

Snow & Avalanches in Utah



USDA Forest Service

Utah Avalanche Forecast Center

Annual Report 1997-98

Forest Service Intermountain Region

in partnership with:

Friends of the Utah Avalanche Forecast Center
Utah Department of Public Safety
Salt Lake County
National Forest Foundation

NOAA National Weather Service
Utah State University
Utah State Parks and Recreation

Authors:

**Bruce Tremper
Tom Kimbrough
Evelyn Lees
Mike Jenkins
Faerthen Felix**

**Cover photos:
Bruce Tremper**

**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
Utah State Parks and Recreation
National Forest Foundation**

Copies of this report can be obtained by writing or calling:

**Utah Avalanche Forecast Center
2242 West North Temple
Salt Lake City, Utah 84116
(801) 524-5304**

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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?

Ninety eight percent of all avalanche fatalities occur in the backcountry—areas 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 arrives 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, less than one percent of avalanche fatalities have involved general public on open runs at ski areas or on open highways.

What kind of people get caught in avalanches?

Ninety two percent of people killed in avalanches since 1985 have been recreationists, and they are almost always very skilled in their sport. In almost all cases their skill in their sport significantly outpaces their avalanche skills. Looking at the most recent 5 years of national data, nearly twice as many snowmobilers have been killed as any other user group, followed by climbers, backcountry skiers, snowboarders and miscellaneous recreationists such as hikers and snowshoers (see charts on page 4).

How do people get caught?

In over 95 percent of avalanche fatalities, the avalanche was triggered by the victim or someone in the victim's party. As Pogo says, "We have met the enemy and it is us." Which is actually good, because it means that, 95 percent of the time, we can avoid avalanche accidents through our route finding and snow stability decisions.

In summary, avalanche fatalities occur almost exclusively in the backcountry, almost always involve recreationists, and almost all avalanche incidents can be avoided if we choose.

How we help solve the problem:

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

Critical, up-to-date avalanche information.

We issue twice-daily recorded avalanche bulletins that give the public important avalanche information they need to make their life-and-death decisions in avalanche terrain. And we also forecast snow stability and weather trends into the future. Our information helps the public to decide what kind of terrain is safe, what kind is dangerous and we give them useful clues to look for when they venture into avalanche terrain.

We provide information on current avalanche conditions primarily through our avalanche bulletins. People access these by:

- ◆ Recorded message updated twice each day
- ◆ Live interviews each day on two different public radio stations
- ◆ The Internet
- ◆ Faxes sent out each morning to businesses and Forest Service offices
- ◆ In times of extreme or unusual avalanche conditions, we issue an avalanche warning that reaches all the broadcast and print media as well as NOAA weather radio.

Finally, we “preach the avalanche gospel” as much as possible to the local, national and international media. This season, for instance, several documentaries played on national television including National Geographic and several on the Discovery Channel and PBS. Program Director, Bruce Tremper was featured in all these documentaries, and in the fall of 1998, Carol Ciliberti will be featured in an avalanche documentary on the Discovery Channel.

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 also some basic avalanche skills. These classes encourage them to take a more involved avalanche class offered by the private sector.

Our Philosophy:

Just because people hear the information doesn't mean they listen. Even good information, if presented in a boring way, wastes the taxpayer's money because no one will remember it. Therefore, we make the bulletins entertaining so that people will remember what they hear and enjoy the experience enough to use the bulletins regularly.

We try and use all the standard tools of effective writing and speaking such as using active voice, first person, examples and stories to illustrate points, humor where appropriate and reading the bulletins in a natural voice, like talking to a friend. The recorded bulletins are informal, chatty and funny, yet informative. It also makes our work fun.

We believe local forecasters do a much better job than distant forecasters.

Local people know local conditions better. They're out in it every day, they see it from their window and they talk with people on the street about it. Because of this, we believe that local people should issue avalanche bulletins for local areas, as long as they have the avalanche skills to do so. For this reason, three crews of avalanche forecasters operate in Utah, one in Logan, another in Salt Lake City and a third in Moab. If there were enough money, we would split the geography up into even finer sections.

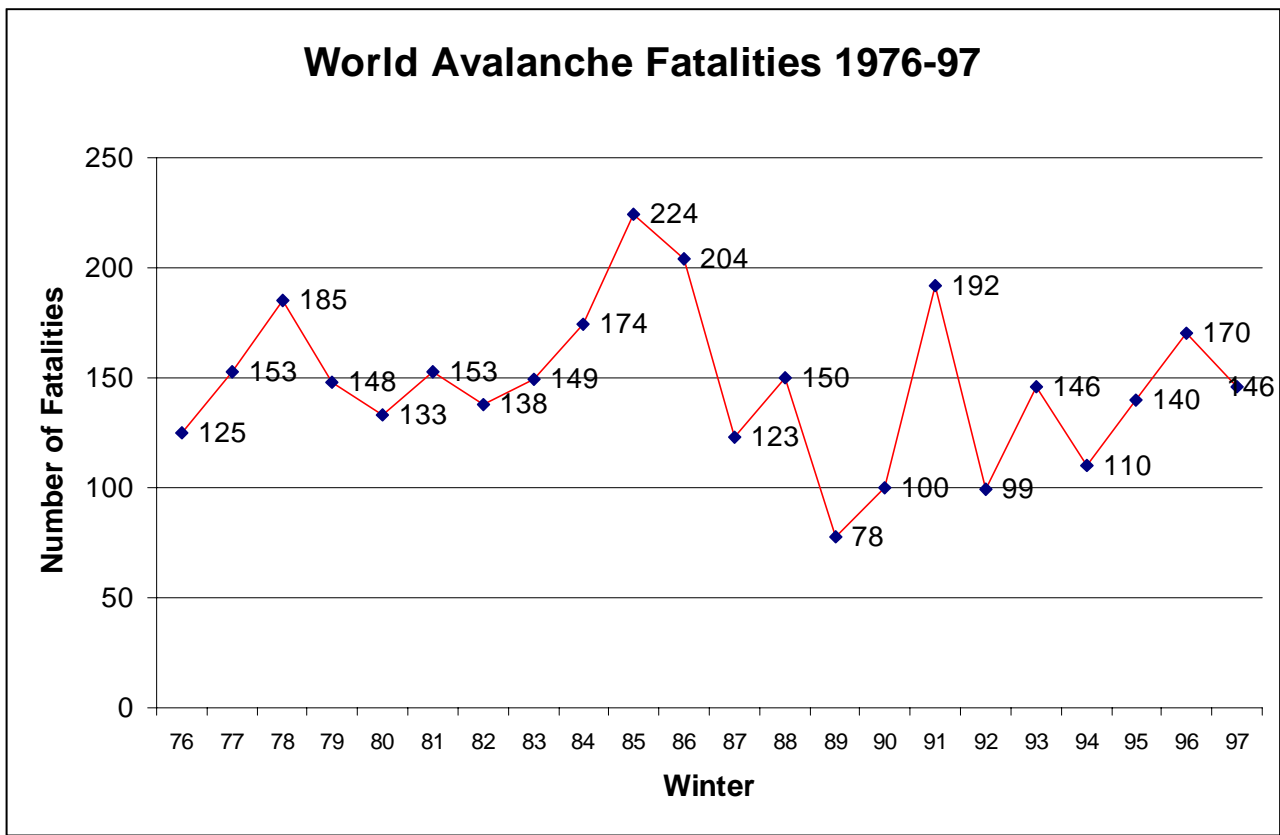
We believe in a strong field-based program.

Avalanche forecasting is more of an art than a science. And because of this, computers never have, and most likely never will, be able to forecast avalanche hazard as well as an experienced and skilled human being. Avalanche forecasting works best when the person putting out the forecast has an intimate, daily connection to the snowpack. We notice that the longer we

spend in an office, the more out of touch with the snowpack we become. Therefore we always put in one or more field days before our forecasting shift, and we never have more than two forecast days in a row.

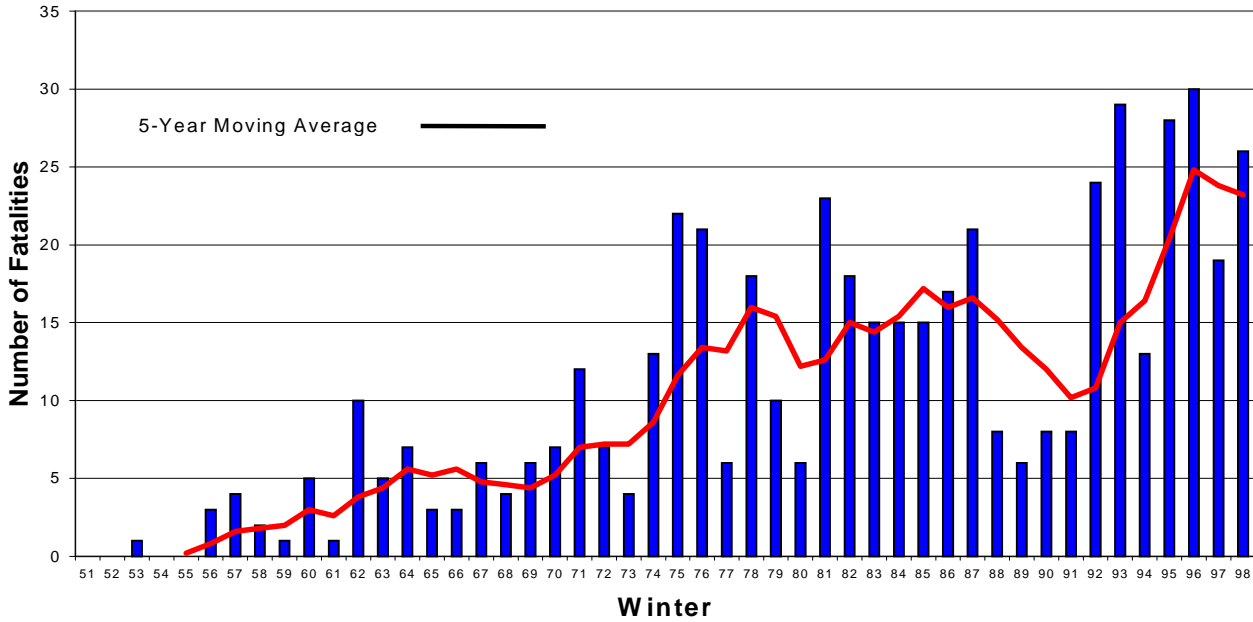
This is our philosophy and it seems to be working. More people call the UAFC bulletin each season than any other avalanche bulletin in North America, and the number keep increasing by an average of 20 percent per year. The numbers of people going into the backcountry keep increasing exponentially, yet the death rate has risen more slowly. We also see an increasing demand for avalanche education and information, not only by Utahns, but by the national and international media.

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

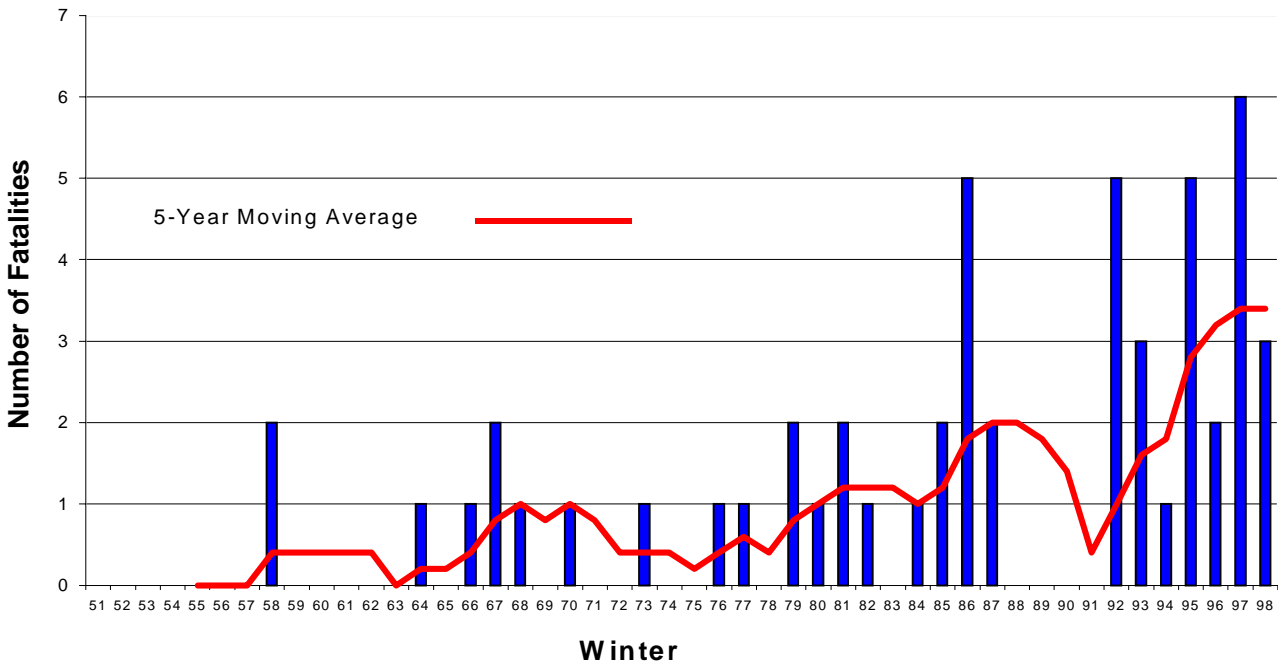


Worldwide avalanche fatalities have remained fairly steady since 1976, yet as we see on the following pages, avalanche fatalities in the U.S. continue to dramatically increase. The difference may lie in the fact that the federal government in European countries spend many millions of dollars to combat avalanche deaths while in the U.S. the federal government spends only around 230,000 dollars.

U.S. Avalanche Fatalities 1950-98

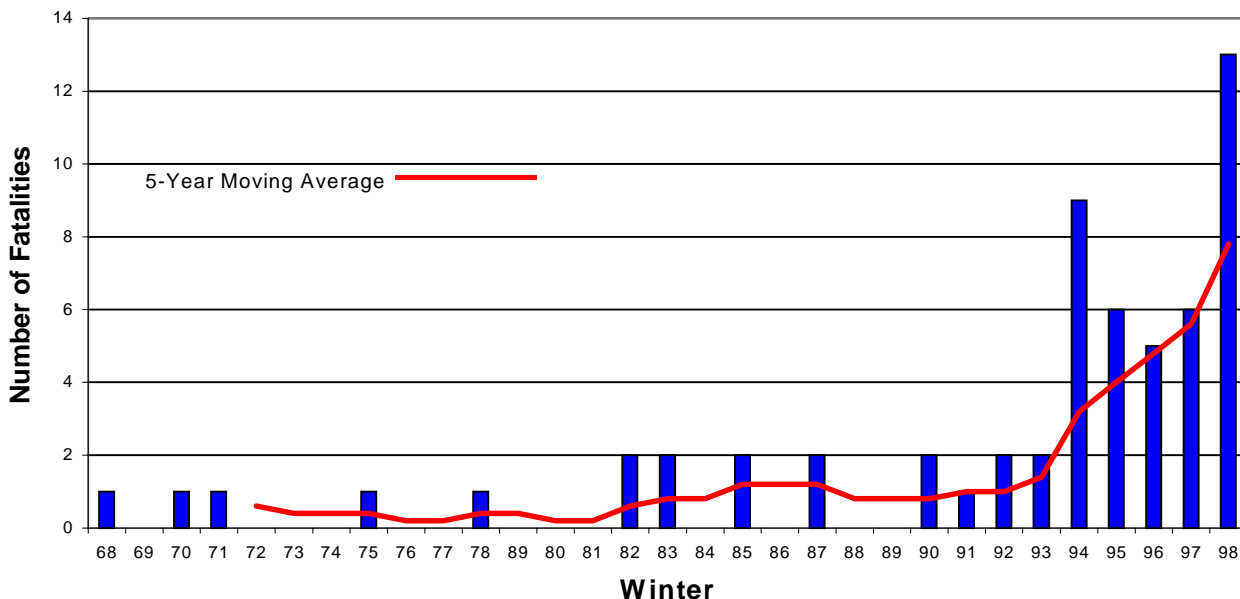


Avalanche Fatalities in Utah 1951-98

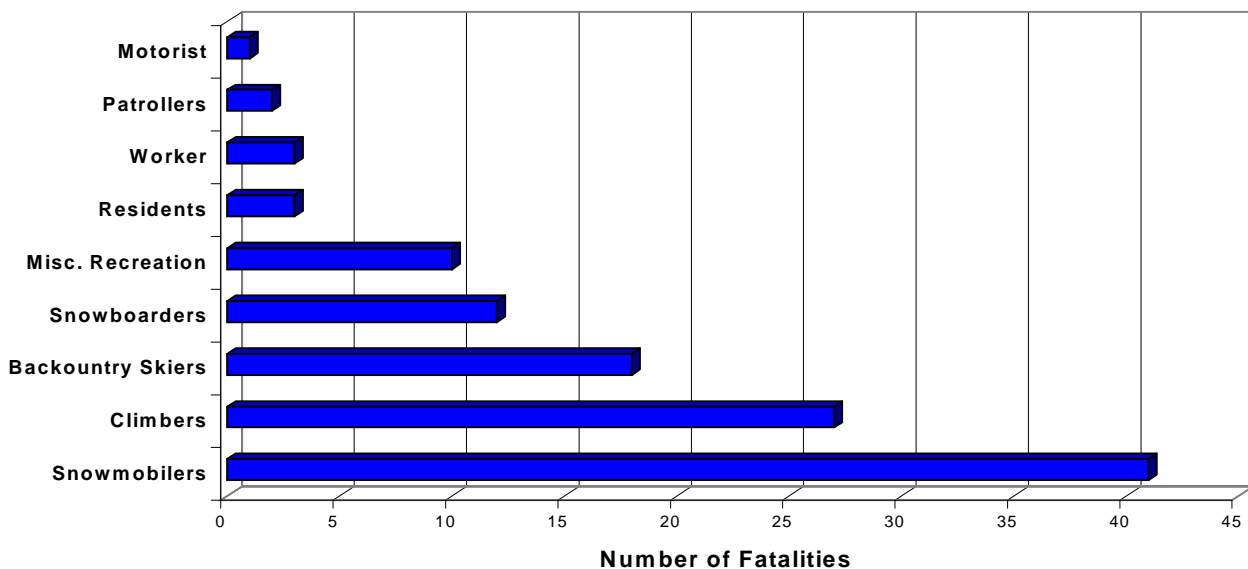


Avalanche fatalities in Utah as well as nationally continue to rise. We expect that recreation on Forest Service lands will continue to grow--and grow dramatically--as more people move to the West and equipment continues to improve. Therefore, avalanche deaths will most likely continue to rise. Public avalanche

U.S. Snowmobile Avalanche Fatalities by Year 1968-98

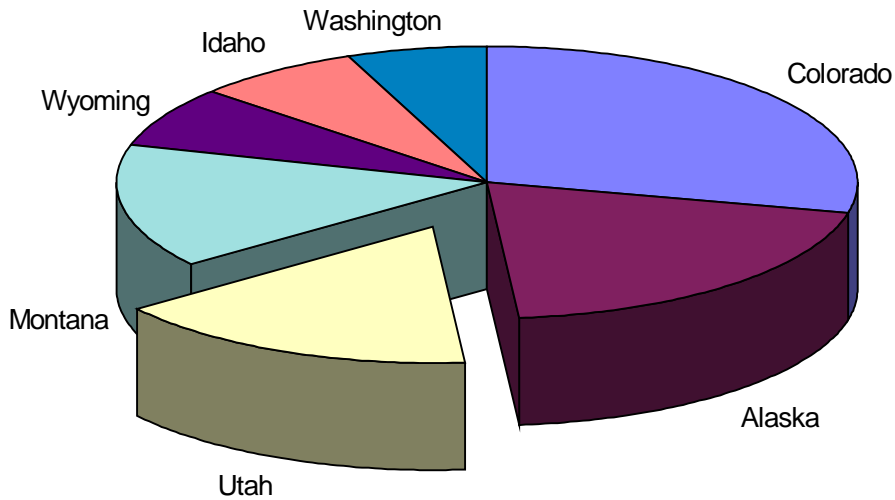


U.S. Avalanche Fatalities by User Group 1993-98

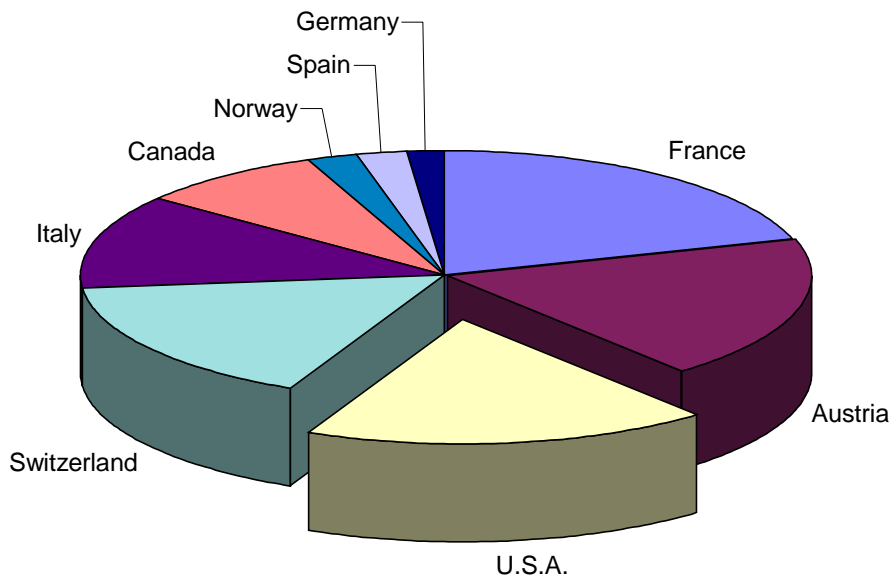


In the past 5 years, we see that snowmobilers lead the list for avalanche fatalities in the U.S. This is a recent phenomenon; more than 5 years ago, backcountry skiers led the list. Dramatic advances in the power, weight and traction of snowmobiles now allow them to easily access dangerous avalanche terrain right after a storm. Also, snowmobiles can cover 100 times the amount of terrain a skier can in a day. Finally, very few snowmobilers carry basic avalanche rescue gear or have taken a basic avalanche awareness class.

Avalanche Fatalities by State 1991-1998



Avalanche Fatalities by Country - 1992-97



Avalanche deaths don't just happen somewhere else. Utah runs neck-and-neck with Alaska for second place behind Colorado in avalanche deaths in the U.S. And the U.S. also ranks neck-and-neck with Austria for second place country worldwide, second only to France.

Nuts and Bolts

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

Mike Jenkins, Kevin Kobe and Bruce Engelhard record the avalanche bulletins in the Logan area mountains on weekends and each Wednesday and the Salt Lake-based staff record the Logan bulletin on the remaining days. Mike Jenkins has taught a quarter-long 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 in the Department of Forest Resources.

In Moab, Faerthen Felix has done an outstanding job in her first year. As the only full time staff for the La Sal Mountains, she has her work cut out for her. The Moab office is located in the Moab Ranger District on the Manti-Lasal National Forest.

Last, but not least, the majority of the backcountry use occurs in the Wasatch Range of northern Utah. A staff of seven full time workers cover the Ogden, Salt Lake City, Park City and Provo area mountains—arguably the most heavily used mountain range in the U.S. Bruce Tremper in his 12th season heads the operation along with a very experienced staff: Tom Kimbrough, Evelyn Lees, Seth Shaw and Carol Ciliberti. Keith Clappier was contracted as a full-time information assistant in the office and the non-profit group, Friends of the Utah Avalanche Forecast Center contract the intrepid Bob Athey as a full time backcountry observer. The Salt Lake office is co-located with the National Weather Service at the Salt Lake International Airport.

Although Bruce Tremper spends most of his time in the Wasatch operation, he oversees all three operations to insure consistency in quality.

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The public can access the bulletins in the following ways:

Telephone:

Salt Lake City - 3-minute bulletin (20 phone lines)	(801) 364-1581
Salt Lake City - 6-minute bulletin (4 phone lines)	(801) 364-1591
Logan (multi-line PBX system at Utah State University)	(435) 797-4146
Park City (multi-line PBX system at Park City Resort)	(435) 658-5512
Ogden (multi-line PBX system at Weber State University)	(801) 626-8600
Provo (multi-line PBX system at Brigham Young University)	(435) 378-4333
Alta (multi-line PBX system through the Town of Alta)	(801) 742-0830
Moab (single phone line)	(435) 259-7669

Radio Stations (live on-air reports each morning around 8:00 am)

KRCL 91 FM

KPCW 92 FM

Internet:

<http://www.avalanche.org>

Fax:

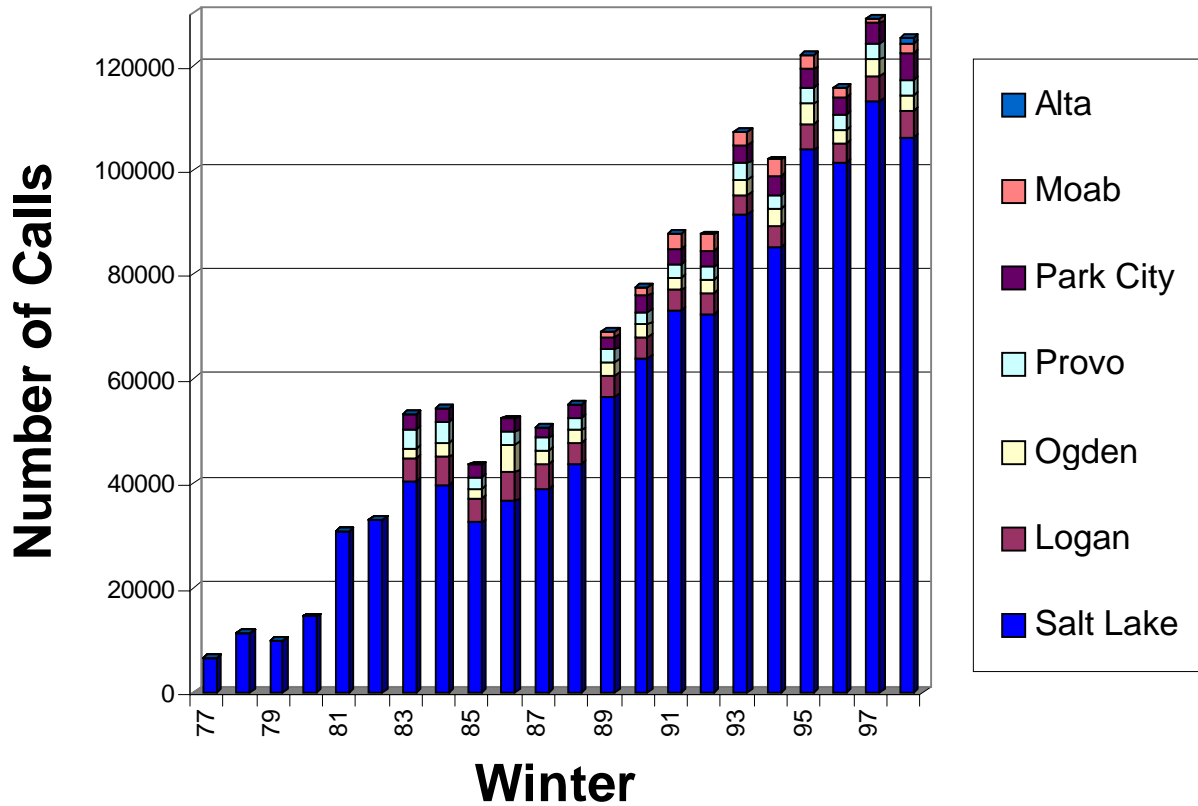
We operate an automated fax distribution of the bulletin for selected businesses and Forest Service offices that post a hard copy for the public to read.

To contact our office: (801) 524-5304 (phone)
(801) 524-4030 (fax)
e-mail: uafc@wasatch.com

Season Highlights

- Three people died in avalanches during the winter of 1997-98, two snowmobilers and one hiker. We do not know for sure if an avalanche killed the hiker. He was a 19-year-old Weber State student who went for a hike in the mountains near campus during a high hazard time. He was missing all winter and melted out in spring in avalanche terrain with some injuries. We will presume he is an avalanche fatality.
- 96 people unintentionally triggered avalanches, 57 were caught, 17 partially buried, 8 totally buried, 7 injured and 3 killed. These numbers include primarily backcountry incidents and only selected important incidents inside of ski area boundaries. These numbers do not include intentionally triggered avalanches or minor incidents in which professional avalanche workers were caught.
- Property damage included several cars damaged on highways and in parking lots in Little Cottonwood Canyon and one controlled avalanche that caused major damage to the east wing of the Peruvian Lodge at Alta.
- Utah finished the season with slightly above average snowfall and warmer than average temperatures. Other than a huge avalanche cycle in January, the snowpack remained relatively stable throughout the season and snow conditions were quite good for skiing, snowboarding and snowmobiling.
- The public called the recorded avalanche bulletins 125,000 times this past season. This averages about 700 calls per day and as many as 2,000 call on busy days. More people call the UAFC bulletin than any other avalanche bulletin in North America. This number is down very slightly from last season because it was a less dangerous year and very little snow fell in the valleys—which especially makes people think about avalanches. But looking at the call rate since 1980, we see an average increase of 10-20 percent per year (see chart).
- About twice as many people accessed the UAFC bulletin via the Internet than over the phone lines. The avalanche bulletin averaged an estimated 1200 hits per day and the mountain weather forecast received about the same amount. This adds up to around 400,000 combined hits per year for both the avalanche bulletin and the mountain weather forecast.
- Once again, the UAFC was prominently featured in both local and national media. We were interviewed for two different national television documentaries, we had seven national TV telephone contacts, five national print media interviews, nineteen on-camera interviews by local television, twenty seven local print media interviews and six local radio interviews. The National Geographic documentary on avalanches, which features UAFC Director, Bruce Tremper, continued to air this season.
- We taught 45 avalanche classes which involved 2560 people. This includes 40 avalanche awareness talks, three multi-day avalanche classes and a quarter-long university course.

Yearly Calls by Area



Calls to the UAFC recorded avalanche bulletin have increased by 10-20 percent each year since we started in the late 70's. More people call the UAFC bulletin than any other avalanche bulletin in North America. The Salt Lake City area accounts for the vast majority of the calls (85%). These numbers do not reflect calls to our bulletin via the 1-800 snowmobile avalanche number operated by Utah State Parks, because they can not count the calls on their system. Call numbers for some of the areas outside of Salt Lake City likewise can not be counted, but are conservatively estimated here based on reliable counts from previous years.

Season History 1997 - 98

El Nino

Much hype regarding the El Nino, long range forecasts preceded the first winter snows by several months. Unfortunately, El Nino was widely misunderstood by the media, and consequently by the public. The media's simplistic reporting never seemed to grasp that the effects of El Nino varied dramatically depending on which part of the country you were talking about. In a typical El Nino year, the northern U.S. is usually dry, the California coast and the southern U.S. is usually wet and northern Utah is usually left somewhere in the middle. That fact seems easy enough to explain, but the popular media almost never mentioned it, and consequently the public ended up with all kinds of crazy ideas.

Depending on which article you read on which day, the winter could be wet or dry, warm or cold, good or catastrophic. Of course all of these predictions were correct, but it depended on which part of the country you were talking about. The "good versus bad" viewpoint could also vary according to your orientation. Is your interest winter sports or growing cotton?

In hindsight, we were impressed by how well the predictions turned out—that is the National Weather Service predictions, not the media spin. The forecast for northern Utah was for a split-flow pattern with an active southern storm track resulting in a dry early season with a wet spring, finishing with an above average, but not record, snow pack. And that's exactly what happened.

October

October snow at Alta totaled 64 inches with only about a foot on the ground at the end of the month on the Guard Station stake. The couple of decent storms brought out the usual early season madness as people were unable to wait for the resorts to open, yet still behaved as if the ski patrol did avalanche control each morning. Despite the usual number of close calls, no serious incidents occurred.

November

Close calls at Tony Grove and also on Mt. Superior

November continued the dry trend with no major storms. But despite the lack of new snow, the weak snowpack resulted in several incidents. In a very close call, two snowboarders in the Logan area mountains hiked up into the Tony Grove area to build a jump. They triggered a large slide that buried one man to his neck and completely buried his wife. He was able to dig himself out and then he heard his wife yelling and dug her out from under 4 feet of snow. Neither of them had avalanche rescue beacons.

Later in the month two people triggered and were caught in a slide on a steep, northeast facing chute on Mt. Superior in upper Little Cottonwood. The slide was a couple of feet deep, and took one of the people on an 800' ride over a couple of cliff bands. Both people were extremely lucky to escape without serious injury, considering the size of the slide and the extreme terrain.

The month had a total snowfall of 46 inches in Little Cottonwood. Total depth at the Alta Guard Station was close to 30 inches.

December

Finally a big storm arrived at the end of the first week of December. Alta recorded a storm total of about 5 feet in less than three days. We expected a major slide cycle, but while there were plenty of avalanches, instabilities were not as widespread as anticipated. This lack of activity may have been due to the light density snow and cold temperatures inhibiting the formation of a consolidated slab on many slopes. Once the new snow settled out there was excellent backcountry skiing and snowboarding all over the range on moderate angle slopes.

The rest of December quieted down, back in the dry, split flow. Most of the 81 inches at the Alta Guard Station fell on December eighth and ninth.

January - and the huge avalanche cycle

January started out slowly, then quickly turned into a wild month of big storms and big avalanches. The precipitation for Utah statewide ended up being above, to well above, normal thanks to the very wet period between the 9th and the 20th. The Alta Guard Station ended the month with a total of 128.9 inches of snow with 13.05 inches of water; close to 100 inches of that snow came down during the mid-month stormy period. Most mountain locations in the Wasatch received as much as 120 to 160 percent of normal snowfall for the month.

Avalanche danger began to increase during the first week as a couple of small storms rolled in, but the action really picked up on the weekend of January 10 and 11. We issued an avalanche warning on the 11th and because of the continuing storm, it remained in effect for the next ten days. The problem was that a dry early season produced a shallow snowpack, with a layer of very weak faceted snow near the ground. During the months of November and December we repeatedly warned our listening public that as soon as we got snow, the avalanche activity would be immediate, widespread and deadly. As predicted, plenty of avalanches occurred on the 11th, including numerous natural slides several feet deep plus lots of slides from control work at the resorts.

The Dave Anderson / Life Flight Helicopter Tragedy

During the late afternoon of Sunday, January 11 we had the first serious avalanche accident of the storm cycle. Experienced backcountry skiers on the sub-ridge between White Pine and Red Pine Canyons (thus called Pink Pine) in Little Cottonwood were taking their last run down a steep west facing slope. The second skier, Dave Anderson, triggered a slide only about a foot deep and 50 feet wide, and it picked up speed very quickly on the slippery underlying bed surface. He sustained serious leg injuries as the slide carried him through trees, but was not buried in the debris. After a long, arduous rescue, friends and rescue workers were able to get him down to the road about 6 hours after the accident took place. Tragedy struck when the rescue helicopter crashed as they tried to fly down canyon in a violent blizzard. All four people on the helicopter were killed—the avalanche victim, the pilot, a paramedic and a nurse. It was a major tragedy that left Salt Lake City reeling. The skier, Dave Anderson, was a good friend to all of us at the Avalanche Forecast Center and was a central and much-loved member of the local skiing and climbing community. He is missed by all of us.

Very close call at Solitude

The next day a Big Cottonwood ski patroller was caught in an avalanche during control work. A section of unbroken snow between two previous shot placements released as he did a ski cut. He went for a long ride through trees and cliff bands, and ended up completely buried when the debris came to a stop. His partner was able to find him within minutes. He was not breathing

and they did CPR on him as they transported him to a waiting helicopter at the base. Miraculously, he began breathing on his own after they reached the helicopter and he recovered with no ill effects.

More close calls at Powder Mountain

Things were also quite active in the Ogden Mountains, with a couple of natural slides 4-6' deep near Powder Mountain and 4' deep slides released with explosives at Snowbasin. Powder Mountain also reported a couple of human triggered slides. In one case a snowboarder triggered and was completely buried and was rescued by passing motorists. Three skiers also triggered a slide on a north facing slope, one of whom rode the slide 300' and injured a shoulder. They were fortunate to escape without more serious injuries.

Precipitation rates increased again on Tuesday, tipping the balance on many slopes. The spontaneous activity in the backcountry probably peaked during the day on the 13th. At a Park City ski resort an avalanche worker was caught and completely buried by a slide while ski cutting a slope he had just bombed. He was quickly located by beacon searching, and was dug out with no injuries.

Periods of snow continued through the week. Towards the end of the week the more stable snowpack of Little Cottonwood had all the load it could take and began producing huge avalanches. One of these ripped through part of the Peruvian Lodge on the 16th but no one was injured. The avalanche cycle affected nearly the entire western U.S. including all of Utah.

Close call with 12 Boy Scouts

About three miles from Elk Meadows, a group of 12 Boy Scouts triggered a slide that partially buried eight of them and completely buried four. Miraculously, even though they were not wearing beacons, they were able to locate everyone and get them out in time.

Two snowmobile fatalities

By this time the avalanche warning had been extended to include the central and southwest mountains of Utah and the Wasatch Plateau. But it was the weekend, and lots of people were out enjoying all the new snow. Seven snowmobilers were killed in five separate avalanches that weekend in the western U.S., two of which were in Utah. The first Utah fatality occurred on the 17th near Coalville on the flanks of the Uinta Mountains. **Damon Vernon**, 21 was buried around 3:00 pm. His four companions found him, dug him out and could not revive him. The second snowmobiler fatality occurred on the 18th on the Wasatch Plateau near Mt. Pleasant in central Utah. **David Dyches** and several friends were riding when they triggered the slide at 5:00 pm. Search dogs recovered him under 5 feet of snow around 9:30 pm but rescuers could not revive him.

Neither of these riders had avalanche beacons. Both of these fatalities occurred either on the fringe or outside our forecast area. They parallel the recent trends in avalanche fatalities in the U.S. Most involve snowmobilers in very rural areas that lack avalanche information services. This underscores the need for additional funding to expand services into more rural areas.

As the storms tapered off the avalanche warning was finally dropped on January 20. Smaller amounts of new snow on the now excellent cover produced what we called "astoundingly good" winter sports conditions by the end of the month.

February

February was a warm and snowy month, with record precipitation both in the Salt Lake Valley and in Little Cottonwood Canyon. In fact, this was the wettest February ever in the Salt Lake area, and the 3rd wettest month ever. The National Weather Service recorded 4.89" of water at the airport which is an impressive 398% of normal. Both Snowbird and Alta also received record monthly snowfall, with Alta measuring 157 inches of snow at 158% of normal. At Sundance in the Provo area the mountains received 72 inches of snow with an average density of 8%. Snowbasin received a monthly total of 89" with an average density of about 7%. Park City Resort received 83" for the month with about 6.3 inches of water. An intense stormy period near the end of the month dropped 1-2 feet of snow in the valley, and closed the Salt Lake airport for 9 hours. In spite of frequent mountain storms, avalanche hazard remained quite tame with low to moderate ratings 9 days out of the month, and only 3 days of high hazard. The huge January avalanches cleaned out most of the underlying weak snow and the large amounts of snow in February fell on a stable base.

There were only a couple of avalanche incidents. On February 3 a backcountry skier in upper Day's Fork of Big Cottonwood Canyon triggered a hard wind slab on a steep east facing slope. He was traversing through a gully when the slide pulled out 1-4 feet deep and about 50 yards wide. He rode the slide down 1,000' of vertical and was lucky to escape with only a wrist injury.

Weber State University student presumed killed in an avalanche

On February 26, David Ebberhard, a 19-year-old student at Weber State University failed to return after taking a walk alone in the mountains behind campus, and a subsequent search failed to locate him. In early May, his body melted out of the snow in an avalanche path behind Weber State University. He did have some injuries and we may never know if this was an avalanche fatality or not. But it was a high danger of avalanches on the day he disappeared, so we will call this an avalanche fatality unless subsequent evidence indicates otherwise.

Also on February 26th, an avalanche hit two cars on the Little Cottonwood road and caused minor injuries.

Despite this, backcountry traveling conditions were excellent and mostly safe for most of the month.

March

March was a month of weather contrasts. Stormy weather prevailed over the mountains the first and last weeks of the month, with a long dry spell in between. The Salt Lake Valley was unusually cool and wet, with over 150% of normal precipitation for the month. The mountains received close to normal precipitation. The Alta Guard Station reported a monthly snowfall total of 92 inches, 98% of normal.

A couple of fast moving storms produced plenty of backcountry avalanches in the new snow around the end of the first week of the month but dry and warmer conditions began for the second week, that is a little too warm. A major wet slide cycle developed surprisingly quickly on the weekend of March 14 and 15. A bus and several cars were hit on the afternoon of March 14 in Little Cottonwood. Several people were buried and one person was seriously injured.

After another small but cold storm on March 17 the heat wave returned full force. Another wet cycle started moving after several days with nighttime lows above freezing at 8,000 feet. The entire snowpack became wet mush, even on upper elevation northerly slopes. Finally on the 26th temperatures dropped into the 20's, re-freezing the pack and relieving the minds of local ava-

lanche forecasters.

Winter returned for the last week of March bringing Little Cottonwood 50 more inches and once again, excellent turning conditions.

April

The El Nino long range forecast of a wet spring verified well during the first half of April. We went nearly two weeks with at least a trace of precipitation at Alta. Although there were no blockbuster storms, a never-ending series of troughs marched into Utah, putting down a lavish supply of fresh powder.

Several experienced people triggered avalanches during the second week of the month but there were no injuries. Skiing and boarding conditions were quite winter-like, at least at the higher elevations. Below about 8,000 feet however, spring temperatures had their effect on the snow and sunny slopes crusted whenever skies cleared.

Finally, more typically spring weather arrived for the third week and with only a few people still interested in winter sports we issued the end of season bulletin on April 20. But even though we had to end our forecasts for the season, it certainly wasn't the end of the avalanche season. Strong El Nino years such as this typically delay the wet slide avalanche cycles because it continues to stay wet and cool, and when the inevitable warm up comes it comes with a vengeance.

Large wet-slide cycle in late spring

With very warm temperatures in the last week of April, a widespread, deep wet slab avalanche cycle took place throughout most of Utah. Very large and sometimes destructive avalanches began breaking down to the old faceted snow near the ground. The Cottonwood Canyons escaped most, but not all, of the activity because it had a deeper and more stable snowpack. Luckily, the snow was so mucky that few people were out to see it and consequently no one was killed.

But there was a very close call. Two hikers, apparently oblivious of the danger, decided to hike up Bridal Veil Falls, perhaps Utah's most notorious avalanche path, on the hottest day of the warm spell. One was swept down and injured. A medical helicopter decided it was too risky to land for a rescue but a smaller television helicopter was able to land and rescue the injured hiker.

We ended up with three avalanche fatalities for Utah this season.

Season History - Logan Area Mountains

by
Mike Jenkins

Yes, it was a “normal” winter in the northern Wasatch, Bear River, Portneuf and Preuss Ranges of northern Utah and southeastern Idaho, at least as far as total snow depth and snow water equivalent. But from the perspective of avalanches, “100% of normal snowfall” doesn’t mean very much. This winter, the snow was slow to come and snow cover, especially at lower elevations was marginal for over-snow travel until well into January. In fact the snow pack created by a few early storms in November was decreasing in depth throughout much of December and added up to only a measly 30 inches on January 4 when a series of large storms finally arrived. Conversely, when we ended our season of advisories in April, the snow was still accumulating. Even as I write this in mid May snow continues to fall at high elevations and the coverage is better now than during most of November and December.

Early Season

Two snowboarders buried

The shallow snow pack of early November quickly turned into weak facets by the cold temperatures of early winter. Four days of moderate snow added about 24" on top of the depth hoar and, predictably, a human triggered avalanche occurred. The incident occurred near Tony Grove Lake, a popular early and late season area for skiers, boarders and snowmobilers alike. The incident involved two snowboarders, husband and wife, who triggered a slide while post holing up a slope to construct a kicker for jumping.

They triggered the avalanche while on a shallow slope of 15-20 degrees below a steep wind loaded gully. The man was ahead of the woman when the slide released above them. They tried to run, but could not, although the man was able to jump on his board to ride as if on a snurfer. He was knocked over and buried to his neck, but able to dig himself out. His wife was totally buried below him and he did not have an exact last seen area. After looking for a brief time he heard her voice and dug down to her with his shovel. She was facing down hill in an upright position and her head was 4 feet below the snow surface. She was uninjured after having been buried for only a few minutes.

Given the four fatalities of last season, having a complete burial before Thanksgiving of this winter was a bad omen. Fortunately no fatalities or serious injuries occurred this winter. Between Thanksgiving and Christmas only about 28 inches of new snow fell at our Beaver Mt. study plot. Total snowpack depth on New Year’s Day was a mere 26 inches, composed mostly of facets.

Concern over the faceted snowpack structure heightened when big storms arrived on a warm southwest flow beginning on January 3. Between the 3rd and 19th of January we received 94", nearly 8 feet of new snow in a series of storms that added new snow almost daily. Not surprisingly numerous natural avalanches occurred, many to the ground, on the deep layer of facets. Many well-known avalanche paths slid including Wood Camp, Beirdneau Peak, Garden City Canyon, Mt. Elmer, Chicken Hill and others.

From a snow safety perspective the new snow came in a way that minimized the potential for human-triggered slides; the snow was just too deep for trailbreaking, even for snowmobilers, and it kept people out of the backcountry. And best of all, the heavy new snow made almost all the avalanche paths slide, cleaning out the problem for the future. During the cycle we had many reports of avalanches in the more easily accessible Salt Lake area mountains, but in the Logan area people couldn’t get out to see the avalanches until some days later when the skies cleared

and people finally were able to break trails into the mountains. Debris from large avalanches that occurred during this cycle was observed for days afterward as travelers explored more remote terrain. Even on a corn day in March I traveled over old debris in Deep Canyon of the Wellsville Mountains that appeared to have been deposited during the January cycle. Ultimately the cycle was a blessing. Not only did we get a much needed base but the large paths were cleaned out. We worried about deep slab instability for several weeks, but remaining facets were so deeply buried that no further large slides occurred.

Mid Season

For the remainder of January, and well into February only small storms, none depositing more than 6" affected our mountains. Several avalanches were reported during this period including the second in Wood Camp, White Pine Knob and at Pebble Creek in Idaho. These were all wind slabs caused by a period of high winds with gusts above 50 mph recorded on Logan Peak. During this period total snow depth at our study plot decreased from the mid January high of 87" to 71" on February 20.

Between February 21 and March 8, a series of colder, northwest storms deposited 59 inches of new snow bringing total snow depth to a season high of 90". A number of natural avalanches occurred during the period, including the third in Wood Camp. In the middle of March temperatures rose to near 40 dissected by a cold snap around the 20th. For most of March mountain top temperatures remained above freezing. Wet slides occurred again in Wood Camp and also in Beirdneau Hollow and several other north facing chutes in Logan Canyon. Near the end of March and into April as we brought our season to an end, but snow has continued into May at the highest elevations.

In summary the winter of 1997-98 was just another "normal winter".

Season History - La Sal Mountains

by Faerthen Felix

October

Several substantial storms in October left us pockets of rotten snow at higher elevations anywhere that the wind and sun didn't strip it away. This layer created moderate to considerable instability as snow began to accumulate later in the season, mostly on steep, wind-affected areas near treeline.

November

The month was dryer than the wet summer and fall predicted, with skiing conditions consistently thin and rife with land-mines. Occasional turns could be found by sticking to very low angle, grassy slopes with speedy recrystallized snow, but most recreationists wisely played it safe and stayed on the well-covered roads and trails. The month's one good storm ended on the 27th and brought us 8" of 7-9% snow at the GPTH with very little associated instability.

December

During the first week of December, we received 3" of snow and I began to see the season's first slab releases. These were on wind-loaded and rotten northerly aspects and were very pockety in nature. It appeared that sluffing snow and graupel from steep rock bands above had loaded these areas and played a factor in magnifying the stress of what seemed to be a very small increase in snowpack weight. So much for the "6"-and-wind" rule; like the man—Ron Perla—said, "the only rule of thumb is that there are no rules of thumb".

A big storm that ended on the 9th brought us 20.5" of snow and allowed backcountry skiing to begin in earnest. This storm was associated with widespread avalanche activity that included areas not ordinarily given to avalanching, like the Corkscrew Glades. Not surprisingly, big facets in the old snow were to blame and many of the slides ran full path and/or to the ground.

8" fell in time for the Christmas holidays, but a split jetstream weather pattern kept the month a little dry.

January

Long periods between snowfalls allowed the snowpack to recrystallize and rot, resulting in unsupportable base conditions in many areas. Good turning could be found by the determined, but most locals abdicated, leaving the skiing to less picky out-of-towners.

The month showed weather patterns typical for this area. The storms that pounded the Wasatch mountains slid just north of us, leaving small snow accumulations in their wake. The month's biggest snowfall came on the 5th, bringing us 8" of light snow which triggered extensive avalanche activity during the storm. By the next day it was all over, with no sensitive pockets to be found. The weakness was depth hoar, with many of these slides running to the ground.

February

The month came in wet, with one small storm after another leaving us 2 or 3 inches at a time for a total accumulation of 10" by the end of the first week of February. The warm SW flow responsible for the precipitation brought the snow in heavy and out light, but the short break between impulses—along with our usual winds—allowed hard wind slab to form on top of light density new snow. The gradual snow accumulation meant that these slabs did not release naturally but hung in place, waiting for a hapless trigger to wander by. This cycle brought us our most devious and dangerous avalanche conditions of the season, but the only observed or reported avalanches were triggered (quite easily) by the Forecaster.

This stormy pattern continued throughout the month. Avalanche hazard seldom dropped below considerable as the monthly snowfall total inched higher and the customary LaSal winds worked their sorcery. On the 14th, the weak snowpack began to fail, leaving crown fractures that stretched across the entire Middle Cirque of Gold Basin as well as many other smaller slides. The weaknesses were buried light density snow and large facets. Lousy weather guaranteed that noone was in harm's way.

The month's largest single storm left us 10" on the 23rd and triggered a few large natural avalanches that were difficult to spot after the clouds lifted and winds died—seemingly the rule rather than the exception, here.

The total monthly snowfall reached 38" before the sun broke through on the 28th—finally climbing high enough into the sky to bring heat to the frigid desert air for the first time this season.

March

March came in like a lamb. 3 days of spectacular, warm sun was greatly appreciated by the bold and hardy few who skipped the back-yard barbecue to get some turns and a ski tan. Mountain temperatures climbed above freezing, settling and soothing our wretched snowpack, but crusting all exposed slopes.

Snow continued to accumulate, with 2" on the 3rd, and another 8" on the 6th pushing the corn-snow season back. The temperatures began to climb around the 10th, and the arrival of 70 degrees in the valley triggered the annual Moab invasion of sun-seekers.

Just as spring-conditions seemed well-established, an unforeseen freak storm on the 17th brought 18" of cold, light density snow to the Geyser Pass Trail Head. Falling on a warm old-snow surface, the new snow stuck like a limpet on a smooth rock. No slab avalanching was observed during or shortly after the storm, but the sneaky, steep temperature gradient quickly eroded the bond. The hazard climbed to considerable on the 19th and a few short-running natural soft slab releases were seen.

A storm cycle that began on the 26th wrecked the developing corn-snow conditions with 13" of new snow that accumulated a little at a time. Warm temperatures guaranteed that shady, high evergreens were the only escape from sticky glop and "Jack LaLane" touring conditions ("...And now, 15 lb. weighted-leg lifts—left, right, left, right...").

The month went out like a lion.

April

Cold temperatures and a 16" fluffy dump heralded the start of April. This was good news for the snowpack, which had become soggy and wet during mid-March's warm sunny weather. Weak faceted crystals persisted near the ground, however, giving pause to those considering steep descents.

As the annual piggy-bank reached empty and the Center closed down for the season on April 6, spring snow conditions seemed well-established. Late spring snow continues to accumulate, however, ensuring excellent coverage and skiing conditions well into May and probably later.

There were no avalanche-related injuries or fatalities in the LaSal Mountains during the 1997-8 season. A snowmobiler was killed in an avalanche on the Wasatch Plateau section of the Manti-LaSal National Forest near Price, however (see accident description in the UAFC annual report).

Snowfall Totals

Totals	October	November	December	January	February	March
Snow			31.5"	24"	38"	41"
% of Ave. Depth		72%	91%	94%	134%	94%
Snow at Gysler Pass	10"	18"	26"	35"	51"	58"

Avalanche Incidents and Accidents

This list includes:

- ◆ Unintentional avalanche incidents in the backcountry. For instance, when someone accidentally triggers a slide, or is caught, carried, injured, buried or killed.
- ◆ Only important incidents at ski resorts and on highways when injury or property damage occurs.

It does not include:

- ◆ Intentional avalanche releases in the backcountry such as avalanches triggered by kicking cornices and avalanches triggered by ski cutting suspect slopes.
- ◆ Intentional avalanche releases by professionals such as ski cuts by patrollers and helicopter guides.
- ◆ Minor incidents in which a professional is caught

Finally, we estimate that we hear about only half of all the avalanche incidents that occur in Utah each winter. It's easy enough to know about avalanche fatalities or major incidents requiring a rescue but we know that, especially in rural areas, and especially among snowmobilers, most incidents go unreported outside of a small circle of friends.

Date	Location	Details
25-Oct	Eddies (Alta pre-season)	2 skiers caught, 1 injured
22-Nov	Meadow Chutes	Skier caught, no injuries
21-Nov	Tony Grove (Logan area)	2 Snowboarders, one buried to neck, one t
22-Nov	Pfeifferhorn	Triggered by climbers
23-Nov	Meadow Chutes	Skier triggered
26-Nov	Mt Superior	2 skiers caught, 1 injured
27-Nov	Hidden Canyon	Boarder buried to neck
8-Dec	Sundance	Triggered by skier
8-Dec	Sundance/Blackeye	Triggered by 2 walkers
10-Dec	Red Pine Saddle	Sympathetic to skier
13-Dec	Millcreek	Hunter caught, rode to bottom, no injuries
29-Dec	Reynolds Pk	Skier triggered
28-Dec	Limelight	Skier triggered
30-Dec	Patsy Marly	Skier triggered
2-Jan	Flagstaff Mtn. near Deer Valley	Skier buried to waist uninjured
2-Jan	Butler Hill near BCC road	Snow player triggered
4-Jan	Ant Knolls	Snowmobile triggered
6-Jan	Lower Ivory	Skier caught, small ride
6-Jan	Little Superior (SE)	Skier caught, able to arrest
6-Jan	Sound of Music bowl	Snowboarder caught, no injuries

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9-Jan	Dry Fork	Skier triggered
11-Jan	Little Superior Pk	2 skiers caught, no injuries
11-Jan	Powder Mtn	Snowboarder buried, OK
11-Jan	Powder Mtn	Skier takes ride, hits a tree, injures knee &
11-Jan	Pink Pine Ridge	2 skiers caught and 1 seriously injured. R
12-Jan	Solitude	Patroller completely buried, resuscitated
13-Jan	Daly Bowl	Skier triggered
14-Jan	1000 Peaks.	Sympathetic releases to skier
16-Jan	3 Mi W Elk Meadows	12 Boy Scouts caught, 4 completely buried
16-Jan	Toledo Bowl	Peruvian Lodge at Alta suffers major dama
17-Jan	Brighton	Skier caught, no injuries
17-Jan	Little Cottonwood Cyn.	Forest Service garage hit and UPL trucks t
17-Jan	Beartrap Fork	Sympathetic releases to skiers
17-Jan	near Coleville	Snowmobiler fatality
18-Jan	Sanpete County	Snowmobiler fatality
18-Jan	Little Cottonwood Cyn.	Cars hit by controlled slide
31-Jan	Mineral Basin	Snowmobile and skier triggered
3-Feb	Upper Day's Fk	Skier takes ride, uninjured
4-Feb	Mid Day's Fk	Skier caught, buried to waist, lost gear, bro
8-Feb	Mineral Basin	Skier takes 200' ride
8-Feb	Guardsmans Pass	Skier triggered, debris over road.
22-Feb	Bountiful Peak	2 skiers kick cornices and go for short ride
21-Feb	Bountiful Peak	Snowmobiler triggered and caught
22-Feb	Soldier Fork	Skier triggered and caught
22-Feb	Uintas, Dushesne Ridge	Huge snowmobile triggered slide, not caught
26-Feb	Near Weber State	David Ebberhard, student at Weber State f.
26-Feb	LCC Highway - Tanners	Slide knocks 2 cars off road, minor injuries
5-Mar	W. Bowl Silver Fork	Skier takes short ride
4-Mar	Red Baldy	Skier triggered from sensitive cornice
4-Mar	American Fork	4-5 skier triggered slides
7-Mar	Millicent	Snowboarder trigered
7-Mar	White Pine	Skier triggered
10-Mar	W of Water Hollow	Skier takes ride, hits trees, OK
10-Mar	Primrose Cirque	Skier caught, loses ski, OK
14-Mar	LCC Highway	White Pine Fingers several burials, 1 serio
19-Mar	Thunder Peak	Skier takes 400' ride, but OK
28-Mar	Pioneer Ridge	Snowboarder triggered slide
31-Mar	Tuscarora	Snowboarder triggered slide
31-Mar	Millicent Peak	Skier triggered
1-Apr	Uintahs (1000 Pks)	Skier caught, no injuries
1-Apr	Uintahs (1000 Pks)	Two more skier triggered slides
5-Apr	Mineral	Skier triggered
7-Apr	Red Baldy	Skier triggered
8-Apr	White Pine	Skier triggered
9-Apr	Mineral/Cardiac Ridge	Skiers triggered several
9-Apr	Cardiac Bowl	Skier triggered
10-Apr	Thunder Bowl	Skier took ride, uninjured
14-Apr	Figure 8 Hill	Skier triggered

17-Apr	Primrose Cirque	Skier triggered several
23-Apr	Bridal Veil Falls	2 people hit, one caught and injured
17-May	Mineral Basin	Snowmobiler triggered and caught, uninjured
30-May	Uinta Mtns.	Snowboarder triggered slide
Summary:		
Triggered	96	
Caught	57	
Partly Buried	17	
Totally Buried	8	
Injured	7	
Killed	3 (includes one unconfirmed avalanche victim near Weber State)	
Total number of incidents: 72		

Avalanche Education

One of the most important things we do is to promote avalanche awareness and to educate the public about avalanche safety. We figure that the more background information we can get out to the public, the better can make wise, informed decisions in the backcountry. We try 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.

We offer a number of free, basic avalanche awareness classes throughout the season. In these two-hour lectures we show slides, videos and use models to explain the basics of the avalanche phenomenon, safe travel in avalanche terrain, snowpack stability evaluation, and the human factors which lead to avalanche accidents and rescue. Our evening lectures at REI are always popular, usually drawing standing room only crowds of about 250 people. We especially try to provide talks to user groups like snowboarders and snowmobilers because their fatality numbers have risen so dramatically in recent years. 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. Each year many more requests come in for talks than we can provide.

In addition to the basic two hour lecture, we also help teach several three-day intensive avalanche workshops offered by the private sector. This type of workshop involves several hours of lecture in the morning, then a full afternoon in the field each day. In order to help start snowboarders on the long road to avalanche education, Evelyn Lees worked with the Friends of the Utah Avalanche Forecast Center 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. This workshop was a great success, with the usual high reviews from the students, and most important, three writers from national snowboarding magazines attended. One writer is finishing a book on backcountry snowboarding and he not only wrote a strong avalanche section into his book, but he encourages other snowboarders to take a class similar to the one we taught.

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.

We feel that education is one of the primary ways that we can help to prevent avalanche accidents and fatalities. This season we made special effort to reach out to the newer, growing user groups like snowmobilers, snowboarders and young students. Each year more people in Utah head out into the backcountry, and so it becomes even more essential to provide quality education to the public.

Avalanche Education List			
Date	Staff	Event	No. People
17-Nov	Jenkins	Franklin Co. (ID) Highmarkers	70
17-Nov	Kimbrough	Blasters School	300
20-Nov	Kimbrough	Snowbasin Patrol	30
1-Dec	Felix	Moab Rescue Team	16
2-Dec	Felix	Friends of LSAFC	
2-Dec	Kimbrough	Garfield Jr High	50
2-Dec	Kimbrough, Lees, Ciliberti	REI	220
3-Dec	Kimbrough	UAFC observers	15
6-Dec	Shaw, Clapier	Rockcreation	24
7-Dec	Felix	Moab Rescue Team	16
9-Dec	Felix	Grand Co. Rescue Team	14
10-Dec	Soucie	REI/Orem	50
12/13/15	Jenkins/Hebertson	Beaver Mt.	30
16-Dec	Staff	REI/Salt Lake	200
17-Dec	Kimbrough	AAI/Level II	35
13-Dec	Shaw, Clapier, Athey	Spruces/beacons	21
16-Dec	Saff	REI/Salt Lake	200+
18-Dec	Felix	Moab HS Outdoor	10
		Ed Class	
24-Dec	Felix	Grand Junction NW S	5
7-Jan	Kobe/Hebertson	USU Outdoor Program	50
8-Jan	Shaw	Black Diamond	15
8-Jan	Tremper	Zion Luthern	90
14-Jan	Lees	Uinta S.O.	25
1/17/19	Staff	Avi W orkshop	33
1/21/24	Jenkins/Hebertson	Basic Avalanche Course	15
1/28/31	Jenkins/Hebertson	Powder Mt.	45
27-Jan	Tremper	REI/Salt Lake	160
30-Jan	Felix / Brown	Moab basic class	15

4-Feb	Lowry	REI/Orem	70
7-Feb	Ciliberti	Park City/NSP	50
7-Feb	Felix	Geyser Pass - Moab	15
7-Feb	Felix	Mt. Peale - Moab	12
11-Feb	Lees	Mt Pleasant	95
2/14/16	Tremper, Ciliberti	Avi Workshop	20
14-Feb	Tremper	Wilderness Medicine	100
18-Feb	Jenkins	Snow Basin Patrol	15
18-Feb	Tremper	U of U/Avi Rescue	100
21-Feb	Kimbrough	WSU/Basic Avi	13
2/27-3/1	Ciliberti	Avi Workshop AK	33
7-Mar	Shaw	Avi Workshop/BCC	8
10-Mar	Felix	Price, UT	9
12-Mar	Clapier	Eisenhower Jr High	150
14-Mar	Felix	San Juan Co. SAR Team	17
15-Mar	Felix	Carbon Co. SAR Team	17
Winter Qtr	Jenkins/Hebertson	USU Avi course	15
45 events			2,560

Media

The Utah Avalanche Center was once again a high profile part of the Forest Service during the 1997-98 winter season. Media contacts were up over 30% from the previous season, partly due to our additional staffing. With the addition of an information assistant during the peak busy hours, 7 days per week, combined with a new second phone line, the media was able to talk to a person rather than get an answering machine.

Television:

We did on-camera interviews for two different national television documentaries this season. Carol Ciliberti was interviewed on-camera for a national television documentary to air on the Discovery Channel next season because of her heroic role in the miraculous live recovery of a woman buried last season (see the 1996-97 annual report). Understandably, the media has focused much attention on this accident and her participation in these documentaries has cast the Forest Service in a very positive light. Bruce Tremper was also interviewed on-camera by the Learning Channel. Both of these documentaries will air during the 1998-99 season.

In addition, several national television documentaries, which were filmed in previous years, continued to see air time this season, including National Geographic and another hour-long documentary on the Discovery Channel. Both of these feature Bruce Tremper.

Television continues to be an effective means of spreading avalanche information. UAFC staff appeared on the local television 22 times, and national television twice.

Print media:

Newspapers and magazines also continue to be an effective way to communicate. UAFC staff was interviewed by national print media 6 times and local print media 34 times. The Salt Lake City Weekly featured Tom Kimbrough as part of an article on "Local Heroes." The Salt Lake Tri-

bune featured Faerthen Felix in their "Mention of Honor" section. Bruce Tremper was the avalanche columnist for Couloir Magazine, a national publication that specializes in backcountry, adventure in the mountains. Tom Kimbrough continued writing a monthly avalanche article for Tuna News, and wrote an article for the Avalanche Review. We do this at no charge since we want to get good avalanche information out to the public in a variety of formats.

Radio:

We have continued our live radio broadcasts on two public radio stations, from late November through mid April. In addition, the UAFC staff did at least 9 other radio interviews with local stations

Media Contacts

Date	Forecaster	Media	Subject
11/13	Clapier	Science Times	UAFC/Avalanches
11/15	Lees	SL City Weekly	Avi awareness
11/18	Clapier	The Journal	UAFC/general avi
11/18	Clapier	KSL news	LCC sirens
11/22	Lees	KSL news	UAFC/Avi awareness
11/26	Clapier	Terra Asscs	Video footage
11/30	Clapier	SL Tribune	UAFC phone #s
11/28	Tremper	KTVX	Avi conditions
12/4	Clapier	Powder Magazine	Fund raising
12/4	Clapier	SL Tribune	Avi accidents 97
12/5	Kimbrough	Ind. Writer	Avi general
12/5	Kimbrough	SL Weekly	Local Heros
12/5	Clapier	NY TV	Filming avis
12/8	Tremper	KSL TV	Avi conditions
12/8	Ciliberti	KTVX	Avi warning
12/8	Tremper	Anchorage TV	Video
12/8	Ciliberti	SL Tribune	Avi warning
12/9	Lees	Stnd Examiner	Avi conditions
12/9	Felix	Moab Times Independent	Schedule of Events
12/9	Lees	KSL radio	Avi conditions
12/10	Clapier	KTVX	Avi hazard
12/12	BT & CC	KTVX	Avi general
12/14	Ciliberti	Learning Channel	Avi general
12/16	Felix	Channel 6 TV Moab	Open for Season
12/17	Felix	KZMU Radio	Schedule
12/18	Felix	Moab Happenings	Open for Season
12/19	Felix	Moab Happenings	Basic Avi Info
12/31	Felix	Salt Lake Tribune	Mention of Honor
1/7	Shaw	Stnd Examiner	Avi Forecasting
1/7	Clapier	GRB Entrtnmnt	Avi accidents
1/8	Ciliberti	Interim Prod	Coyle accident

1/12	Shaw	Std Examiner	Avi conditions
1/12	SS & CC	SL Tribune	Conditions/Accident
1/12	Shaw	Std Examiner	Avi advisory
1/12	Ciliberti	KUTV	Avi conditions
1/12	Ciliberti	Deseret News	Avi warning
1/12	Tremper	KSL TV	Avi warning
1/13	Kimbrough	KUTV	Avi warning
1/13	Clapier	Deseret News	Red Pine accdnt
1/13	Kimbrough	Std Examiner	Red Pine accdnt
1/13	TK & BT	KUTV	Red Pine accdnt
1/13	TK & BT	KSL TV	Red Pine accdnt
1/13	TK & BT	KTVX	Red Pine accdnt
1/13	Tremper	KPCW - NPR	Avalanches
1/14	Clapier	Std Examiner	Avi conditions
1/14	Tremper	KSL Ski Utah	General avi info
1/14	Felix	Channel 6 TV Moab	Interview - avi conditions
1/17	Tremper	SL Tribune	Reporting policy
1/18	Tremper	KSL TV	Avi warning
1/19	Shaw	Fox 13 News	Avi conditions
1/19	Shaw	KSL	Avi conditions
1/19	Shaw	Deseret News	Avi conditions
1/19	Shaw	Park Record	Avi conditions
1/19	Shaw	KSL	Avi conditions
1/19	Shaw	SL Tribune	Avi conditions
1/20	Lees	Park Record	Avi conditions
1/20	Lees	Standard Examiner	Avi conditions
1/20	Tremper	Ski Utah News	Avi conditions
1/20	KC & CC	GRB Prod	Coyle accident
1/23	Felix	Moab Happenings	Avi information
1/28	Felix	Channel 6 TV	Avi Awareness Week schedule
2/04	Clapier	Japanese TV	El Nino/Avi conds
2/05	Kimbrough	Deseret News	2/4 avi incident
2/06	Clapier	Standard Examiner	Avi conds/fatalities
2/17	Shaw	Sandy News	Avi forecasting
2/25	Tremper	KSL Radio	Avi conditions
2/27	Clapier	Deseret News	Tanner's Gulch avi
2/27	Clapier	KUTV	Tanner's Gulch avi
2/27	Clapier	News 4 Utah	Avi conditions
3/10	Felix	Price Sun-Advocate	Snowmobile avalanche class
3/10	Felix	Emory County Progressor	Snowmobile avalanche class
3/11	Clapier	ABC News	Avi rescue story
3/12	Kimbrough	Michigan HS	Avi forecasting
3/15	Ciliberti	KSL-TV	Avi conditions
3/16	Shaw	News 4 Utah	Wet slides/Avi Ed
3/17	Shaw	Park Record	General avi info
3/19	Kimbrough	Holt,Rhinehart	Jr High text book
3/19	Felix	Snowmobile Magazine	Avalanche Information
3/27	Tremper	Learning Chan.	General avi info

79 Total media contacts

Synopsis of media contacts:

Media	Number of contacts
National TV on-camera interviews	2
National TV telephone contacts	7
National print media interviews	6
Local television interviews	22
Local print media	34
Local radio	7

Observers

As the Forecast Center begins working towards 2002, we started beefing up the volunteer observer program by adding three very experienced new observers. Scott Burch and Craig Gordon have been feeding us information for years. Finally, we are giving them a small token of our appreciation for their fine reports. Eric Trenbeath has become our Eyes at Alta, with excellent and timely reports on control results as well as backcountry conditions.

Our reliable old regulars continued their usual good work. In addition to frequent backcountry trips several of our observers have become active avalanche educators. Phil Lowery gave talks in the Provo area. Brad Bodily did the same around Ogden, plus conducting several field sessions. Bruce Englehard and Bob Athey were primary instructors at the two three day extensive workshops in the Salt Lake mountains.

Our program would be lost without Bob Athey. As a field observer hired directly by the Friends of the Forecast Center, his reports are essential to our forecasts. The FUAFC pays him a flat rate for the season and he is out nearly every day, calling in from his cell phone with great observations. We consider him part of our staff, and as such, his observations are not tabulated below.

The return for each dollar paid to these people represents about an hour's time for a highly trained and experienced winter mountaineer. Their dedication to the safety of all backcountry travelers is greatly appreciated by our entire staff.

FUAFC Observers

Observer	Observations	Cost
Joey Dempster	17	\$170
Sean Wagner	35	\$350
Craig Gordon	35	\$350
Scott Burch	31	\$310
Eric Trenbeath	26	\$260
Greg Gagne	13	\$130
Luke Smith	4	\$40
Bob Merrill	3	\$30

Total **164** **\$1,640**

USFS Contract Observers

Observer	No. Observations	Cost
Greg Dollhousen	46	\$460
Bruce Englehard	24	\$240
Rip Griffith	34	\$408
Brad Bodily	20	\$200
Brian Smith	9	\$90
Phil Lowry	36	\$360
Total	169	\$1,758
Grand Total	333 observations	\$3,398

Budget

Where the Money Comes From

For the past half-dozen or so years, demands for our services have exceeded the funding available to deliver them by a wide margin. This season, we came closer to being able to do our job properly than any other year in recent memory. And barring any catastrophes, the future prospects to continue look good.

In short, our funding represents the epitome of a successful partnership. Only 28 percent of the funding for the northern Utah operation comes from Forest Service base operating funds. The rest comes from a consortium of other private money and other agencies that have an interest in preventing avalanche deaths.

Funding sources for public avalanche bulletins throughout Utah

Forest Service base funds for northern Utah	31,000
Forest Service 2002 Planning Team	31,000
State of Utah Department of Public Safety Division of Emergency Management	25,000
Salt Lake County	20,000
Friends of the Utah Avalanche Forecast Center (private funds)	25,000
Manti-La Sal National Forest, Moab Ranger District	15,500
Utah State University	15,000
Utah State Parks (for recording avalanche information for snowmobilers)	9,000
National Forest Foundation	5,000
Total	176,500

In-Kind Support

In addition, several agencies, universities and businesses contribute in-kind support. Utah State University provides salary for Mike Jenkins, office space and computer and telephone resources. The National Weather Service in Salt Lake City donates office space, weather forecasting services, computers and postage. Several universities and businesses have donated space on their PBX telephone systems for distribution of our avalanche bulletins to the local community. These include: Utah State University, Weber State University, Brigham Young University, Park City Resort and the Town of Alta. We wish to thank each one of these entities for helping to save lives in Utah.

Where the Money Goes

Almost all (85 percent) of the money is spent "on the ground" i.e. salaries for skilled avalanche forecasters that gather and compile information, issue avalanche bulletins to the public and teach avalanche classes to the public, contract observers and work on special projects. A proportionally small amount (15 percent) is spent on telephone service, computers, travel and equipment.

Expenditures for public avalanche bulletins in Utah

Salary	151,000
Equipment and Supplies	14,000
Telephone	7,110
Travel	6241

Total	178,351
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Planning for the 2002 Olympic Games

Additional funds for the 2002 Winter Olympics gave us a much-needed shot in the arm. Although it only increased the total budget for northern Utah by about 20 percent, it allowed us to finally have two people staff the office in the mornings. In the past, a single forecaster in the office could not hope to get out the products to the public and have the time to answer all the incoming calls from the media and our cooperators. Callers would just have to leave a message and we would get back to them if we had time.

Our three most important jobs in building toward 2002 are: relationships, relationships and relationships. With the addition of an information assistant in the office, anyone who called our office could talk to a live person, which of course, is the first step in developing and maintaining relationships with our cooperators, the media and other agencies. For instance, we have watched our relationships with the ski areas suffer over the past several years because we increasingly found that we just didn't have time to talk with them anymore. And in a community of avalanche professionals, talking with each other is not a luxury, it's a necessity.

Because of the increased demand on our staff, especially the Director, to do Olympic planning work, we also felt it necessary to boost two part-time positions to full time. This allowed us to gain better coverage to outlying areas, visit venue sites more often, attend more Olympic planning meetings, develop an Internet site, and most important, develop better relationships with our cooperators.

During the summer of 1997, we developed a detailed avalanche plan for the 2002 Olympic Games (available on the Internet, www.avalanche.org, and from the Forest Service 2002 Planning Team).

We also developed a graphical display of avalanche information, otherwise known as "Powder the Polar Bear". We would like to utilize Powder the Polar Bear as the winter sports equivalent of Smoky Bear. Powder points to the avalanche danger scale for various locations and terrain types throughout our forecast area. We will release it to the public during the 1998-99 season. The public can see it on the Internet at www.avalanche.org.

During the summer of 1998, we plan to develop a GIS display of avalanche danger that will complement the information from Powder the Polar Bear. This will also be available on the Internet.

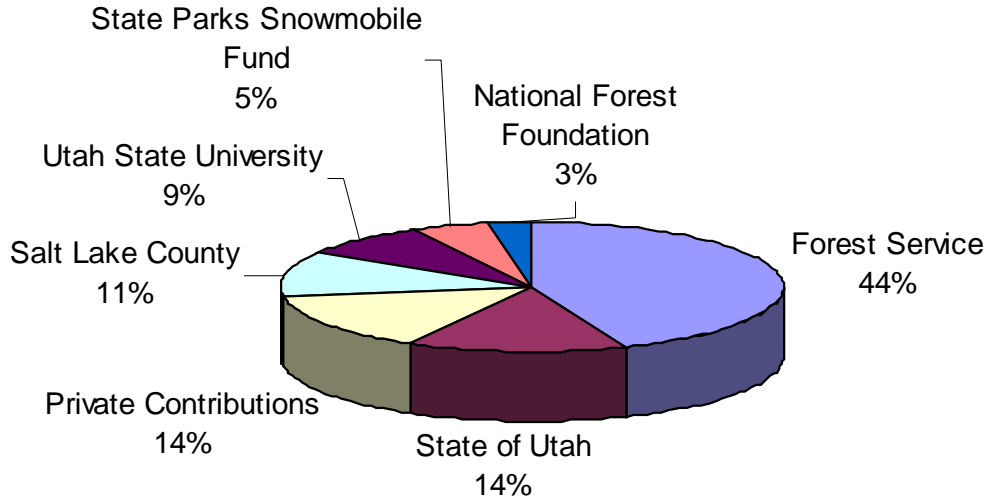
We have also used 2002 dollars for the installation and programming of automated weather stations throughout northern Utah and we will continue to install stations in critical areas. We have done this in partnership with the National Weather Service and the Salt Lake Organizing Committee.

Finally, during the summer of 1998, we will further develop Westwide Avalanche Network, an Internet-based way that avalanche professional communicate critical information and data throughout the U.S. For the 2002 Olympic Games, we will need a real-time display of snowfall amounts and other weather data, and avalanche occurrence data, from cooperators such as ski resorts. Each resort will type their weather and avalanche information into the Internet twice daily, and that information can be instantly accessed by all the entities that cooperate in the system. This is very similar to INFOEX run by the Canadian Avalanche Association, which has proved very successful and useful. This will run on Westwide Avalanche Network, a private, non-profit organization which is run in association with the American Association of Avalanche Professionals.

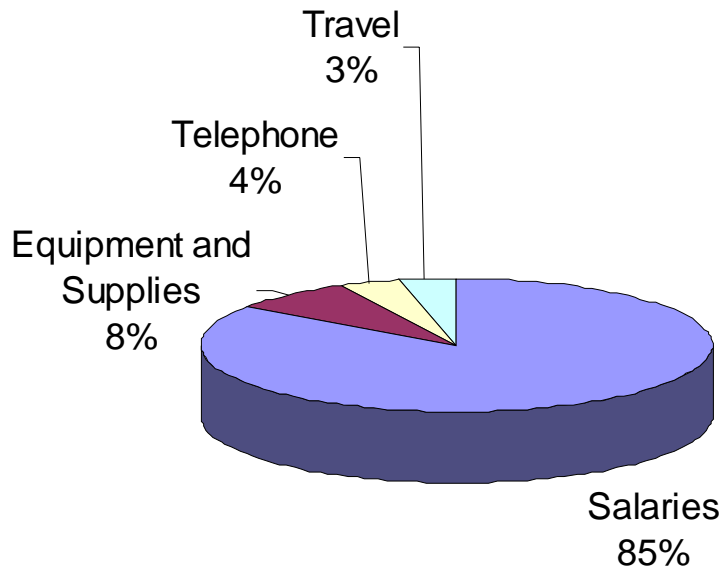
2002 Olympics Avalanche Budget 1997-98

Information Assistant	9000
Additional Staff Time and Training	8000
Internet Site Development	5000
Olympic planning and meetings	3000
Venue Site Visits and Meetings	4000
Weather Station Installation and Programming	2000
Total	31000

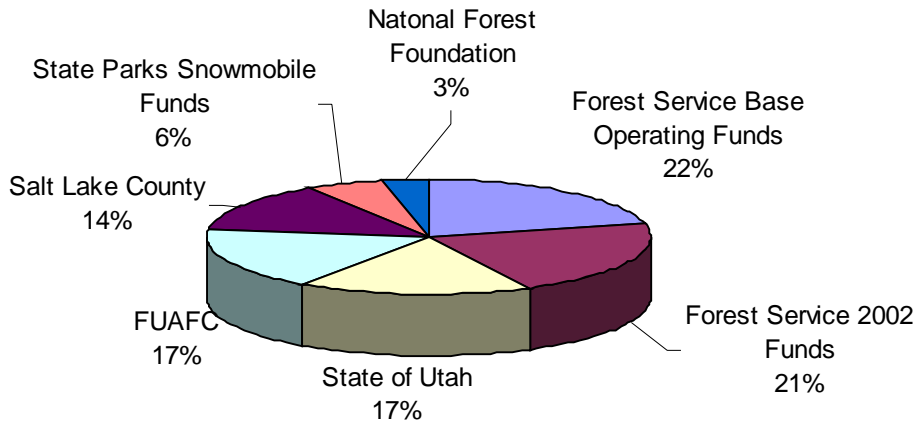
Statewide Revenues



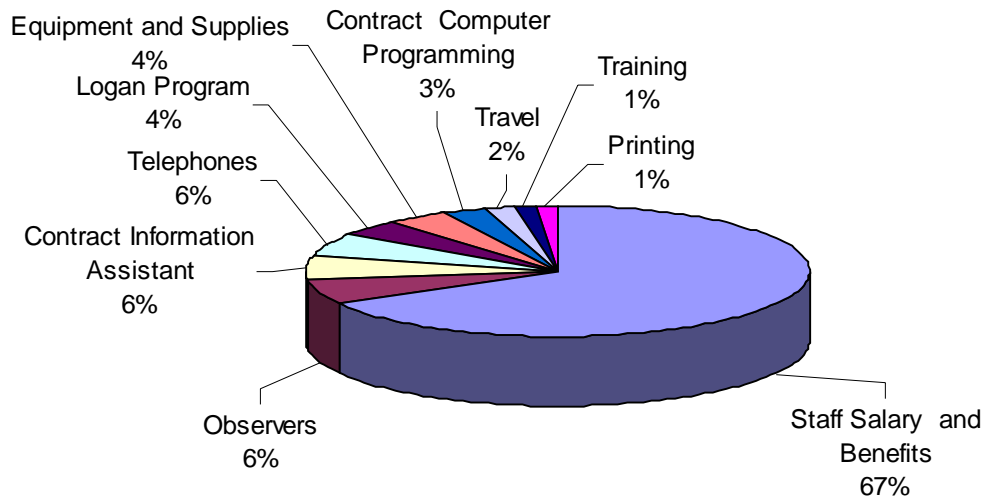
Statewide Expenditures



Wasatch Revenues



Wasatch Expenditures

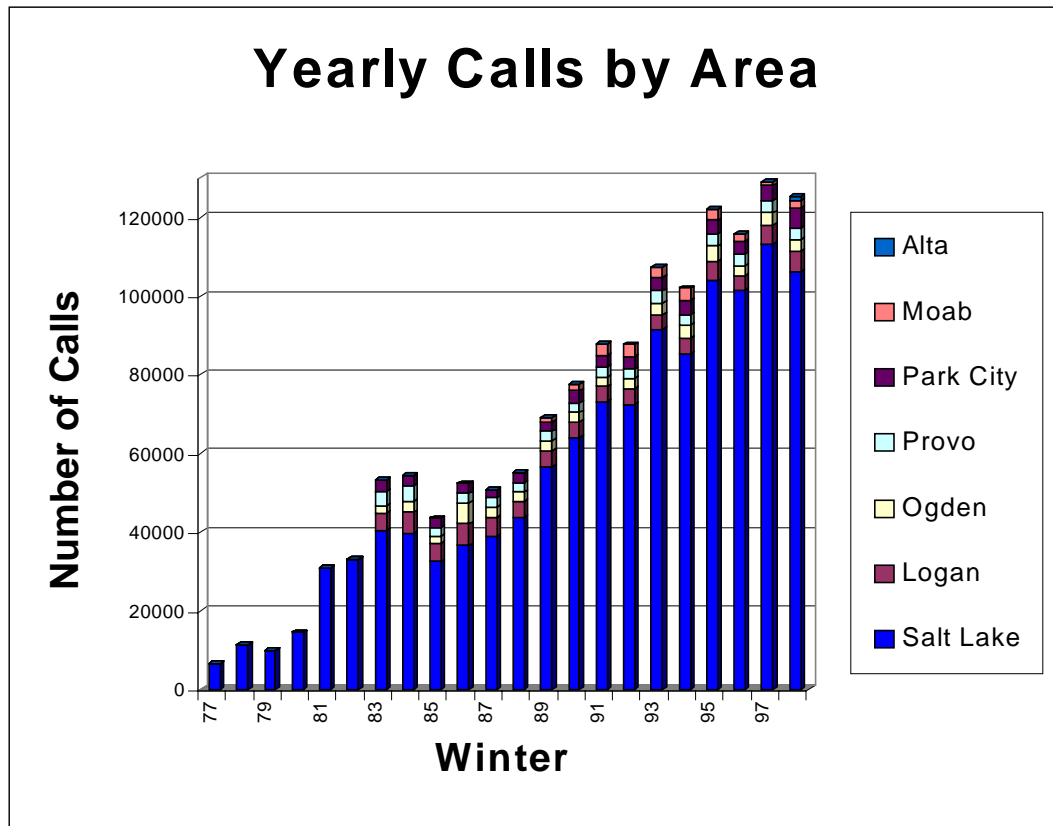


Appendix

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
1998	9,529	16,672	27,407	25,453	17,746	9,464	106,267



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
98	106,267	8,579	106,267	5,000	3,000	3,000	4,000	2,000	125,271

the PBX systems that carry the bulletins for Logan, Ogden, Park City, Provo and Alta can not count calls. Therefore, we use estimates here based on reliable numbers from previous years. Actual numbers will likely be higher because multiple callers can access the bulletin at the same time--something that was not possible during the years with accurate numbers.

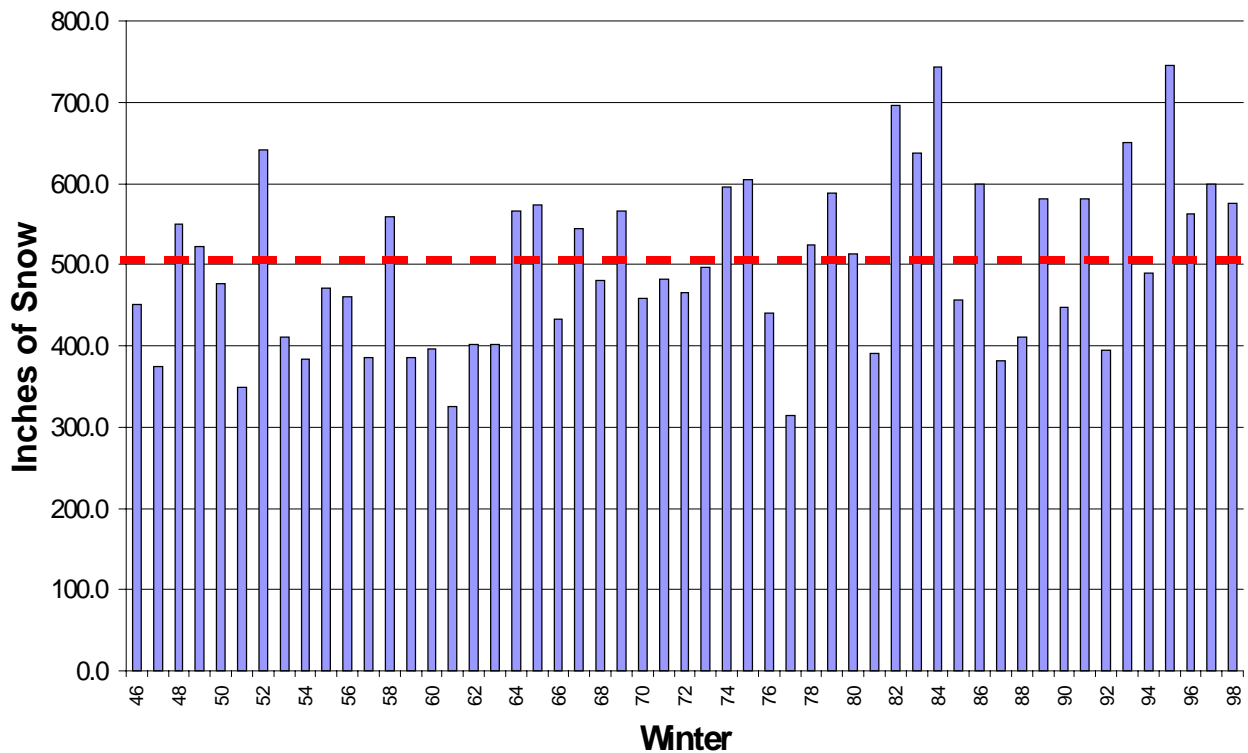
Backcountry Avalanche Incidents

Year	Triggered	Caught	At Least Partially Buried	Totally Buried	Killed
1997-98	96	57	17	8	3
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
1992-93	65	29	9	5	3
1991-92	76	27	14	9	5
1990-91	46	19	7	1	0
1989-90	65	34	14	2	0
1988-89	64	9	1	0	0
1987-88	39	6	(1)	(1)	0
1986-87	50	18	6	3	2
1985-86	66	27	12	5	5
1984-85	79	39	15	6	2
1983-84	M	24	M	M	1
1982-83	M	M	15	M	0
1981-82	M	M	M	M	1
1980-81	M	M	M	M	2
1979-80	M	M	M	M	1
1978-79	M	M	M	M	2
1977-78	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
1997-98	46.3	81.8	128.8	156.6	92.3	69.0	574.9
Average	71.1	90.7	94.2	81.0	91.4	66.1	500.6
Maximum	205.9	244.5	199.7	155	183	136.3	745.4
Year of Max	94	83	95	68	64	91	95

Alta November - April Snowfall



The Alta Forest Service Upper Guard Station has the longest record and most accurate record for any ski area in Utah. We tend to use their snowfall numbers as an indicator of the season. Alta finished the season with 579.8 inches of snow, 115 percent of its average of 500 inches.

Utah Avalanche Deaths - 1950-present

Date	Deaths	Sex	Location	Activity
3/9/58	2	Males	Snowbasin	rescuer
3/29/64	1	Male	Snowbasin	worker
12/31/65	1	Male	Park City	in-bounds skier
2/12/67	2	Males	Pharoah's Glen	climbers
2/19/68	1	Male	Rock Canyon	hiker
1/29/70	1	Male	Alta	in-bounds skier
1/29/73	1	Male	Park West	in-bounds skier
1/6/76	1	Male	Alta	out of bounds skier
3/3/77	1	Male	Snowbird	in-bounds skier
1/19/79	1	Male	Helper	worker
4/2/79	1	Male	Lake Desolation	skier
1/11/80	1	Male	Evergreen Ridge	skier
2/1/81	1	Male	Cardiff	hiker
3/1/81	1	Male	Millcreek	skier
3/22/82	1	Male	near Park West	skier
1/2/84	1	Male	Superior	skier
2/22/85	1	Male	Near Powder Mountain	skier
3/19/85	1	Female	Park City	in-bounds wet slide
11/13/85	2	Males	Sunset Peak	skiers
1/6/86	1	Male	Provo Canyon	skier
2/17/86	1	Male	Big Cottonwood Canyon	snowboarder
2/19/86	1	Male	Alta	in bounds skier
11/20/86	1	Male	Sugarloaf, Alta	hiker in unopened area
2/15/87	1	Male	Twin Lakes Reservoir	skier
11/25/89	1	Male	Tony Grove Lake, Logan	kier
2/12/92	4	3-M/1-F	Gold Basin, La Sal Mtns	skiers
4/ 1/92	1	Male	Mineral Basin, near Snowbird	skier
1/16/93	1	Male	Sundance	closed area
2/25/93	1	Male	Pinecrest, Emig. Cyn.	skier
4/3/93	1	Male	Wolverine Cirque	skier
2/18/94	1	Male	10,420 Peak, B.C.C.	skier
11/7/94	1	Male	Snowbird	unopened
1/14/95	2	Males	Ben Lomond, Ogden	snowmobiler
1/23/95	1	Male	Midway	resident killed in roof slide
2/12/95	1	Male	Gobbler's Knob, B.C.C.	skier
2/2/96	1	Male	Solitude patroller	worker
3/27/96	1	Male	Maybird Gulch, L.C.C.	skier
12/7/96	1	Male	Bountiful Peak	snowmobiler
12/26/96	1	Male	Flagstaff Peak	snowboarder
01/11/97	3	Males	Logan Peak	Three campers
01/25/97	1	Male	Provo Canyon	climber
01/17/98	1	Male	Near Coleville	snowmobiler
01/18/98	1	Male	Sanpete County	snowmobiler
02/26/98	1	Male	Near Weber State	hiker

Total Deaths since 1950: 53 51 Males, 2 Females

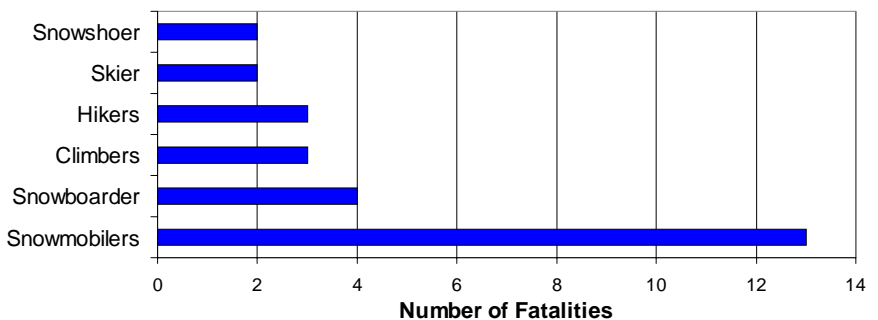
Avalanche Fatalities in the U.S. - 1997-98

As of June 20th

Date	Location	State	Description (all backcountry unless otherwise noted)
11/9/97	Hatcher Pass	AK	Snowboarder
11/23/97	Crow Pass	AK	Hiker
12/30/97	Guanella Pass	CO	Snowhoer
1/3/98	Reas Pk, near Island Park	ID	Snowmobiler
1/3/98	near Hamilton	MT	Snowmobiler
1/3/98	Mission Mountains	MT	Climber
1/11/98	Battle Lake, near Encampment	WY	Snowmobiler
1/17/98	Mt. Pleasant, Wasatch Plateau	UT	Snowmobiler
1/18/98	Summit Co. east of Park City	UT	Snowmobiler
1/18/98	Cooke City	MT	3 Snowmobilers
1/18/98	Madison Range	MT	Snowmobiler
1/18/98	Blewett Pass	WA	Snowmobiler
1/21/98	Lizzard Head Pass - Telluride	CO	Snowboarder
1/24/98	Inspiration Pass, near Kalispell	MT	Snowmobiler
2/11/98	Donner Pass	CA	Snowboarder
2/22/98	Mormon Hills, near Sun Valley	ID	Snowmobiler
2/26/98	Near Ogden	UT	Hiker
3/1/98	Berthod Pass	CO	Snowboarder
3/8/98	Aspen	CO	Out-of-Bounds Skier
4/1/98	St. Mary's Glacier	CO	Hiker
4/19/98	Berthod Pass	CO	Snowshoer
4/20/98	Thompson Pass	AK	Helicopter Skier
4/25/98	Denali National Park	AK	Snowmobiler
5/31/98	Mt. Hood	OR	Climber
6/11/98	Mt. Rainier	WA	Climber

Snowmobilers	13
Snowboarder	4
Climbers	3
Hikers	3
Skier	2
Snowshoer	2
Total	27

1997-98 U.S. Fatalities by Type



Example of an Avalanche Bulletin

Good Afternoon, this is Seth Shaw with the Forest Service Utah Avalanche Forecast Center with your backcountry avalanche and mountain weather bulletin. It is Monday, January 19 and it's 4:30 pm. This information is brought to you in part by a generous donation to the FUAFC from the Evolution Ski Company, makers of hand crafted skis.

Bottom Line:

Avalanche warning in effect! Northern, central, and southwestern mountains and the Wasatch Plateau: High avalanche danger at all elevations.

Current conditions:

As of about 3:00 this afternoon there is a foot of new snow in the upper part of Big and Little Cottonwood canyons, a foot at snowbasin, 6" to a foot on the Park City side of the range, and 8" at Sundance. The new snow averages around 7 to 10% density. Today winds blew 10 to 20 mph out of the NW along exposed ridges except at snowbasin where they are still gusting to 40 in area with Mt Ogden gusting in the 50's. Last night the winds blew hard from the S and SW with an extra burst this morning at frontal passage. Today's snow sluffs easily and runs far and fast, possibly on a density inversion mentioned in one observation.

Avalanche Conditions:

There were several avalanche accidents over the weekend. On Friday a boyscout troop was digging snowcaves when a slide buried them under 5 feet of debris. They were all out and O.K. in 5 minutes, so I'm guessing this was a terrain trap sort of incident where the slide did not travel far and the debris was loosely packed. The rest of the accidents did not have happy endings. A snowmobiler was buried and killed in Spring Canyon in Summit County yesterday. Another snowmobiler is presumed dead in Pleasant Creek in San Pete County, this accident occurred on Saturday. In Montana four snowmobilers died in two different avalanche accidents yesterday. The avalanche warning remains in effect for most Utah mountains, including the northern, central and southeastern mountains and the Wasatch Plateau. There is a high danger of human triggered avalanches on slopes steeper than about 30 degrees. This means that both human triggered and natural, spontaneous avalanches are likely both in and around steep terrain. People without well developed avalanche and route finding skills should avoid backcountry travel. Stay away from steep terrain, including steep sided gullies and streambeds. Stay well out from under steep slopes and avalanche runout zones. Yesterday, explosive control work released many huge avalanches with some releasing sympathetically at long distances, showing that the weak faceted layer near the ground is still quite sensitive. The additional load of new snow today should cause another avalanche cycle. Paths that have already slid may be ready to slide again. The snowpack: There is stout rain crust below about 7,500' that could provide a slippery bed surface in the future. There are several weak layers with in the snow that has fallen in the past week, usually located between storms. Closest to the surface there is the large graupel that came down saturday, which has been pooling in lower angle terrain below steep slopes and below cliffs. There is a light density layer of snow mixed with graupel buried anywhere from 1-3' deep in the pack. Then of course there is the old faceted snow near the ground that produces huge, far-running slides.

Mountain weather:

Tonight several more inches (3-6) should stack up, especially in NW flow favored areas like LCC. Winds will be around 15 to 20 mph from the NW tonight and only 10 to 15 tomorrow. The 8,000' low will be around 10 degrees tonight. Tomorrow will be showery with accumulation around 2 to 4 inches. Wednesday we should see a break with more snow possible on thursday.

If you see anything we should know about please leave a message on our answer machine at 524-5304 or 1-800-662-4140. For more detailed information call 364-1591. -To find out where the Wasatch Powderbird Guides will be skiing and to get their schedule, call 521-6040 x 5280. -Comments on the scoping notice analyzing the impacts of issuing a new 5-year permit to WPG need to be received by the SL Ranger District by Jan 30, 1998. The information contained in this bulletin is from the U.S. Forest Service which is solely responsible for its content. This information describes general avalanche conditions, local variations always occur. Bruce will update this bulletin by 7:30 Tuesday morning. Thanks for calling. Shaw

Example of a Mountain Weather Forecast

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

Sunday February 8, 1998, 1330 hrs

The mountains are currently receiving snow at rates of about 1" per hour, with locally heavier showers. Additional snow this afternoon should be in the 3-6" range. A shortwave will turn the flow to WNW around 5 pm this afternoon kicking in snow showers again, mainly early this evening. After that showers should taper off as we begin to lose moisture. Another wave in the flow will produce mountain snow early in the day tomorrow, then decreasing in anticyclonic flow as the ridge begins to build in. Extended: A dirty ridge Tuesday with warm overrunning gives the mountains another chance of light, scattered snow. The med-range models show another splitting trof on Wednesday, with a chance of snow in the mountains.

	Today	Tonight	Tomorrow	Tom.Nite
Free air (700 mb)				
Wind Direction	SW>W	NW	NW	W
Wind Speed (mph)	30>20	201	5-20	10-15
Temperature (F)	18	14	14	10
8,000' Temperature	27	22	25	18
Cloud Cover	Ovc	Ovc	Ovc/PC	Ovc
Wx	S	S-	S-	S-
Rain/Snow line	dropping to valley----->			
Snow Density	7% --->			
Lightning	10%			

Quantitative Precipitation Guesstimate (Inches of snow)

	Today	Tonight	Tomorrow	Tom.Nite
Logan Mountains	4-8	1-3	all areas:	
Powder Mountain	4-8	2-5	2-3" Mon.	
Snowbasin	4-8	1-3	morning	
Canyons Resort	4-8	2-4		
Park City/D Valley	4-8	1-3		
Solitude/Brighton	6-9	2-5		
Snowbird/Alta	6-9	2-5		
Sundance	4-8	1-3		

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