thanks for calling.
Tremper
NNNN

Example of an Avalanche Warning

ZCZC SLCSABSLC ALL
TTAA00 KSLC DDHHMM
UTZALL-012300-

AVALANCHE WARNING

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

1000 HRS, FRIDAY, DECEMBER 6, 1996

*** AVALANCHE WARNING ***
*** NORTHERN WASATCH MOUNTAINS ***

AN AVALANCHE WARNING IS IN EFFECT FOR THE NORTHERN WASATCH MOUNTAINS, ESPECIALLY THE LOGAN, OGDEN AND PROVO AREAS AS WELL AS THE LOWER ELEVATIONS IN THE CENTRAL WASATCH AND NEAR PARK CITY. HUMAN TRIGGERED AVALANCHES ARE LIKELY AND SPONTANEOUS AVALANCHES ARE POSSIBLE. PEOPLE SHOULD AVOID STEEP BACKCOUNTRY SLOPES AND AVALANCHE RUN-OUT AREAS.

FOR MORE DETAILED INFORMATION, CALL:
SALT LAKE CITY 364-1581
OGDEN 621-2362

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

Example of a Mountain Weather Forecast

ZCZC SLCWRKMTN SDC
TTAA00 KSLC DDHHMM

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

Monday, March 31, 1997, 0600 hrs.
The big Pacific trof headed our way looks just as impressive in last night's model runs. The NWS has issued a winter storm warning for the mountains today through Tuesday morning. Pre-frontal snow should start around midday as the SW flow taps into good subtropical moisture. Frontal passage will be late this afternoon or early evening. The models still differ by a few hours on when the front will pass thru the SLC area, but the consensus leans toward about 4-5 pm. Thunderstorms with lightning are likely to occur along with fropa and also tonight due to the clash of cold air with the warmer air mass now over the state. Behind the front very cold air will move in rapidly, and the strong NW flow should get orographic snowfall going in the mountains. Heavy snowfall is likely at times this evening and tonight. By Tuesday morning the atmosphere should start to stabilize; snowfall will turn showery and amounts could be quite variable, depending on the amount of solar heating.
The extended shows mountain snow showers and cooler temperatures through Wednesday as a closed low develops to the SW, then another system in a NW flow will push south into S CA. Models keep most of the energy to the west, but there's a chance of more snow as it moves through on Friday.

	Today	Tonight	Tomorrow	Tom. nite
Free air (700 mb)				
Wind Dir and Speed	S-SW 30-40	NW 30-40	N 25	NE 25
Temperature (F.)	25	7	3	7
8,000' Temperature	42>25	12	20	15
Cloud Cover:	MC	MC	MC	MC
Rain/Snow Line:	7K	valley -->		
Precipitation:	S	S/S+	SW-	SW-
Precip density:	12%	5%		
Lightning:	Yes(late)	yes		

Quantitative Precipitation Guesstimate (inches of snow)

	Today	Tonight	Tomorrow Tom.nite
Logan Mountains	3-6	4-8	All Areas snow
Powder Mt.	2-5	6-10	showers 1-4" each
Snowbasin	3-6	4-8	12 hour period.
Wolf Mountain	2-5	4-8	
Park City/Deer Valley	3-6	4-8	
Solitude/Brighton	2-5	6-10	
Snowbird/Alta	2-5	6-10	
Sundance	3-6	4-8	

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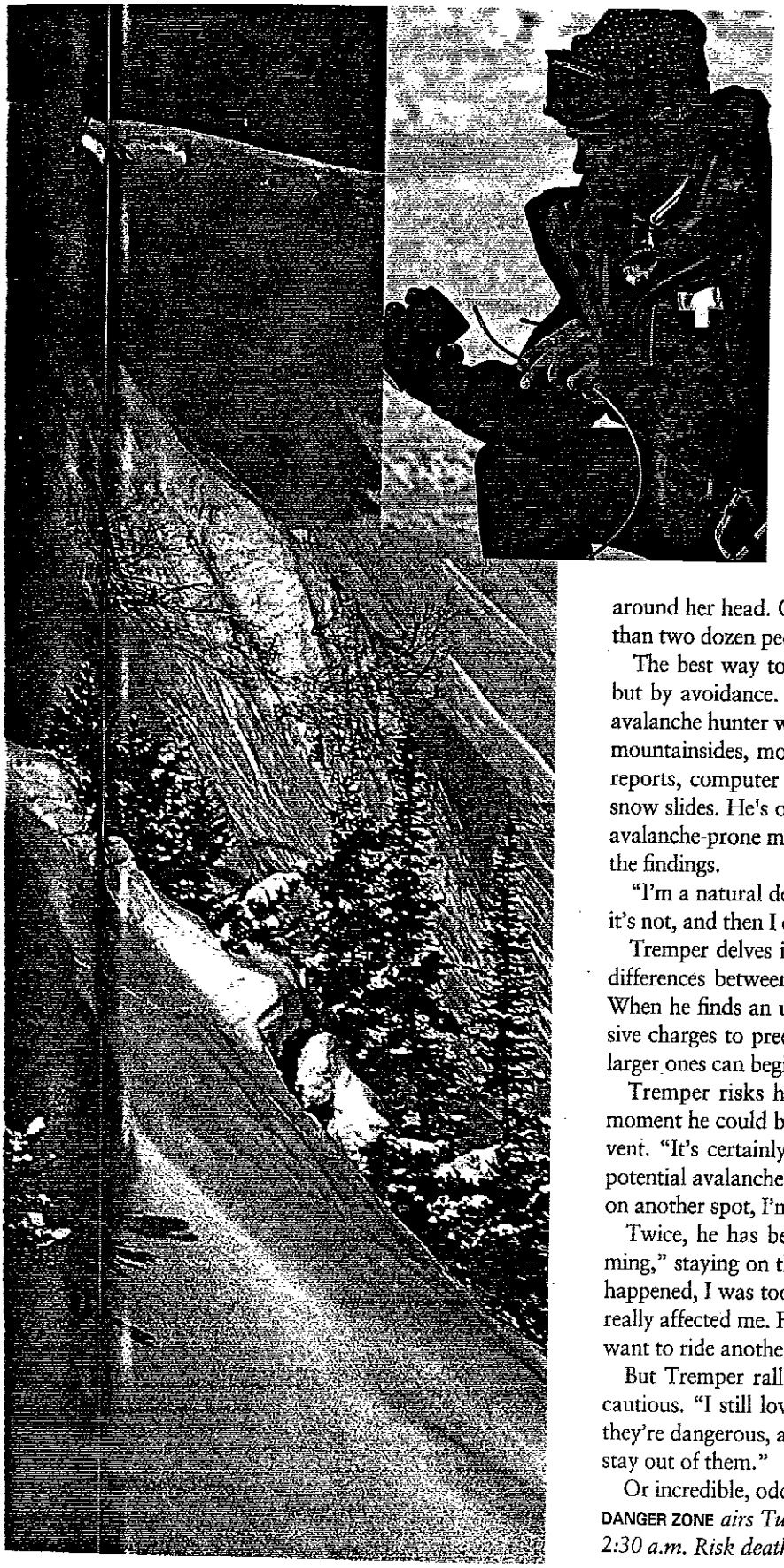
NNNN

Media Articles



Discovery channel monthly

The avalanche patrol, with eyes and ears peeled for killer slides, tames the mighty mountain.

Cammille Coyle is a lucky woman. Last January, while snowshoeing in Utah's Big Cottonwood Canyon, a small, relatively soft avalanche buried her under six feet of snow. Her companion quickly summoned help, but after almost two hours, the rescuers were losing hope. At last, by probing the snow with a collapsible pole, they found Coyle, alive and unhurt.

She walked off the mountain, lucky indeed. She had gone out in a heavy snowfall, without an avalanche beacon (a homing device hung around the neck), into an area already riddled with small slides. Fortunately, the snow smothering her was porous, and she was able to hollow an air pocket around her head. Otherwise, she would have joined the statistics, one of the more than two dozen people killed in North American avalanches just last winter.

The best way to survive the freight-train force of an avalanche is not by luck, but by avoidance. It's a challenge made easier by people like Bruce Tremper, an avalanche hunter with the Utah Avalanche Forecast Center. His job is to comb the mountainsides, monitoring the potential for avalanches. He also studies weather reports, computer models, and satellite images to assess the daily likelihood of snow slides. He's only one of a new breed of snow men (and women) who patrol avalanche-prone mountains throughout the world; there's even a website to report the findings.

"I'm a natural detective," he explains. "I try to figure out where it's safe, where it's not, and then I communicate that to the public to try to keep them alive."

Tremper delves into the snow, probing it, digging pits, measuring temperature differences between one layer and the next to discern potential avalanche sites. When he finds an unstable slope, he may use the force of his skis, or even explosive charges to preempt the mountain's rage by starting small snow slides before larger ones can begin.

Tremper risks his life so that others can keep theirs, knowing that at any moment he could be swept away by the same killer avalanches he is trying to prevent. "It's certainly a dangerous job because I'm putting myself in the paths of potential avalanches. I can stand on one slope and be perfectly safe, and if I stand on another spot, I'm dead."

Twice, he has been hurled down the mountain in a deadly slide. By "swimming," staying on the surface, catching gasps of air, he survived. "The first time it happened, I was too ignorant to really understand the danger. The second time, it really affected me. For almost a year, I was afraid to go on the mountain. I'd never want to ride another."

But Tremper rallied, and returned to the slopes and canyons wiser and more cautious. "I still love avalanches because they're beautiful, they're powerful, and they're dangerous, and because it takes a lot of brain power and good judgment to stay out of them."

Or incredible, odds-defying luck. —*Kit Carlson.*

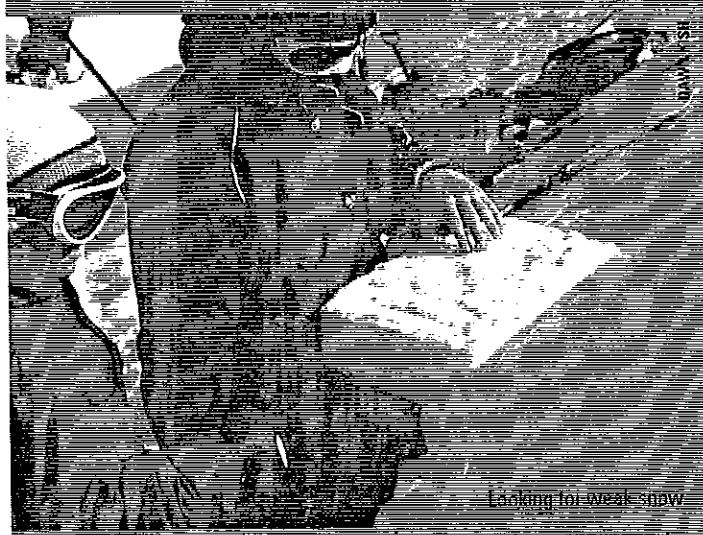
DANGER ZONE *airs Tuesdays at 8:30 and 11:30 p.m., and Sundays at 7:30 p.m. and 2:30 a.m. Risk death by snow with the* **Avalanche Patrol,** *June 3 and 8.* **TLC**

Zones

Avy 101 Offered In Utah

ACCORDING TO THE UTAH AVALANCHE FORECAST CENTER (UAFC), more people call its avalanche hotline (it's two to one) than any other avalanche advisory in North America. "We have more people heading out or thinking about heading into the backcountry than most any other area," says UAFC forecaster Evelyn Lees. "We attack the problem of people [getting caught in avalanches] with a very powerful weapon—that weapon is knowledge."

But it wasn't until last season that the UAFC offered an avalanche course specifically for snowboarders. "I had taken the course a couple of times," says local pro-rider Shannon Smith, "but I was always the only snowboarder in the classes. I couldn't keep up with them because I was

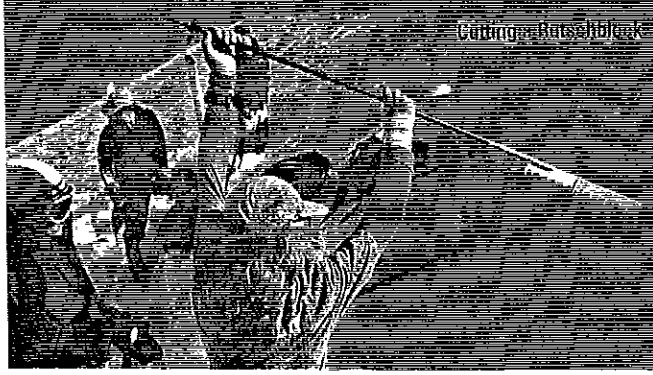


Looking for weak snow

on snowshoes." Thanks to Smith's insistence, for three weekends in a row beginning January 28, the UAFC offered snowboarders a practical avalanche field course taught by snowboarders at Brighton Ski Resort.

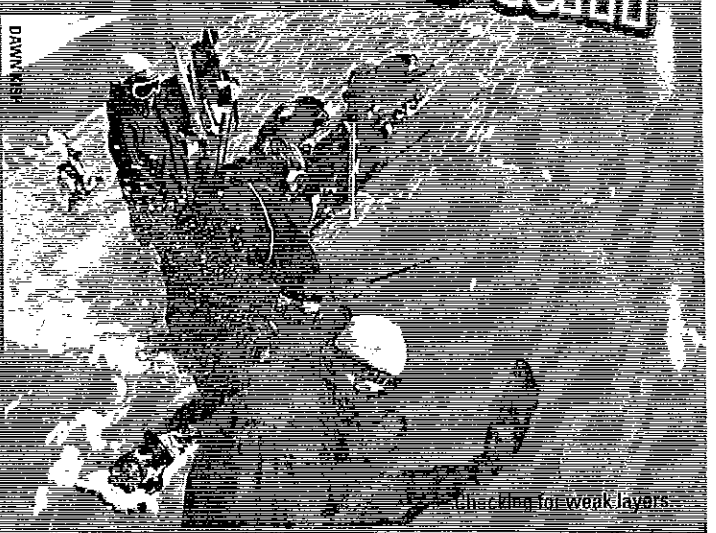
About fifteen people signed up, ranging in age from seventeen to 30 and in backcountry experience from noob to riders like Shannon Lees explained that the people who get caught in avalanches in Utah, in almost all cases, have skills in their sport that significantly outpace their avalanche skills. Such was the case with our group.

Our instructors were Matt Ryan, a snowboarder for sixteen years



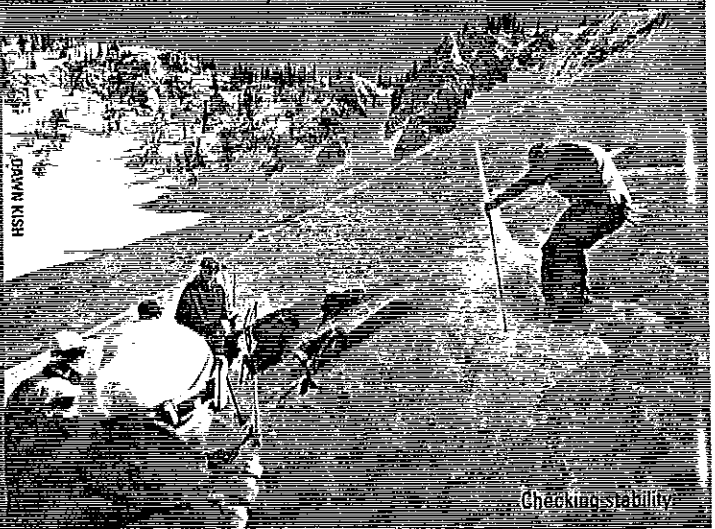
Cutting a Rutschblock

and a ski patroller at Alta; Allen Murphy, an avalanche controller for Snowbird and Solitude; Evelyn Lees; and "Backcountry" Bob Athey, a paid observer for the UAFC who, as one *Salt Lake Tribune* editor described, "looks like a Woodstock version of the Cowardly Lion, only he's really the Wizard." They rotated each day to give us a complete approach to the backcountry. First-timer Dawn Kish described the teaching experience: "The instructors themselves were experts, but they didn't make us feel like idiots. They told us that even they were at great risk."



DAWN KISH

Checking for weak layers



DAWN KISH

Checking stability

Day one was filled with discussions about the "avalanche phenomenon"—what it is, how it starts, who starts it. Avalanche education was then broken down to the elements of reading snowpack by digging snow pits and testing the snow with shovel sheers, roof blocks and determining the formation of snow crystals.

Day two had us outside using our avalanche transceivers to find a buried backpack. Unfortunately after our first try, our times told us we

Avalanche

Rain, snow and timing have made 1996-97 avalanche season the deadliest this century.

By Elaine Jarvik and Jason Swensen
Deseret News staff writers

The deadliest avalanche season in recent memory begins on a day that is sunny and clear. Bruce Tremper turns to his girlfriend and says, "Someone is going to get killed today."

It's the first Saturday in December and, after two days of storms, there is fresh powder in the mountains. The Utah Avalanche Forecast Center, where Tremper is director, has issued a special avalanche advisory, but Tremper knows it won't keep people away from the slopes.

Early in the morning, Vern Cotterell meets his snowmobile buddies near Current Creek Peak in the mountains near Heber. They ride up and down one bowl, then head for another, gunning their machine straight up through the untouched powder. Snowmobilers call it "high marking" — leaving your track as high as you can on a hillside.

Cotterell takes a stab at the new slope and gets stuck halfway up. He gets off his machine, bends over and begins to adjust the skis. He is wearing his helmet, so maybe that's why he doesn't hear what's coming. Or maybe some avalanches are just quiet.

The mountain, suddenly, is sliding on top of him. And then, just as suddenly, everything is dark and quiet. The thing that amazes him is that he can't move. The snow feels like cement. It is pressing so tight on his chest that he can't take a deep enough breath.

In the seconds before he loses consciousness he thinks, in a detached sort of way, *Who would have ever thought I would die like this?*

The slab has also buried his friend Carl Guymon and has partially buried Guymon's son-in-law, Sam Peterson. Peterson is able to dig himself out and then dig out his father-in-law. Then they begin looking for Cotterell. Minutes go by, maybe 20, as they frantically dig at the snow with their hands. He is not wearing an avalanche rescue beacon.

Finally Guymon decides to look uphill from Cotterell's snowmobile, up past the wedges of slab that have blocked their view of Cotterell's gloved hand, jutting up through the snow.

At first when they uncover his face they think he's dead. But luck, it turns out, is on Cotterell's side after all. The snowmobile helmet, visor down, has kept a deadly ice mask from forming over his face. He is blue but still breathing. In 10 minutes they have revived him. Soon he is driving his snowmobile back down the mountain. He is taken to the hospital and then home, where his two children and pregnant wife are waiting for him.

At about the same time, two counties away, on Bountiful Peak in Farmington Canyon, Rick Adams isn't so lucky. Snowmobiling with friends in Tree Bowl, he triggers a slide that completely buries him and his machine. When it's over, the debris covers an area as big as four football fields. It will take 12 days before rescuers, using probes and dogs, find his body.

This all happens on Dec. 7, the same day Bruce Tremper is scheduled to teach an avalanche safety class at a Salt Lake snowmobile shop. The class is canceled because nobody signs up.

The 1996-97 avalanche season will turn out to be the deadliest since the turn of the century. And it will begin, oddly enough, with rain. Rain that pours in November, on slopes as high as 10,000 feet, then freezes at night.

Snow settling on ice is bad news, especially early in the season when the snowpack is thin. Heat from the earth travels up through the snow toward the cooler nighttime air. So the snow on the top of the snowpack is colder than the snow underneath, and these temperature differences cause the snow to change.

Where once you had those pretty hexagonal crystals that snow is famous for you now have odder, angular crystals called "faceted snow" — crystals with fewer surfaces for other snow layers to adhere to.

Scott Carrier, a Salt Lake backcountry skier and radio writer, puts it this way: Snow in the air is like love. Snow on the ground is like marriage. Sometimes the layers don't really bond. That's when everything can fall apart.

So by December, the Wasatch has a rain crust, slippery as a luge run, and a layer of faceted snow, fidgety as a bunch of styrofoam pellets. Then it snows some more, thick and dense — ready to slide a slightest provocation.

Thursday, December 26. Greg Dr supposed to pick up his girlfrie the Salt Lake International Airport p.m.. When he doesn't show up she takes a cab to Park City. The next m ing, she notifies the sheriff.

Dres had last been seen heading Flagstaff Mountain, across from Al p.m. on the 26th. Flagstaff is popu with snowboarders; you can hike u ski down Day's Fork, heading towa Cottonwood, or back toward Alta.

It is snowing and windy when he up the trail. "High avalanche dang slopes steeper than 35 degrees," w the Avalanche Forecast Center.

More snow and wind the next d rescue efforts impossible. On the 2 Tremper and Dave Madera, a Utah Department of Transportation ava forecaster, hike up Flagstaff and l their search. When they find Dres the snowboard is still attached to

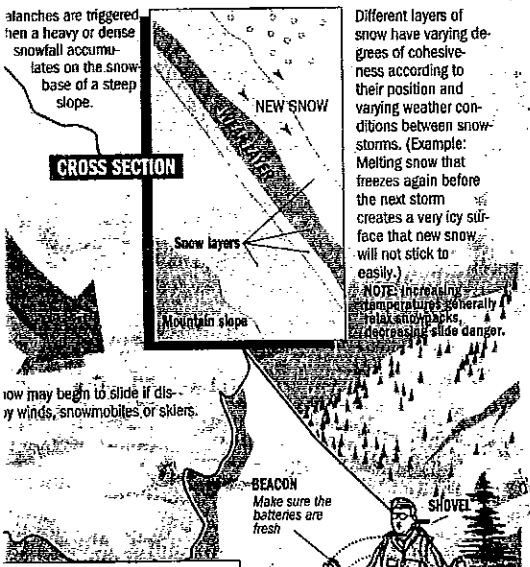
Please see **AVALANCHE**

Snowmobiler Vern Cotterell was four revived after he was buried in a sno

Avalanches

WHY THEY OCCUR

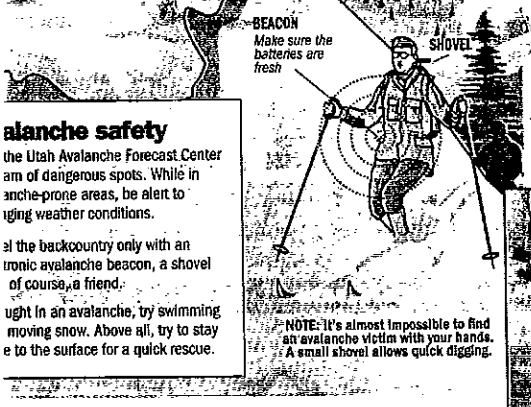
Avalanches are triggered when a heavy or dense snowfall accumulates on the snow base of a steep slope.



Different layers of snow have varying degrees of cohesiveness according to their position and varying weather conditions between snowstorms. (Example: Melting snow that freezes again before the next storm creates a very icy surface that new snow will not stick to easily.)

NOTE: Increasing temperatures generally relax snowpacks, decreasing slide danger.

...ow may begin to slide if dis... ...y winds, snowmobiles or skiers.



...alanche safety

...the Utah Avalanche Forecast Center ...am of dangerous spots. While in ...anche-prone areas, be alert to ...ging weather conditions.

...el the backcountry only with an ...tronic avalanche beacon, a shovel ... of course, a friend.

...ught in an avalanche, try swimming ...moving snow. Above all, try to stay ...e to the surface for a quick rescue.

The road that winds up Little Cottonwood Canyon, right, crosses dozens of avalanche paths on the way to the resorts.

LANCHE

from A17

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hasn't been an avalanche across there in 50 years.

But it is snowing like crazy, and strong northwesterly winds are blowing, redepositing the snow on top of a weaker layer of snow on top of a 5-inch rain crust. When the snow on a ridge high above them releases sometime during the night, it slides farther and faster than anyone would have ever guessed.

Rescuers find them two days later, buried under 4 feet of snow, their tent wrapped around an aspen tree.

□□□

Meanwhile, in the canyons outside Salt Lake City, Salt Lake County Sheriff's Sgt. Lynn Cox spends most of Jan. 11 patrolling Little Cottonwood Canyon highway in his Ford Bronco.

Just after dusk, he makes a run to the bottom of the canyon to pick up a couple of UDOT snowplow operators. Heading back up the highway toward Alta, he spots a trio of backcountry skiers strapping gear to the top of their car.

In the next instant the trio is buried in a wall of snow that covers the highway, and in the instant after that Cox's Bronco is buried too. Cox rolls down his window and tries to punch his way to the surface, but the snow is already as solid as a rock. His passenger is luckier. The snow is shallower on his side of the car, and the men are able to tunnel to the surface with a shovel, then begin looking for the three skiers.

By then a few dozen other skiers, on their way down the canyon from the resorts, have jumped out of their cars to help. Two of the skiers are found right away. The third is found a few minutes later, pinned between two cars. They are all alive.

It's not the first time an avalanche has buried cars in the canyon. The truth is that the road up Little Cottonwood crosses dozens of avalanche paths, and it's a wonder, say former UDOT avalanche forecasters, that no one has been killed in the bumper-to-bumper traffic heading down from the resorts.

In the early '90s, five of those forecasters quit in protest over UDOT's road closure policies, charging that the department occasionally kept the road open when it shouldn't. Conditions are better now, they say, but there are still days, when the road is open but a storm is blowing through, that they choose to stay home.

□□□

An avalanche can begin with rain and ice and faceted snow. But

BOB ELLIOTT, COURTESY OF U.S. FOREST SERVICE

Searchers look for snowmobiler Rick Adams on Bountiful Peak. It took 12 days to find his body.

begin their frantic search for 4-year-old Lauren. They tunnel to her with a pot lid and their hands. They get to her in time, and later they all move to another house on the sunny side of the mountain, in the middle of a meadow.

Everything is fine now, although sometimes Lauren will still be frightened when a piece of ice falls off the roof. And sometimes Bail

□□□

Saturday, Jan. 25. It is raining or snowing, depending on where you are. In Provo Canyon it is both raining and snowing. It's generally a yucky day, but when you work all week, sometimes Saturday is all you have.

Scott Lee and Doug Hall have a plan to go backcountry skiing, but they discover, after they're already

dig himself out.

Weeks later, warm and dry and recuperating from his injuries, Lee talks about risk. He has always been avalanche-conscious, always the one to wear a helmet, even on easy climbs.

But if you wanted to be completely safe, of course, you'd just stay home. What he likes about

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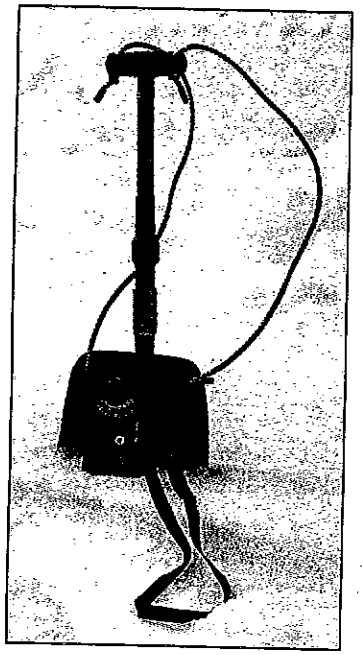
The Salt Lake Tribune TUESDAY, JANUARY

Daybreak OUTDOORS & RECREATION

SNOWMOBILE SAFETY



A shovel and safety beacon should be taken on every snowmobile trip.

Bruce Tremper digs a snow pit to determine whether area is safe.

Snowmobiler Death Spurs Big Increase In Sales of Beacons

BY PAULA HUFF
THE SALT LAKE TRIBUNE

Within two weeks after snowmobiler Rick Adams died in a Dec. 7 avalanche east of Bountiful, REI sold 188 avalanche beacons that emit a radio signal and help searchers find someone buried under snow. It was more than in all of the previous December.

Kirkham's, another Salt Lake City outdoor-products store, doubled its sales of avalanche beacons after Adams' death.

"We sold out a couple times, and we definitely sold a lot of them to snowmobilers," said Dennis Maw, Kirkham's assistant sales manager. "Part of it was awareness. People saw [avalanche forecaster] Bruce Tremper on TV saying, 'You've got to have a beacon to travel safely in the back country.'"

Avalanches and snowmobilers have not tangoed until recently, when the once sluggish, wallowing machines metamorphosed into souped-up vehicles that easily climb avalanche-prone terrain.

Names like Panther, Summit and Lion convey the power and extreme terrain reached by these modern snowmobiles, with 100 horsepower compared to 30 in the 1970s, said Gary Canfield of Heritage Snowmobile. They also have better traction for ascending mountains and scooting through powder.

"Snowmobiles are lighter physically, too, which makes them easier to handle, so it's easier to climb higher," Canfield said.

Combine these technologies, and you've got snowmobilers zipping around steep, avalanche-prone slopes. And when the snowy torrents are triggered, few victims have any training.

Avalanches usually occur on slopes 35 degrees or steeper. So, avoid hills at this angle.

The best sign of avalanches are other avalanches, said Tremper of the U.S. Forest Service Utah Avalanche Forecast Center.

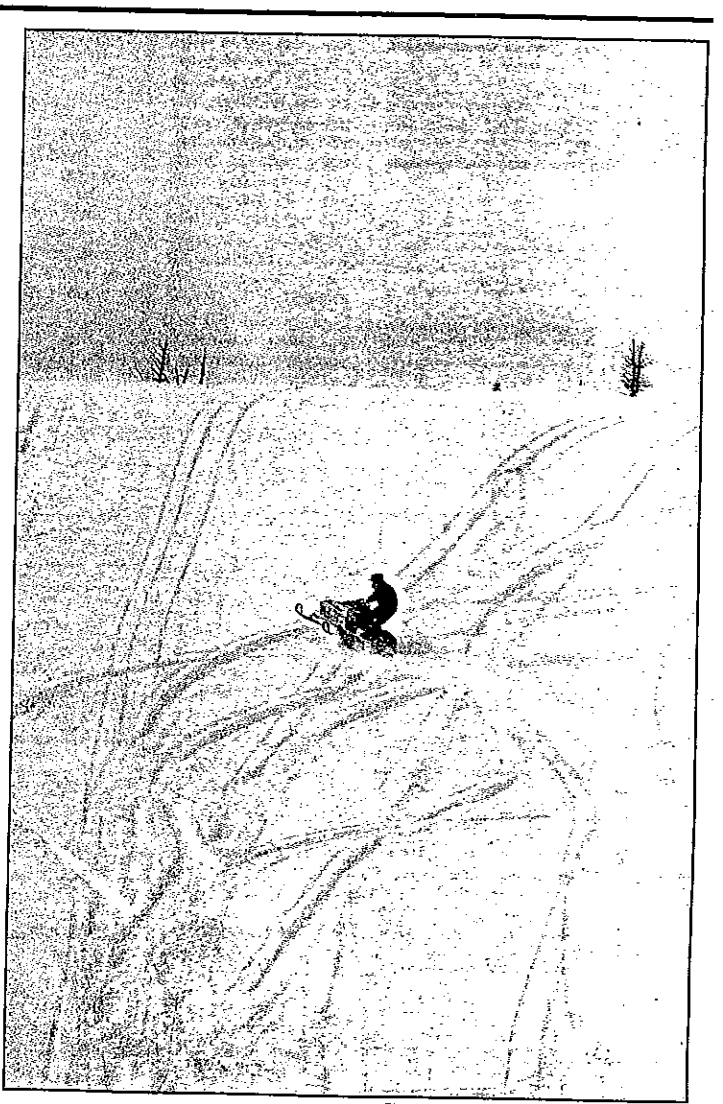
While snowmobiling into an area, look for avalanches on slopes along the way. If you see them, it means an avalanche is more likely to occur on other steep hills.

Often, snow likely to avalanche will crack and collapse, making a "whomping" sound. These clues are difficult for snowmobilers to pick out, since they travel at high speeds.

Finally, dig a snow pit. See the accompanying graph on Page C-3 for details.

Interpreting snow pits does take some training and experience, which can be

See SNOW PIT, Page C-3



Photos by Brett Prettyman/The Salt Lake Tribune

With today's more powerful snowmobiles, safety measures are crucial.

Safety Starts With Dose of Common Sense

BY BRETT PRETTYMAN
THE SALT LAKE TRIBUNE

Ask Rod Patterson the most important thing snowmobilers should always have with them and you might be surprised by his answer.

It's not a first-aid or survival kit, not even maps or extra spark plugs.

"Use your head," said the Orem resident who serves as a volunteer Off-Highway Vehicle (OHV) instructor. "When in doubt, don't do it. If you feel like you can't do something, don't try

Utah has 23,000 registered snowmobiles, 11,000 more than in the 1987-88 season. As the popularity of the sport increases, so does the number of snowmobile-related accidents and deaths.

Laurie Allred-Christiansen, a ranger at Wasatch Mountain State Park, said the most common mistake people make is going out unprepared.

"Even if you are only going out for an hour or two, you need to take things like a survival kit along," she said. "The

The Evacuation Begins, and The Party Ends

BY WINA STURGEON and CONNIE COYNE
THE SALT LAKE TRIBUNE

Snow, especially lots of fresh powder, is seductive to skiers — even those who have been trapped inside a lodge for 30 hours watching it fall.

When the last of the Utah Transit Authority buses pulled up to Snowbird ski resort about 6 Sunday evening to offer rides down the mountain to more than 1,000 people stuck there by road closures in the canyon, some actually could not make up their minds.

They hesitated, rocking back and forth — others, though, grabbed the stuff they had been sitting beside for hours and ran for the bus.

Even though Snowbird employees had scrounged pillows and blankets for them so the stranded skiers could bed down everywhere — across sofas, under pianos, in elevators and on every available inch of lobby or conference-room floor — they wanted to go home.

> *"Everybody's taking it with a great sense of adventure. The type of people we have up here aren't pantywaists."*
>
> DICK BASS
> Snowbird owner

Despite the fact that Snowbird fed them a free breakfast of bagels, oatmeal, danish, coffee, cocoa and juice about 5:30 Sunday morning when the avalanche patrol started setting off explosives to clear overloaded canyon walls, hundreds of downhillers were ready to go down the mountain seated. Their bodies ached. They smelled from sleeping in their clothes.

The party was over.

But Snowbird's loss may be Park City's gain. Skiers who had reservations at Snowbird or at Alta called and canceled Sunday when they realized they could not make it up the mountain, resort front-desk personnel said.

Some of those people checked into hotels around Salt Lake City. But many skiers just went to Park City instead, according to clerks at Olympia Park Hotel and Radisson Inn, both in Park City.

"We had eight or nine people who were supposed to go to Alta but were referred here," Nina Oyler of the Radisson said. "They weren't mad; probably got it out of their system on the drive up."

At the Salt Lake Airport Hilton, the problem was reversed. "It was funny, but we had people who were supposed to be here Saturday who couldn't make it. They were stuck up there [at Snowbird]," the front-desk supervisor said. He declined to give his name.

The Ramada Inn received about 20 unexpected guests Sunday night — people who finally could descend from Snowbird or Alta but who missed their flights out of Salt Lake City, said night manager Kyle Crosland.

The aftermath of the Little Cottonwood Canyon closure left the elegant lodges at Snowbird looking like a refugee camp on Sunday. Paper plates, soft drink cans and trash littered the floor. Staff rushed to gather up blankets,

See SKIERS, Page D-4

Photos by Sallie I

Skiers stranded at Snowbird by slide-caused road closures pass the time Sunday morn Cliff Lodge. Anticipating another night's stay, some even reserved space using hotel c

Stranded But Had Fun

■ Continued from D-1

sheets and pillows that had been provided for stranded skiers and snowboarders Saturday night.

The staff put away all the extra mattresses and rollaway beds they had pulled from guest rooms on Saturday night. While security had to break up two fights that broke out, most people accepted their overnight stay with good humor. "It was like a scout campout," said one skier.

At noon on Sunday, the rumor spread through the lodges that the road would soon be open, and people began heading toward the parking lots. A frantic sense of haste gripped people as they dug their cars out with snowboards and bare hands.

People cleared snow off windows with credit cards and shared scrapers.

Denniss Kneebel of California still was trying to get down the canyon as night fell Sunday. "We planned to take the shuttle back to the airport, but the shuttle can't get back up." Traveling with three others, Kneebel had waited too late to hitch a ride. Most cars that passed him were full — and his overlarge suitcase persuaded others not to stop.

Those who were registered at Hellgate Lodge, between Snowbird and Alta, were unable to get to their rooms Saturday night because the uphill side of the road was barricaded. Anyone who tried to walk uphill was told that they faced a $400 fine.

But most of the stranded skiers seemed content to ride out the storm with equanimity. Many pulled out decks of cards, headed for the bars or just stared out the window into the blowing whiteness.

"Everybody's taking it with a [illegible] night. "The type of people we have up here aren't pantywaists."

Marty Axel, out with his son Rick from their home in Chagrin Falls, Ohio, was impressed at the laid-back way most of the refugees seemed to accept their lot. "If this had been in the East, there would have been a lot more yelling," he said.

The two men were ready to sleep on the floor, but they wound up getting a room at the Cliff Lodge, which they shared with a woman and her family they did not know

John Adams, a restaurant owner from Columbus, Ohio, was not so lucky. He and his friend wound up sleeping in the hallway on the eighth floor, using their ski pants as pillows.

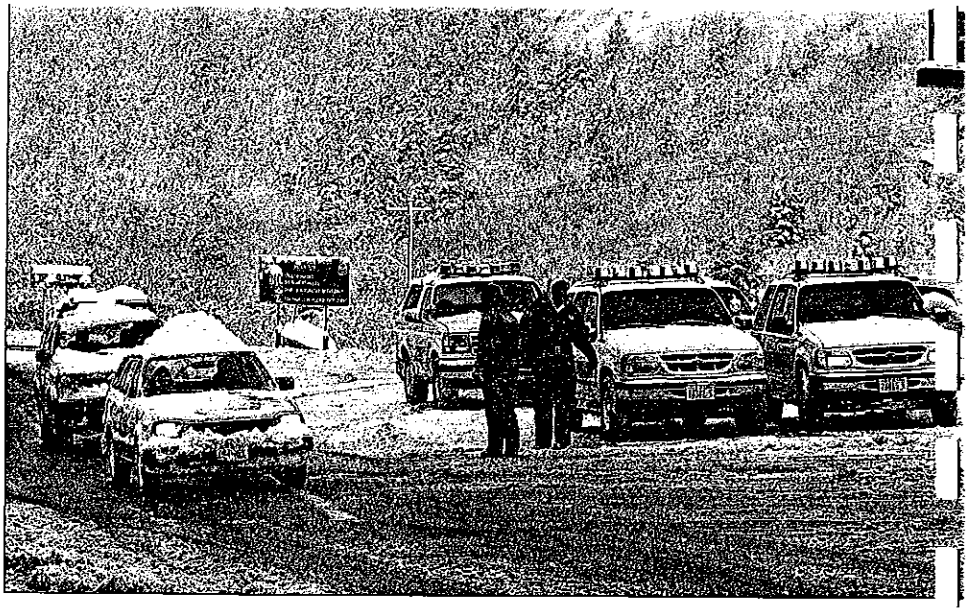
Snowbird officials opened the lifts at 11 a.m. Sunday.

Marty and Rick Axel got down off the mountain Sunday morning by hitching a ride with a friendly pickup truck driver, who let them squat down in his truck bed. They rode out of the canyon in the slow-moving afternoon caravan. But even so, their experience with the vagaries of nature hasn't dampened their enthusiasm for skiing. Their flight doesn't leave until Tuesday, and Marty was talking about going up to Park City for the day.

University of Utah Professor Dale Niederhauser, up for the day Saturday with his son, Jake, was unable to get a room or even a blanket. He and his son wound up in the Alpine Room along with 50 other refugees. They spread their coats on the floor and used bath towels for blankets.

Those who could afford it rented rooms at the Cliff Lodge for $229 per night, but almost everyone grabbed a few hours sleep where they could.

"Anyone under 20 is having a good time. Anyone with a sense of humor is having a good time," said Sallie Shatz, a professional photographer who grabbed a friend's "point-and-shoot" camera from her car before being restricted inside Snowbird's Cliff Lodge. "The place literally turned into a high school or college party."



The danger sign illuminated, Salt Lake County sheriff's deputies monitor traffic coming out of Little Cotton

One of the most unpredictable occurrences of the overnight adventure was the "interlodge" call that restricts guests to the building they are in and keeps them from venturing outside, if avalanche danger is so high it could bury pedestrians. The first of these happened early Saturday afternoon when the canyon roads were closed to all traffic.

Some people handled the inconvenience better than others, according to Shatz. "In the Cliff Lodge, toilet paper streamers were tossed off the balconies as well as blankets towels and pillows. The employees were amazing at dealing with the situation and diffusing the anger of visitors to the area who did not understand the concept of interlodge and not being able to leave the building," she said.

The Aerie restaurant and the sushi bar ran out of food and closed down late Saturday night. The bar was out of glasses and frazzled waitresses served half the beer in plastic cups and the other in water glasses.

It seemed to Shatz like all Utah realities were suspended. "At one point I followed some young partiers into a hall and there was a parade of teens coming down. One looked at us and said, 'Jack Daniels party ahead.' Teens were sleeping in the elevators."

Updates on availability of food, blankets, pillows, and information on road conditions and skiing were posted every couple of hours.

But it was not all fun. Rose Woods, who works at The Lodge at Snowbird lost her car in a snowslide. "My car is upside down and up against the Iron Blossom Lodge. It's buried in snow and all you can see is three wheels sticking out of the snow."

Jaan Haugen, 28, Seattle, is a teacher and had to call to arrange for a substitute. Sunday, she prayed for less snow. "I never experienced anything like this, never expected it. People at work will give me a hard time, especially the students."

Ivan Zeitz, now a Salt Lake City resident, rushed to get out of the lodge. "I don't want to be stranded. I have to go to med school tomorrow. . . "I'm a little freaked. But stuff happens."

One of the many avalanches in the canyon on Saturday and early Sunday morning buried a Ford Bronco driven by Salt Lake County Sheriff's Sgt. Lynn Cox. A huge slab of snow came loose from the mountainside near the Peruvian Lodge at the moment when Cox

SUNDAY, JANUARY 26, 1997 The Salt Lake Tribune Sunday SEC.

PERSONALS
Page J-4, 5

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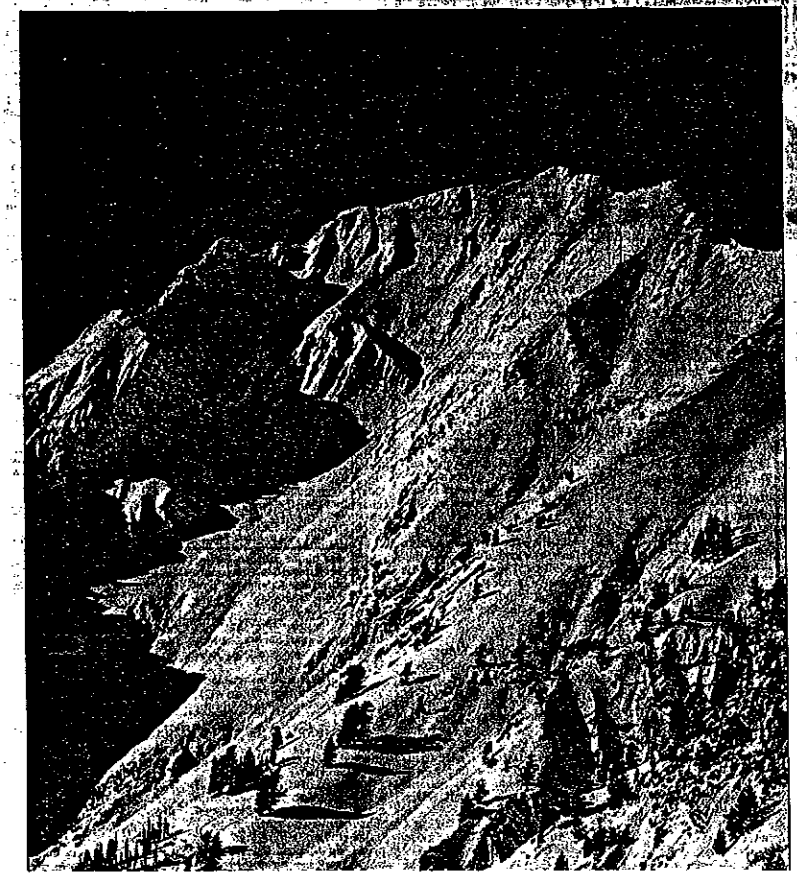


SUPERIOR PRETTY, PERILOUS

The Face of Danger

BY JOAN O'BRIEN
THE SALT LAKE TRIBUNE

Mount Superior beckons.

A century ago, the peak beckoned temple builders who came to Little Cottonwood Canyon's granite quarries. Miners looking for gold and silver followed. Then came skiers seeking powder.

The skiers, like the pioneers before them, respected the power of a mountain that yearly sent devastating avalanches into their modest constructions below. They seemed content — at first at least — merely to gaze upon one of the Wasatch Range's most beautiful mountains.

In the past decade, however, Mount Superior has beckoned more than just the admiring gaze of miners and skiers.

Scores of skiers and snowboarders, some with no avalanche or mountaineering training, are brazenly taking on Mount Superior. As if to remind recreationists of its power, 11,132-foot Superior this month sent down a slide that damaged dozens of cars and stranded thousands of skiers at Alta and Snowbird some 25 miles southeast of Salt Lake City.

It won't be the last time Superior slides this year.

"We classify main Superior as a major path with a frequent return cycle," says Steve Conger, lead avalanche forecaster for the Utah Department of Transportation's Region 2.

UDOT, which is responsible for avalanche control in the can-

See SUPERIOR, Page J-2

Superior: Fearless in the Face of Danger

■ Continued from J-1

yons, can expect a Superior avalanche to cross the road between Snowbird and Alta two or three times in a normal snow year. Two years ago, when record snows hit the Wasatch, avalanche hazard forced UDOT to close the road 30 times.

UDOT has faced periodic criticism over its avalanche-control program in Little Canyon, with some arguing the road is kept open when conditions are too dangerous.

Last week, state, federal and resort representatives discussed UDOT's decision to keep the canyon open until the Superior avalanche — the first of about 10 large slides — hit Snowbird's parking lot. They re-examined the weather forecasts and other information available at the time.

Al Soucie, U.S. Forest Service snow ranger, says the evaluation is ongoing. But one conclusion has been reached: "For as chaotic as the situation was, everything turned out reasonably well. Nobody was killed. Nobody was seriously injured."

Winter recreation in Little Cottonwood Canyon will always carry some risk, Soucie says, despite the best efforts of the resorts and the state and federal agencies.

"That type of situation is going to happen again in the canyon."

Mount Superior does not have one slide path; it has many. UDOT crews have identified 35 areas stretching over 100 acres where they target explosives for avalanche control.

Not the Only One: Superior is hardly the only avalanche-prone area in Little Cottonwood Canyon. Nor is it the most deadly.

In January 1881, Davenport Hill east of Superior avalanched, killing nine people. Three years later, an avalanche slightly down-canyon from that same spot killed 12 people. And on Feb. 14, 1885, an avalanche southeast of Superior killed 16 people and nearly erased the settlement of Emmaville.

While Superior is not the most deadly slide zone in Little Cottonwood Canyon, it may be the most conspicuous. From peak to road is a nearly 2,800-foot drop. After a snowstorm, the mountain looks Himalayan with its craggy, treeless slopes.

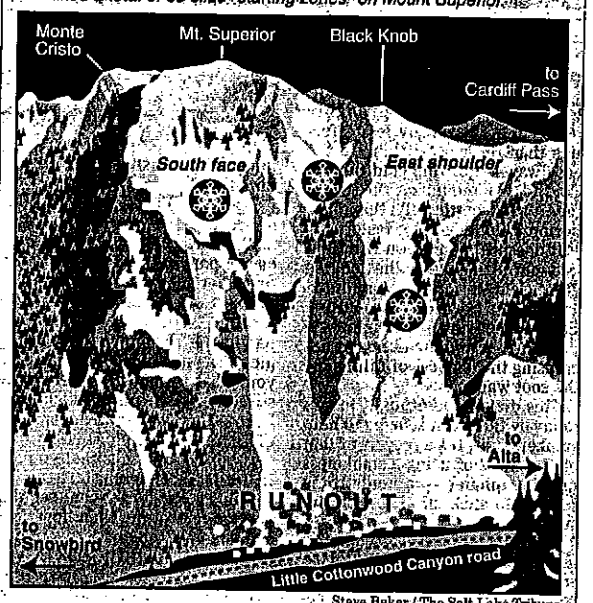
That beautiful face is part of Superior's allure.

Since skiers began flocking to Alta in the late 1930s, Superior has become the favored backdrop for photos. William F. Buckley posed in front of it for his 1994 *Ski* magazine article titled "My Alta."

Even Coloradoans recognize the appeal of what is sometimes called "Mother Superior." Alexis Kelner, author of *Wasatch Tours and Skiing in Utah*, has the edition of *Colorado* magazine featur-

Mount Superior

Despite the avalanche danger, skiers and snowboarders can't resist leaving their mark on Mount Superior. Snowflakes denote the major slide paths on the 11,132-foot peak. The Utah Department of Transportation, which conducts avalanche control in the canyon, has identified a total of 35 slide "starting zones" on Mount Superior.



Steve Baker / The Salt Lake Tribune

Skier Lives to Tell Harrowing Tale

■ Continued from J-1

think of this cliffy mountain that requires surefootedness any time of year.

On the north face is Mineral Fork and Cardiff Fork bowl, an avalanche-prone slope often visible from the Big Cottonwood road. Over aptly named Cardiac Pass is the Lake Blanche drainage. And on Mount Superior's south face is the avalanche path that wreaks havoc every winter.

When it actually came time to push off Superior — some call it skiing — I inched over the edge. One inch. Two inches. Six inches. My ski tips hung in thin air. I leaned forward looking for something below. Seeing nothing, I took a deep breath, planted my poles behind and shoved.

Careening down a chute with a cliff on one side and a wall of snow on the other, I broke into a snowplow and worked my way to the bottom.

I hate that humiliating survival skiing, when I feel as if I've never skied a day in my life.

Mount Superior is the domain of intrepid extreme skiers and heli-skiers, who fly to the top to avoid that kick-turn. Braggers only have to say, "I've skied Mount Superior," and you know their intestinal fortitude. Wannabes dream of it.

One ski partner calls it "a big boys' tour." I know skiers who stay away, saying they want to see their kids as adults. It's the kind of place where you want to know your business, winter and summer.

My only other trip to Mount Superior ended in tears. A summer hike along the Poleline road put the group on the "kick-turn" ridge.

After walking west for a few miles on the ridge, we turned around. On the way back, we somehow missed the trail and got on a sheer cliff face made of crumbly rock. An 800-foot drop hung below.

With our feet in a ballerina's plié position — because there was no room to keep our feet straight — we inched forward.

When we finally got back on the trail, no one talked and heads hung.

Just writing about Mount Superior makes my palms sweat. Often, when an experience frightens me, I return to the place. It is like getting back on a horse when it throws you.

I've never returned to Mount Superior.

"I inched over the edge. One inch. Two inches. Six inches. My ski tips hung in thin air. I leaned forward looking for something below. Seeing nothing, I took a deep breath, planted my poles behind and shoved."

"People do funny things when they're searching

mountain, oblivious to the danger above them.

"It is a dangerous playground."

Avalanche Danger Prompts Officials to Call Off Search for Kaysville Snowmobiler

BY VINCE HORIUCHI
THE SALT LAKE TRIBUNE

Davis County sheriff's deputies have called off the search for a Kaysville man believed to have died in an avalanche.

Officials are fearful the search for Rick Adams could trigger another avalanche, said Davis County Sheriff Rob Davis. The victim apparently died during a snowmobiling trip in Farmington Canyon.

"There is such an extreme avalanche danger up there every day," Davis said. "It would be a miracle if he were still alive."

The victim was in one of two snowmobiling groups in northern Utah this weekend that led to rescue operations — only one of which was successful.

Adams, a 37-year-old construction worker, was snowmobiling with four friends in an area known as "Tree Bowl" east of Farmington when the avalanche was triggered Saturday. The others escaped unharmed.

"We've talked to the family and they understand the danger" in searching for Adams, Davis said. "They want closure on this, but they don't want anyone to get into danger too."

Although family members have discouraged anyone from searching at this time, friends still went out Monday.

Meanwhile, DeWayne Harlan and his son Trenton were luckier.

Both Evanston men were snowmobiling in Rich County when they got trapped in a large ravine Saturday. Sunday night, rescuers plucked the duo from the ravine, and they were returned safely Monday morning.

The wife and mother of the two men recalled the nightmare of waiting for word of their fate. "It was a horrible experience," said Cheryll Harlan. "I was a nervous wreck. I had to go to the hospital two or three times."

The Avalanche Forecast Center in Salt Lake City said Monday there is a "moderate to high" avalanche danger along the northern Wasatch Mountains.

Avalanche victim urges others to heed warnings

Editor's note: "The danger of a human-triggered avalanche is moderate to high on all slopes steeper than 35 degrees," warned the Provo Avalanche Forecast recording if you called Monday. It said there had been five natural slides in the Sundance area and also reports of human-triggered avalanches in canyons in Salt Lake County. Carl Guymon and Vern Cotterell, two Orem men buried by an avalanche on Saturday, are warning people to take the avalanche danger seriously. The following is their story and warning.

By PAT CHRISTIAN
The Daily Herald

"Look out!" Carl Guymon yelled to his snowmobiling companions.

Still being dragged by the avalanche, Guymon was panicked.

"I didn't know where my son and my son-in-law were," he said Monday, recounting the snowmobilers' weekend ordeal.

He didn't know it, but two of his companions were buried. Two others had avoided getting hit.

Sam Peterson, Guymon's son-in-law, was buried to his chest but already was digging himself out with his hands.

Their friend Vern Cotterell, Orem, was buried and nowhere in sight.

Cotterell said he was bending over to free his stuck snow machine when he was surprised by the avalanche. It hit him and carried him about 10 feet before it buried him. Then he remembers falling into a peaceful sleep. He ended up about 30 feet from his snowmobile.

Moments before, the five snowmobilers — Guymon, Cotterell, Peterson, Dee Long and Guymon's son Craig — had been enjoying themselves, snowmobiling in a bowl near the 10,584-foot Current Creek Peak in Wasatch County.

Guymon said after his son-in-law freed himself, he started to dig him out. "I couldn't move a bone and kept telling him, 'I can't move,' and he thought I was paralyzed."

At the same time, Craig and Dee were searching for Vern, but there was no trace.

Once Guymon was free, he joined the search for Vern.

(See AVALANCHE, Page A2)

U. Geophysicists Recover Body Of Snowmobiler

BY VINCE HORIUCHI
THE SALT LAKE TRIBUNE

It took three technical whizzes from the University of Utah an hour Thursday to find what search-and-rescue experts could not locate in two days — the body of a missing snowmobiler buried in an avalanche of snow.

Searchers unknowingly came close, but could not find the body of 37-year-old Rick Adams, who died Dec. 7 while snowmobiling with friends above Farmington.

But with geophysics technology just a year old and dogged determination from volunteers, Adams' body was recovered Thursday afternoon.

"We're relieved he was found," said Adams' nephew, Bryan Ellington. "We're happy that he's home and not up there."

A geophysics graduate student and computer specialist from the university's College of Mines used the latest in geophysics technology: a probe called a magnatometer, a kind of souped-up metal detector.

"This is the top-of-the-line model," said graduate student Doug Brumbaugh.

For two days last week, rescuers from Davis County tried to find Adams but to no avail. Sheriff Rob Davis called off the search because of avalanche danger.

But rescuers wanted to try again. One contacted Jerry Schuster, a U. professor of geophysics, a branch of geolo-

See **U. TEAM,** Page **B-11**

Friday, December 20, 1996 **B11**

U. Team Finds Body of Snowmobiler

■ **Continued from B-1**

gy that deals with the Earth's movement.

"Geophysics is one of the few fields that has this kind of sophisticated equipment to probe beneath the earth, or in this case, beneath the snow," Schuster said.

The professor assembled his team and convinced the dean of the College of Mines to spend $500 to rent a magnatometer from the California firm Geotechnics.

The magnatometer normally is used to find buried mineral ore and to conduct magnetic field surveys.

Searchers from Salt Lake and Davis counties accompanied Brumbaugh and university computer specialist Bill Wilson on Thursday morning to the avalanche site, in an area of Farmington Canyon known as "Tree Bowl."

A friend of the victim had located a tree that had snowmobile tracks, giving rescuers a place to begin searching. Rescuers held the magnatometer, an 8-foot aluminum pole with sensors at one end, to the ground to take readings.

About 10 a.m., they received "a pretty whopping signal." The snowmobile was just 4 feet below, in a grove of trees. About 4 p.m., rescuers with probes found the body about 30 feet from the snowmobile.

Snow Adds to Avalanche Danger From Provo to Ogden

BY MIKE GORRELL
THE SALT LAKE TRIBUNE

ntil midmorning Friday, the ind howled through the northrn Utah mountains, altering the i it of steadily falling snow and e ranging the resting places of ays-old flakes.

In the valleys of the Wasatch e w, there was only wind.

hile the wind was strong nough to topple trees in Salt ake City and Bountiful, the im- a was more pronounced in the n ntains. It packed additional now onto slopes already strain- ng to hold the 5 feet of snow (or n e) that fell in the past week. s night be expected, the strain requently became too great.

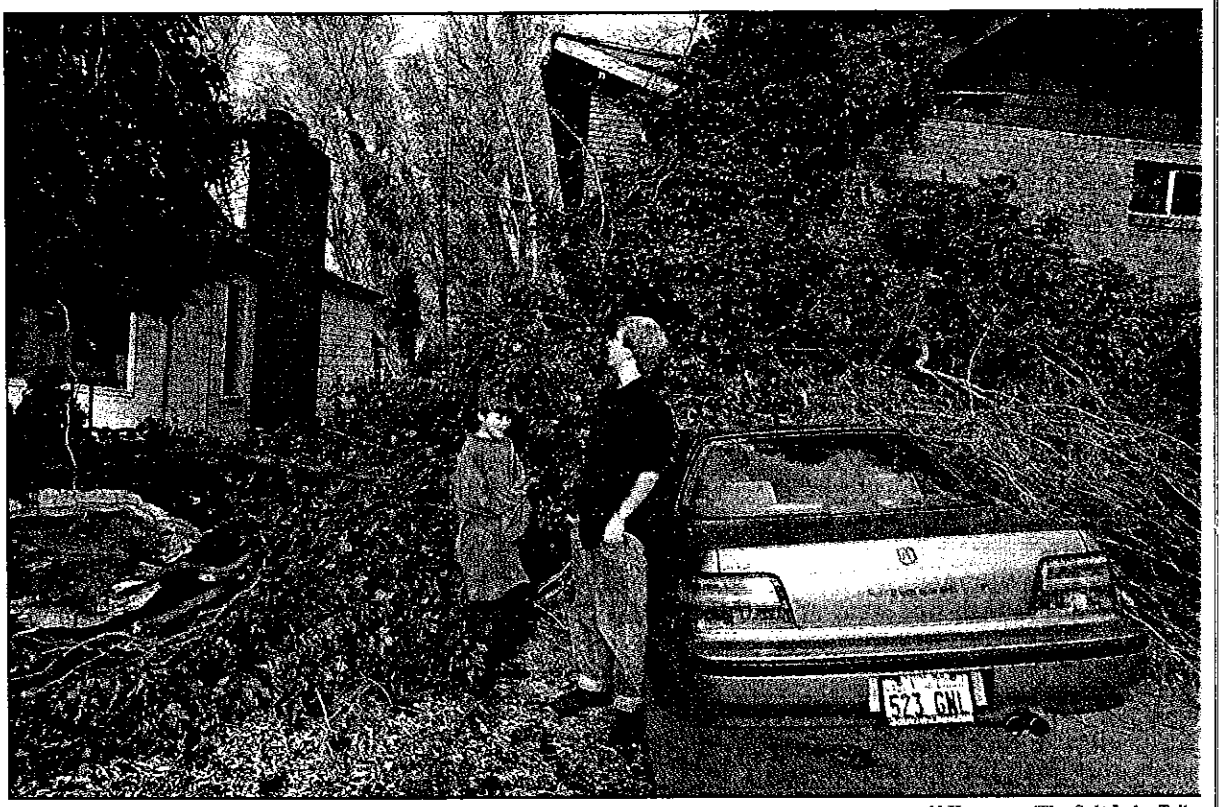
Numerous snowslides broke o e along the Wasatch Front on] rsday night and Friday and, vith more snow expected, the Utah Avalanche Forecast Center a issued a warning of a high a ard in the mountains from Ogden to Provo.

"Even if there is some clearing o y," said forecaster Tom Kimn igh, "I'm going to steer clear f steep, wind-drifted slopes for a ew days. . . . You don't need t p slopes to have fun, so it n ht be good to stay away."

Plenty of evidence supports Kimbrough's caution.

ne skier is missing in the backc ntry between Little Cottonwood and Big Cottonwood cans (see item in For the Record, 3· .

n avalanche in the mountains above Provo wiped out a snowstudy site that had been in service



Al Hartmann/The Salt Lake Tribu

Alex, left, and Clayton Morrison survey damage to the family car and home caused when high winds on Friday toppled a box elder tree on Roosevelt Avenue in Salt Lake City.

■ More weather information B-8

for years and always escaped slides. The road up American Fork Canyon was closed by Uinta National Forest officials because of the threat of releases down well-known slide paths.

Farther north, a slide on Mount Ogden ripped loose trees and piled up snow and debris 20 feet deep.

A large slide in Little Cottonwood Canyon damaged a garage and was part of an overall avalanche threat that kept the canyon closed to skiers for much of the morning.

The resulting traffic jam prompted the Utah Department of Transportation and the Salt Lake County Sheriff's Office to reiterate that skiers cannot wait at the mouths of the Cottonwo canyons for the roads to open.

Long lines of vehicles have hi dered snow removal and t movement of emergency vehicl blocked access to canyon-ar subdivisions and mailboxes, a made it hard for school-bus dr ers to negotiate their routes.

Bob Bonar, Snowbird's vi

See AVALANCHE, Page B

Snowmobiler missing following avalanche

Bear Lake County deputies and search and rescue volunteers reportedly worked all day Saturday and late into the night near Montpelier searching for a snowmobiler lost in an avalanche in Home Canyon.

The unidentified male apparently was riding a snow machine in Home Canyon Saturday morning when a wall of snow collapsed on him. A search using law enforcement personnel, volunteers and specially trained dogs went on through the day.

Snow and wind complicated the search as evening approached and poor conditions closed the major roads.

A Bear Lake County law enforcement spokeswoman said she was not at liberty to discuss the situation. Other organizations involved in the search also declined comment so no further information was available Saturday.

Avalanche kills Georgetown man

MONTPELIER — Troy Lewis, 34, Georgetown, was killed in an avalanche Saturday while snowmobiling in Home Canyon northeast of here.

Rescuers from numerous agencies and volunteers searched all day.

Lewis' body was recovered at about 7:30 p.m. under nearly 4 feet of snow, Bear Lake County Sheriff C.J. Bunn said.

The search was hampered by high winds and blowing and drifting snow that closed all the roads in and out of Bear Lake County.

Some search team members were forced to stay in Montpelier because roads were barricaded.

Local families opened their homes to travelers whose cars had slid off the road and left them stranded.

Most of the roads are now open, but Immigration Canyon Road remains closed, she said.

Avalanche danger is expected to remain extremely high for the next few days in all of the Caribou National Forest, especially on steeper leeward slopes and cornices.

Snowmobilers, cross-country skiers and snowshoers are advised to stay out of these areas altogether, particularly on slopes of 40 to 45 degrees or greater, forest supervisor Paul Nordwall said.

Conditions are such that even minor disturbances can cause snow to slide.

Back country travelers wanting information on latest conditions may call their nearest forest office — Pocatello, 236-7500; Soda Springs, 547-4356; Montpelier, 847-0375; Malad, 766-4743.

Subject: Kudos to Utah FS Avy Forecast Center!
rom: mnr@netcom.com (Mark Rosenberg)
ate: 1997/02/20
Message-Id: <mnrE5wsqz.EGs@netcom.com>
ender: mnr@netcom21.netcom.com
rganization: Netcom On-Line Services
Newsgroups: rec.skiing.backcountry

i bet I'm not the only subscriber to this group that takes a daily imaginary backcountry skiing break by visiting

ttp://nimbo.wrh.noaa.gov/Saltlake/SLCWRKSNW.html

t is obviously more fun if you've skiied in the Wasatch, but ven if you haven't, their weather and snowpack analysis reports are like a short course in snowpack analysis. If you read it daily you get a very clear feel for how the snowpack evolves id how wind, sun, exposure, and the passage of time affects snow stability.

ie style is very conversational, and there are occasional bits of y humor like when in mid January, after a long period of unstable snow conditions, Bruce Tremper issued the first "moderate hazard" and, nticipating the onslaught, went on a diatribe about how that did not an that you could throw yourself down any radical shot "with impunity".

is really a shame that more of the backcountry is not covered by user-oriented avalanche information of this caliber. California's public avalanche information is a particulary bad joke.

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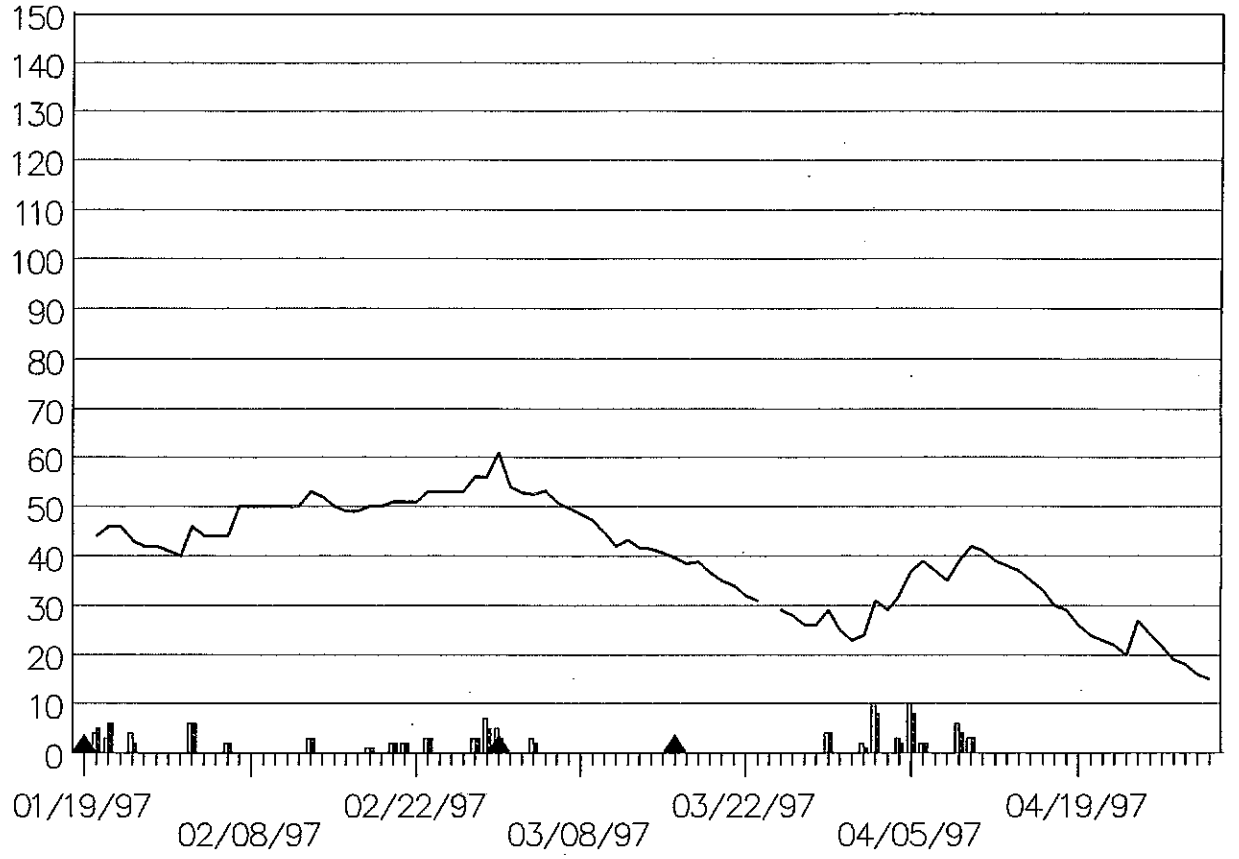
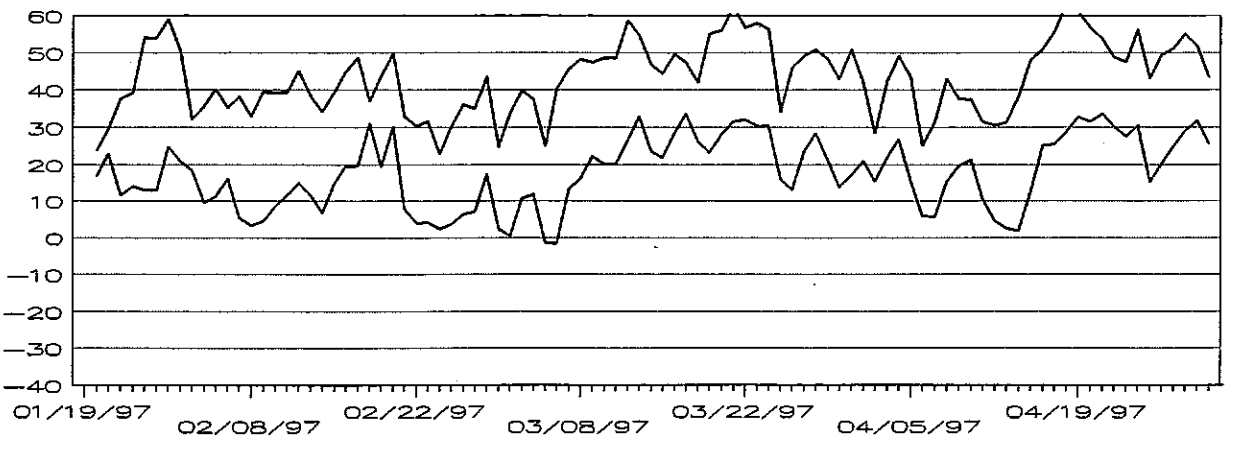
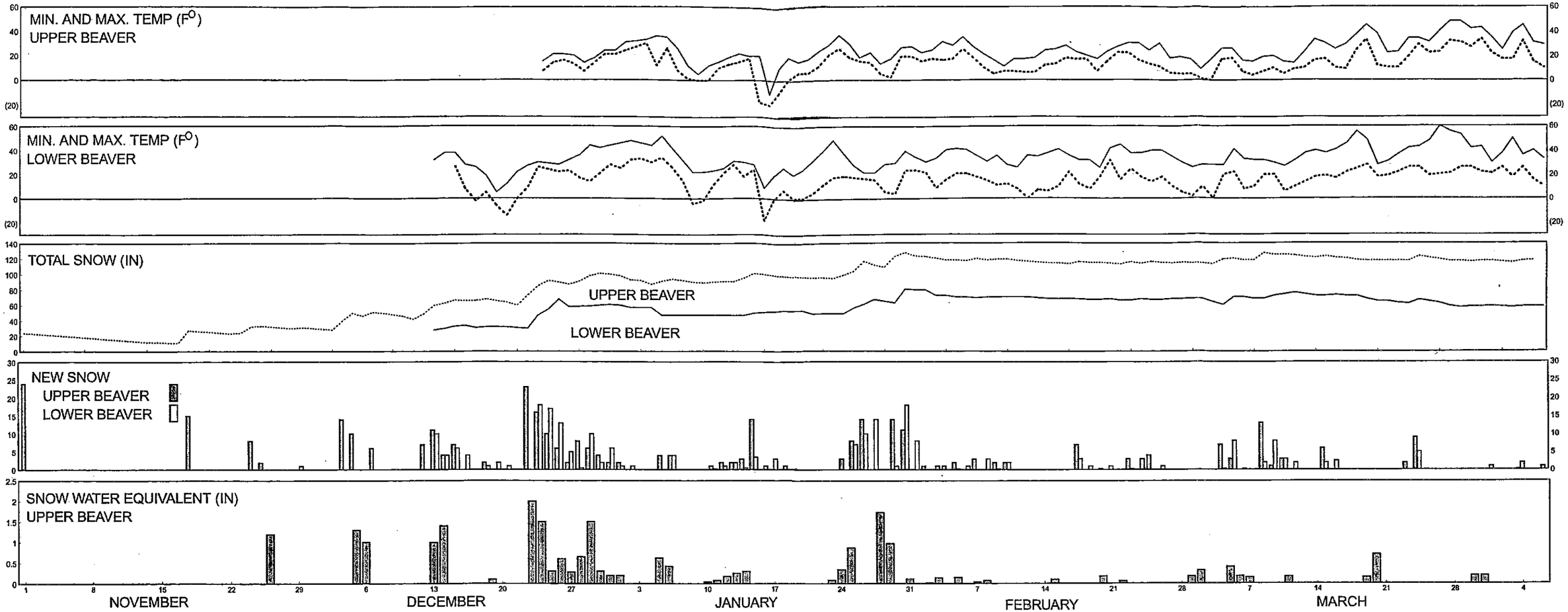
rk Rosenberg
mnr@netcom.com

La Sal Mountains 1996–97

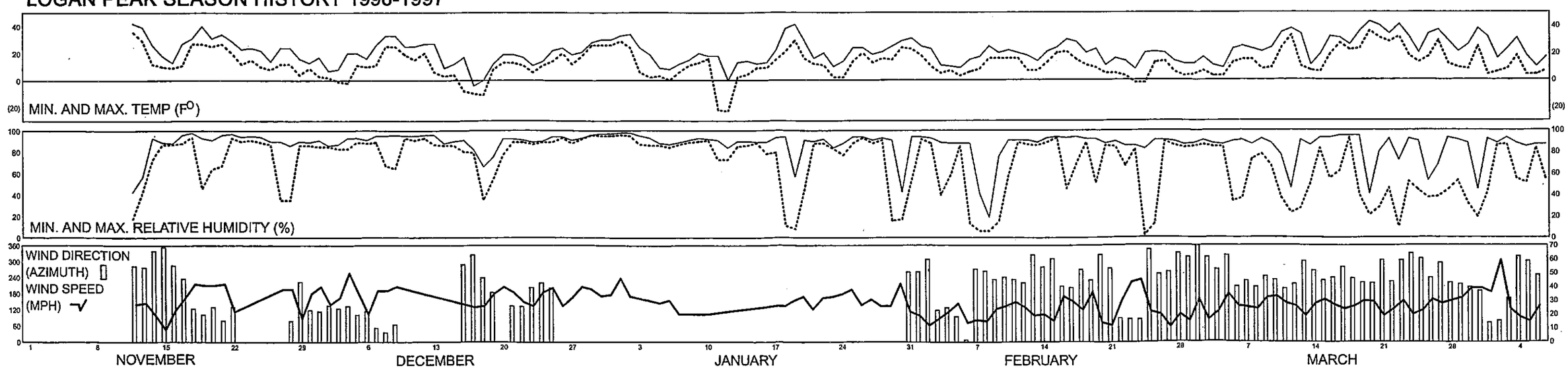


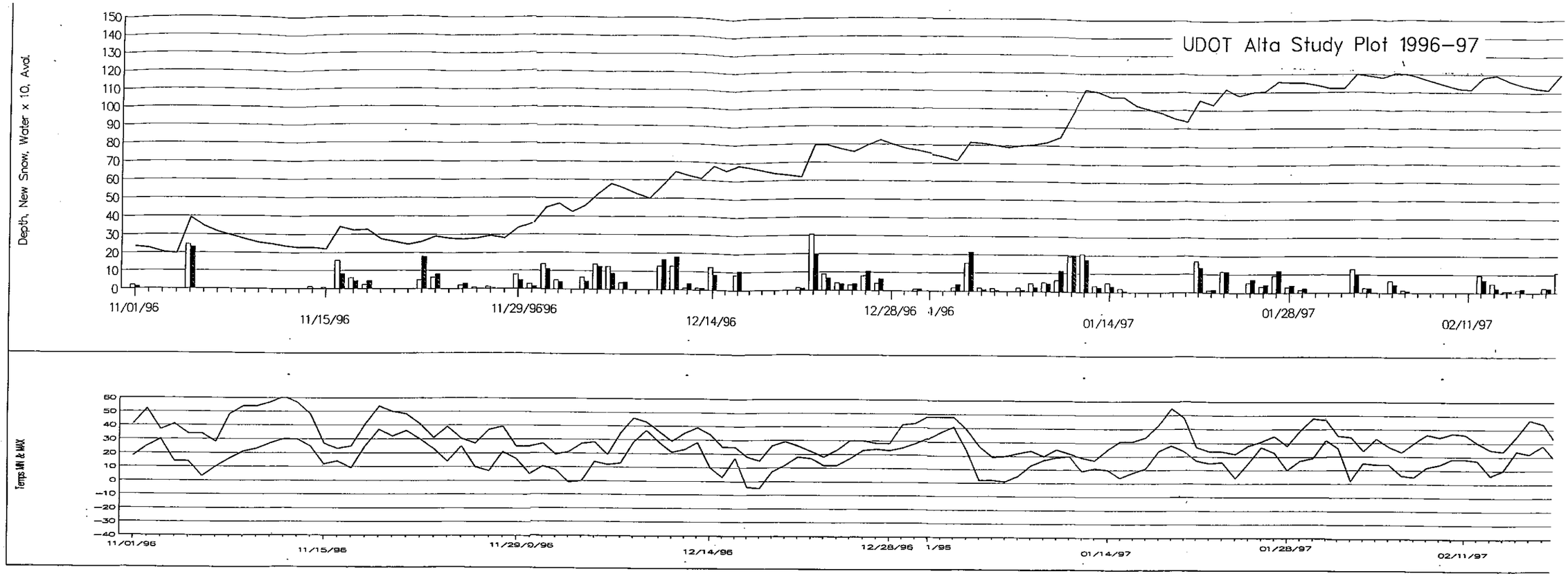


BEAVER MOUNTAIN SEASON HISTORY 1996-1997



LOGAN PEAK SEASON HISTORY 1996-1997




UDOT Alta Study Plot 1996-97
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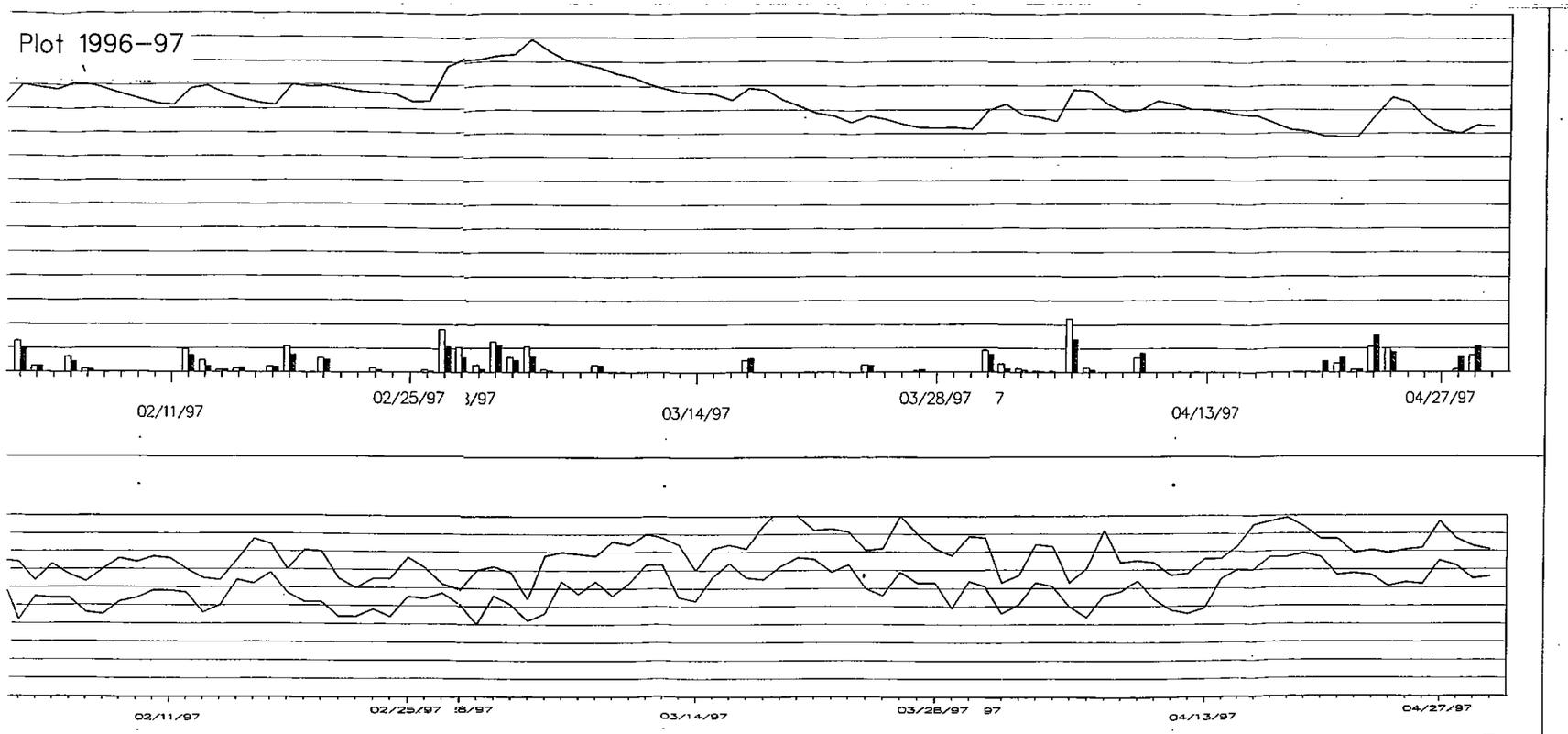
Plot 1996-97
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