Snow and Avalanches in Utah

Annual Report 2000-2001

Forest Service Utah Avalanche Center

In partnership with:

Friends of the Forest Service Utah Avalanche Center
National Weather Service
Utah Division of Comprehensive Emergency Management
Salt Lake County
Utah State University
Utah State Parks and Recreation

Cover photo: Meadow Chutes in Silver Fork of Big Cottonwood Canyon
by Bruce Tremper

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

Forest Service Utah Avalanche Center
2242 W. North Temple
Salt Lake City, UT 84116
(801) 524-5304 phone
(801) 524-4030 fax

Or view online at:
www.avalanche.org

The Forest Service Utah Avalanche 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 nine 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 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.

How do people get caught?

In over 90 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, 90 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 daily avalanche advisories 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 advisories. People access these by:

- Recorded telephone message updated each day
- Live interviews each day on three 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, PBS and the Weather Channel. FSUAC staff is featured in most of these documentaries.

Avalanche education:

We teach about 50 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 the public 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. Therefore, we try to make the advisories entertaining so that people will remember what they hear and enjoy the experience enough to use the advisories regularly. We try and use all the standard tools of effective writing and speaking such as using active voice, first person, personal 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 can get out in the mountains 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, four crews of avalanche forecasters operate in Utah, one in Logan, another in Salt Lake City, one on the Manti Skyline and a fourth in Moab.

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 seldom have more than two forecast days in a row.

This is our philosophy and it seems to be working. More people access the FSUAC bulletin each season than any other avalanche advisory 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 Utahans, but also by the national and international media.

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

A look Under the Hood

The UAC is operationally separated into four entities:

- Bear River drainage (Logan area – northern Utah and southeast Idaho)
- Wasatch Mountains (Ogden, Salt Lake, Park City and Provo area mountains)
- Manti Skyline (Fairfield Canyon – Wasatch Plateau)
- La Sal Mountains (near Moab)

Greg Johnson heads the Logan operation with Spencer Logan as an assistant. Spencer is employed by Utah State University. In past years, the Logan center was run entirely by Utah State University, but this season, Mike Jenkins took over as the head of snow safety at Snowbasin. So this year for the first time, we hired a Forest Service forecaster to work the Logan Operation. We hope that we can find funding to continue this position for the long term.

In Moab, Faerthen Felix was the program director with a part-time staff of Eric Trenbeath. The Moab office is located in the Moab Ranger District on the Manti-Lasal National Forest. Faerthen will not return next season as she has accepted a better employment opportunity in California.

The Manti Skyline (Wasatch Plateau) avalanche forecast was issued for weekends-only by Craig Gordon and Eric Trenbeath. Funding for this program comes from a generous grant from the National Recreation Trails Program administered through Utah State Parks. Craig and Eric work part time as snowmobile avalanche educators and part time as forecasters for the Manti Skyline. In its first full season of operation, it was a very successful program.

Last, but not least, the vast majority of the backcountry use occurs in the Wasatch Range of northern Utah. A staff of six 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 15th season, is the Co-Director along with Evelyn Lees. This season, Tremper spent most of his time working on Olympic-related avalanche issues while Lees oversaw the day-to-day operations. Although Bruce Tremper and Evelyn Lees spend most of their time in the Wasatch operation, they oversee all three operations to insure consistency in quality. The rest of the very experienced Salt Lake staff include: Tom Kimbrough, Carol Ciliberti, Ethan Greene and Jeff Brown. All are Forest Service employees and this season, organizational oversight was transferred from the Intermountain Regional Office to the Wasatch-Cache National Forest. The Salt Lake office is co-located with the National Weather Service at the Salt Lake International Airport.

Lastly, a private, nonprofit group, the Friends of the Utah Avalanche Center, contracts the intrepid Bob Athey as a full time backcountry observer.

The Utah Avalanche Center is a Forest Service program under the Wasatch-Cache National Forest and the Manti-La Sal National Forest, in partnership with Utah State

University, the State of Utah Department of Public Safety, Division of Emergency Management, Salt Lake County, the National Weather Service and private contributions through the Friends of the Utah Avalanche Forecast Center.

The public can access the bulletins in the following ways:

Telephone:

Salt Lake City - (24 phone lines)	(801) 364-1581
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
Manti Skyline (courtesy of Utah State Parks)	(800) 648-7433
Snowmobile hotline (courtesy of Utah State Parks)	(800) 648-7433

Radio Stations (live on-air reports each morning around 8:00 am)
KRCL 91 FM
KPCW 92 FM
KCPW 105.7 FM

Internet:
http://www.avalanche.org
http://www.wrh.noaa.gov/Saltlake
http://www.csac.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@avalanche.org

How we Generate Avalanche Advisories

The Utah Avalanche Center is the interface between avalanches and the public. People who venture into backcountry avalanche terrain literally make life and death decisions based partly on critical avalanche that we provide, so we take our jobs very seriously.

We often think of ourselves as natural detectives. We gather as much information as possible, we torture the data until it confesses, and then we communicate our analysis to the public. Each day we look at weather, talk to ski area avalanche control programs, helicopter ski companies, highway control programs and volunteers, but our most important source of information comes from us, from our up-close-and-personal work with snowpack. We regularly travel into the mountains, where we not only get our best information, but it's where we test out theories in an unequivocal way—sometimes with our own lives.

We split our time more or less equally between the mountains and the office. With our staff of five people, we have a rotating schedule in which one person sits in the driver's seat in the office as the forecaster for that day while the others either head into the mountains to look at snow, work in the office on various education or computer projects or take their scheduled days off.

Field Day:
A typical "field day" might begin at 6:00 in the morning when we wake up, listen to our trusty NOAA weather radio, get on our home computer and look at the data from all the automated weather stations in the mountain. Like everyone else, we call our own avalanche advisory to get the latest information. Then we jump in the car or on the bus and head for the mountains.

We usually travel on skis and we use a snowmobile to access more remote areas. We usually travel with a partner using all the usual safety equipment like electronic avalanche beacons, shovels, probes, belay rope and radios. We seldom have a regular patrol area, but we simply go to the area that concerns us the most, or to a place that we know is representative, where we can look at snow on a variety of aspects, elevations and terrain types. We almost always go into the backcountry--meaning areas outside ski area boundaries where no avalanche control is done. We put climbing skins on our skis and huff-and-puff to the top of a mountain, take off the skins, ski down into another valley, put the skins back on again, go to another ridge, and so on.

And yes, it can certainly be dangerous if you don't know what you're doing. It takes years of experience and training to be an accomplished avalanche forecaster, not to mention to be able to do it safely. Most of our staff of six has degrees in some kind of physical science such as meteorology, geology or engineering, three staff members have master’s degrees and two are working towards their PhD. We also have a number of years experience doing avalanche control at ski areas, plus, we all are accomplished mountaineers with many years of accumulated mountain experience. Finally, we all stay in top physical condition so we can efficiently cover lots of terrain.

We gather information from many different places in many different ways. For instance, we dig snow pits on several different slopes to get a good feel for the distribution pattern

of snow stability. A snow pit, like the name implies, is about a 5 foot (1.5 meter) hole in the snow we dig and then we do a variety of stress tests to determine the stability of the snowpack. We also look at the crystallography of the various layers, and measure temperatures and sometimes density. This isn't nearly as complicated or time-consuming as it seems, as we usually spend no more than 15 minutes in a single snow pit. We would rather dig several quick pits in several areas than do one detailed pit in one area because once we figure out what kind of avalanche dragon we're dealing with, we want to know the distribution of the pattern so we can communicate the pattern to the public.

We also test the snow in other ways, such as sawing off cornices, which bounce down the slope, keeping close track of the pattern of recent avalanches and we always pay very close attention to the present snow surface because it's much easier to map a layer of snow when it's still on the surface then after it's buried by the next storm. Finally, when we get home, we leave a detailed message on our answer machine in the office, which the forecaster will hear early the next morning. We also fax a written version of our observation, including the snow pit profiles, so that the forecaster has less to write down the next morning. Finally, we often call the person who will forecast the next day and talk to them in more detail, making sure not to call after bedtime, which is 8:00 pm, since they have to be up by 3:00 am the next morning.

Office:
Our office days are brutal. We usually arrive at our office, co-located with the National Weather Service near the Salt Lake Airport, around 4:00 am, and earlier on big storm days. There's only one avalanche person in the office, so the pressure and time constraint is intense.

First, the lead weather forecaster for the National Weather Service briefs us on the general weather setup and then we jump on the weather computers ourselves and type up a detailed mountain weather forecast that goes onto the Internet by 6:00 am. Then, we check our answer machines and write down all the field observations not only from our staff, but from our army of volunteer observers, ski areas, helicopter skiing companies and highway control programs. After that, we furiously kick into high gear and write backcountry avalanche advisories customized for five different zones in northern Utah, record those advisories into six different answer machines, each one customized for its area, do three live radio interviews, all while trying to answer the phone from ski areas calling to leave observations or talk about avalanche hazard. The recorded advisories are on by 7:30 and by 8:15 am, when we're done with the last live radio interview, we finally collapse with relief, take that bathroom break we've needed for the last couple hours and take a walk outside and watch the sun rise and hope that our information is accurate. An average of 800 people call the avalanche recording and twice that number get it over the Internet, most of which head into the backcountry to test our theories with their lives.

Then it's lunch time, just when most people are eating their breakfast. After lunch, we start answering phones, collecting data, updating clipboards and just catching up. Finally, by 10:00 am we start the whole process again to put out an afternoon update, which is usually finished by about noon to 1:00 pm. Then our day is done. We head home and get some sleep.

Season Highlights

Avalanche Incidents and Accidents
In Utah, this season tied the dubious record of six avalanche fatalities, which included three snowmobilers, one out-of-bounds skier and two climbers. An astounding 161 unintentional human triggered accidents in the backcountry were reported (the average is around 100) with 71 people caught, 17 people partly buried, 12 buried, 2 injured and 6 killed. Nationally, it was a similarly grim story with 34 fatalities, which eclipsed the old record of 33.

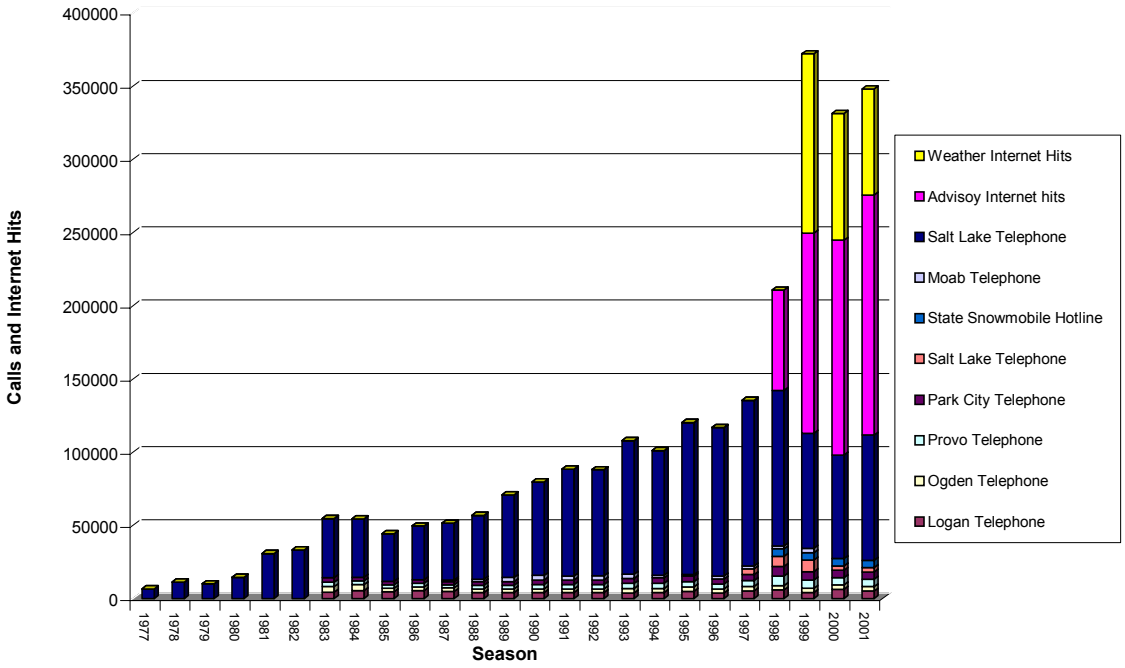
Weather
This was yet another dry winter in Utah with even drier conditions for the northern U.S. and Canada. Most of northern Utah hovered around the 70 percent of normal while the mountains in the Escalante and Zion area stayed significantly above normal—one of the few areas in the western U.S. which was above normal. Alta ended the season only slightly below normal with 470 inches of snow. Thin snow combined with long dry spells creates weak snow and consequently dangerous avalanche conditions.

Media
Once again, the Utah Avalanche Center staff was featured on a number of national and international television programs including NBC Nightly News, The Discovery Channel, The Weather Channel and the Earth and Space Channel. We were featured or quoted in a total of 13 national and international television programs, 24 national or international print media, 12 local television interviews, 2 radio interviews and 9 local print interviews.

Avalanche Education
We continued our strong avalanche education programs with a total of 49 free classes for the public, which directly reached nearly 3,000 people.

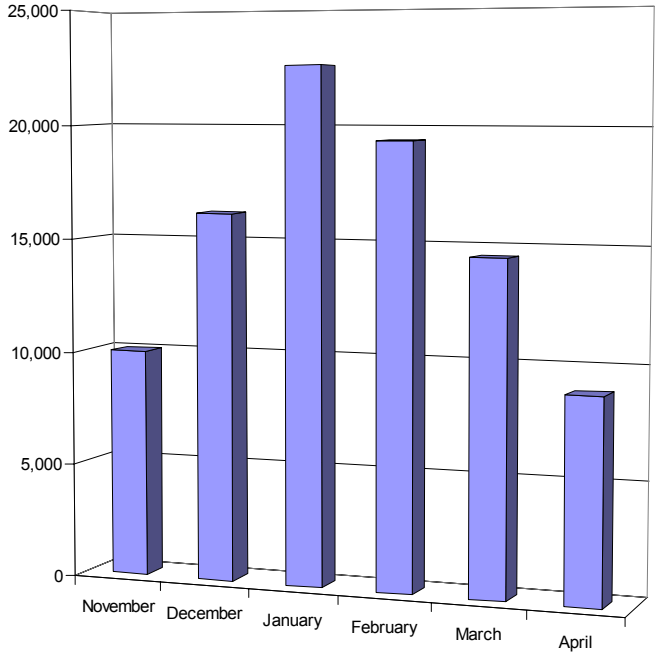
Olympic Avalanche Preparations
We continued to ramp up for the Olympic Games in February of 2002. We added staff members, developed web sites, developed computer programs in partnership with the Swiss government, worked with public safety officials, developed media packets, developed trailhead displays and developed informational brochures.

Total Product Access Per Season



Use of UAC products has fallen slightly this season due to yet another warm, dry winter. As Internet access of the products increases, call counts decrease.

Average number of calls to UAFC advisory 1994-2001



Season History – Northern Utah

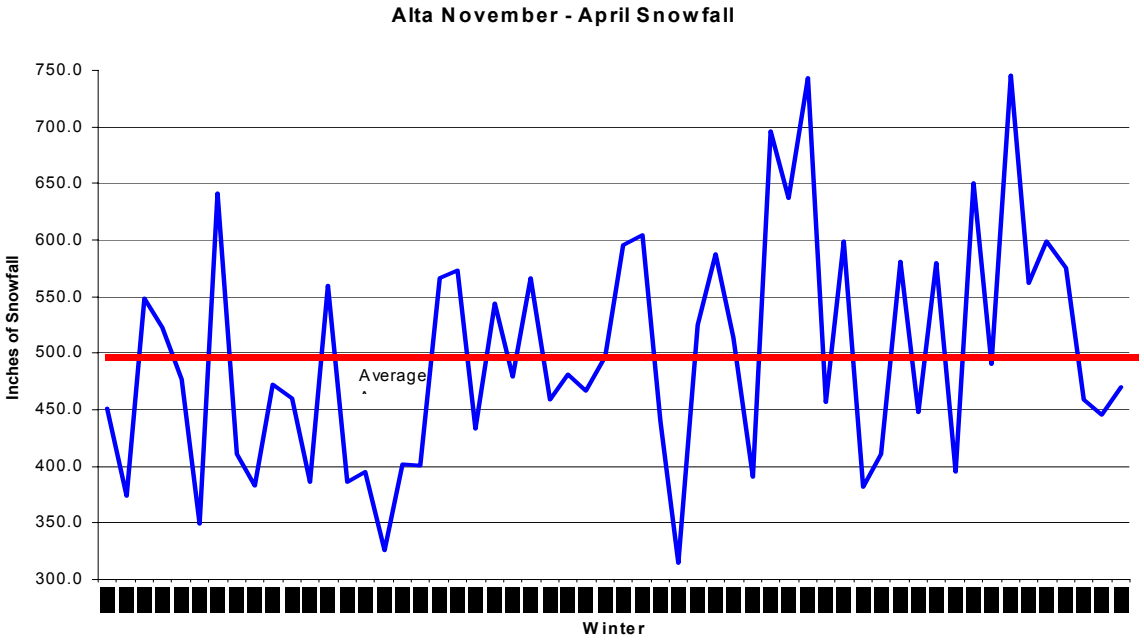
November

The 2000 – 2001 season is a tale of high hopes dashed. The winter began at the end of October with great promise. Some of us thought that a big winter was likely, which would balance out the hot, dry summer. Unfortunately after two weeks of stormy weather, but no really large dumps, the first of a series of dry spells set in. The month ended with 77 inches of snow at the Alta Guard Station, containing 5.45 inches of water. The total depth stake was reading 30 inches.

December

This 30 inches was just the right amount of snow on the ground for the cold, clear nights to produce a nasty layer of faceted crystals that plagued backcountry travelers for the remainder of the winter. By mid December the Wasatch snow pack was a loose, weak mess. Eight days of snow, beginning on December 10, pushed the Alta stake to 70 inches and produced a major avalanche cycle. There were two incidents of note during this week of storms: One fatality, and a very close call.

Three snowmobilers were testing a new sled in Willard Basin, a remote backcountry area northeast of Ogden, UT during the evening hours of December 14. After six days of gradual accumulation, the weak Wasatch snow pack was on the verge of a large natural avalanche cycle. The trio had already triggered several small slides when a big one took the lead rider off the road. Without rescue gear, the remaining two called for help on a cell phone and began poking around in the snow. When the rescue



team arrived several hours later, they quickly located the deceased victim with a probe line. (See www.avalanche.org for details on all these accidents.)

The close call, on the afternoon of December 16, involved a couple of teen-age extreme sledders of the plastic variety, rather than snowmobiles. There are several deep ravines on the south facing side of Little Cottonwood Canyon, directly across the road from the Alta Ski Area. Avalanche people call gullies like these "terrain traps", because even small avalanches can bury someone very deeply. While they give many of the locals cold shudders, the X-Generation loves playing in these natural half pipes. A 14 year-old male was in the bottom of the gully waiting to film his partner jumping the corniced lip. The partner jumped, the cornice broke, triggering a slab avalanche. The photographer was totally buried (sans beacon). Several people in the area began a search. The Alta Ski Patrol spotted the activity and began an organized response. But before the arrival of the rescue team, backcountry folks with shovels and probes had located and uncovered the young man. He was unconscious, but alive, after a burial time of about 30 minuets.

After this busy week, the Wasatch weather turned dry again. Except for a quick Christmas Eve gift of a nice 10 inches of light powder, there was another three weeks of high pressure. The month ended with 71 inches of snow, 6.79 inches of water and the snow stake at 50 inches.

January

The holiday clear period again developed a thick layer of faceted crystals near the snow surface, spelling trouble when the next series of storms arrived. Three small storms broke the monotony during the second half of January but they weren't enough to seriously overload the snow pack. A big storm would have triggered many natural slides but the small storms just kept the weak layers close to the breaking point, close enough that the extra weight of a person could sometimes trigger a slide. This pattern of small storms continued in February, which maintained the hair-trigger nature of the snowpack, resulting in an unprecedented series of human triggered avalanches. Triggered slides were reported almost daily for over two months. Local avalanche worker's hair turned gray and we were very lucky not to have had more accidents than we did.

January totals from the Alta guard station were 65 inches of snow, 4.67 water and an end of the month snow stake reading of 65 inches.

February

Three small storms and a couple of dustings kept backcountry snow conditions fairly good during February but they also continued the nagging avalanche potential. I'm sure our audience grew weary of our constant refrain, "There is a moderate danger of triggering a deeper release on old faceted layers……". With almost daily reports of human triggered avalanches, the human triggered potential wasn't quite widespread enough to call it high danger but not localized enough to call it a low danger, so we were perpetually stuck in the twilight zone of "moderate" and occasionally "considerable." Most avalanche accidents occur during moderate danger because people perceive that it's safe enough, yet there's just enough booby traps to surprise people. The wonder was that no one was killed or seriously injured during this protracted period until February 27, when our luck finally ran out.

Ironically, it wasn't an extreme snow rider pushing the edge. Instead the avalanche victim was a middle age woman, vacationing from the northeast with her family. She had exited The Canyons 9,990 gate and ventured into the backcountry with several family members looking for untracked powder. She entered the slope first but soon fell, losing a ski. A couple of her companions dropped in to help her, triggering the

slide, which released on faceted snow near the ground. Three were caught and carried, one partly buried and two totally under. One of them was located quickly when he was heard shouting under the snow. The deceased woman was found after a couple of hours by The Canyons rescue team with a probe line.

The Alta Guard station recorded 73 inches of snow, 6.69 inches of water and a snow stake reading of 80 inches.

March

March, usually a wet month in the Wasatch was quite dry, with just over half the normal monthly snowfall. Despite the dearth of major storms, avalanche activity continued at a brisk pace. Avalanches were reported on all but 5 days of the month, with human trigged slides occurring on 16 of those days.

On March 10 a pair of snowmobilers were caught and killed in the Uinta Mountains. A small storm had dusted northern Utah, including the Uintas, with 4 to 6 inches of new snow. The Uinta Mountains have a snow climate more like Colorado than the Wasatch Range. Thick layers of faceted snow are quite common and the range is receiving increasing use from snowmobilers. The accident followed a common pattern. A high-marking sledder became stuck and his two friends went up to help him. The weight of the three people and machines released a large hard slab avalanche running on faceted snow near the ground. One of the three was only partly buried and the sleds were on the surface. The search for the missing two men focused on the vicinity of the sleds. Eventually the search widened and both men were found via surface clues but resuscitation efforts proved futile.

A similar but happier incident occurred on March 24 in central Utah's Wasatch Plateau. A snowmobiler was totally buried by a large slide for an hour while bystanders searched for him. Finally someone thought they heard a voice coming from under the partly buried snowmobile. The sled was moved and there they found a very lucky man.

The largest storm of the month arrived on March 28 dropping 15 inches of new snow and serving notice of a change in the weather. Totals for the month were 50 inches of snow, with 4.89 water. The snow stake read 63 inches.

April

April is often a month of contrast and 2001 was no exception. This April was both the snowiest month of the winter but also the warmest. The first two weeks of the month produced the deepest total snow depth (96" on 4/8) and arguably the best turning conditions of the winter. About 5 feet of new snow fell during this period, with a major avalanche cycle on April 7 and 8. Another storm over the weekend of the 20th and 21st dropped an additional 2 feet of fresh snow.

A warming trend began after this last storm. The Alta Guard Station recorded an overnight low of 31 degrees on the morning of April 25. This was the final freeze of the month.

By dawn on April 28 the overnight low had climbed to 45 degrees and the skies were mostly cloudy. Sometime during the early morning hours a massive glide avalanche released in Stairs Gulch off Big Cottonwood Canyon catching two snow climbers heading up Twin Peaks. Reported overdue by their families, their bodies were recovered late that evening.

April totals were 117 inches of snow with 11.7 inches of water. On the last day of the month the snow stake had dropped to 50 inches.

Season History – La Sal Mountains – by Faerthen Felix

September
The traditional Labor Day storm rolls in, but clouds conceal the mountains long enough for any evidence of snowfall to disappear.

October
Summer comes to an abrupt halt and mountain bikers get drenched and muddy on the White Rim as terrifically wet storms begin on the 19th. This cycle continues through the month, with only brief periods of clearing between waves.

November
Mild temperatures and a warm ground eventually melt all but snow banks on the deepest, darkest north aspects. Before the autumn sun can remove these worrisome patches, the storms resume. Deep snow accumulations of up to 4' pile up in on the high peaks. A few natural avalanches release in new snow layers on very steep slopes and motivated locals hurry out for the earliest turns in years. A clear spell of high-pressure moves in, wrecking our hopes for a deep, stable snowpack as cold temperatures and clear skies spin our fluff into sugar and hiker's feet begin to punch through to the ground. Our fondest hope is for a huge snowfall to either tear out this widespread weakness, or bridge over the facets. Neither would arrive this season.

Glen Casamassa and the Manti-La Sal Forest continue their amazing support of our avalanche program. Intern Evan Stevens arrives on the 17th to assist the center with fieldwork and GIS projects for the season. Faerthen Felix is hired to fill the new permanent Lead Forecaster-Program Director position on the 20th. The money and support is in place to hire a Forest Service Assistant Forecaster-Southern Utah Snowmobile Educator, but the paperwork drags along due to personnel staffing shortages.

December
The clear spell is broken as winter returns to the La Sals. ½" of snow falls at the Geyser Pass Trail Head on the 7th, followed by 2" on the 8th, 2" on the 9th, and 2" again on the 10th. Eager locals begin making turns on protected shady slopes, despite poorly covered deadfall and a somewhat hollow base. Turns can also be had on westerly aspects where stiff, generally supportable sun crusts lie beneath the new fluff.

Rather moderate winds allow the new snow to hang in place on its delicate, sugary foundation, or slough gently down onto slightly lower angle slopes below. 3" and strong SW winds on the 12th finally topple the house of cards and the hazard rises to High. Natural avalanches release on a few easterly aspects on open slopes and gullies near treeline where the earlier snow sluffing piled up. Unlike many regional mountain ranges, the new snow never gets deep and heavy enough to warrant an avalanche warning, despite the widespread shaky snowpack foundation.

The winds build as 1" falls on the 14th and another 1" on the 15th. With widespread weak facets on the ground, egg shelling and sluffing occurs on almost all aspects during the storm and a couple of large pillows release on NNE aspects below rock bands that

provide some protection and allow wind-driven snow to accumulate. The soft new snow begins to slab and span the weakness below, setting up a creepy scenario where the most supportable areas are also the most dangerous.

The 24th drops 2" at the GPTH, with another 5" on the 25th. Strong winds accompany the snowfall, but unusually, they blow from the NE during the storm, building slabs in unexpected places. Danger gradually dissipates as the year ends.

January
Large facets on the ground continue to grow and expand through the snowpack as clear skies start the month. Backcountry travelers begin to punch through to the ground beneath a shallow snow cover of only 16" at the GPTH.

An inch of snow falls on the 9th, and then 20" of new snow accumulate from the 12th through the 17th.

Winter returns on the 25th with storminess that lasts through the end of the month. When it's all over, the season's biggest storm has dropped a total of 30" of snow on our fragile snowpack over a 7-day period. In a rather surreal twist, the new snow accumulates in absolutely breathless air. Natural avalanching is unexpectedly limited, although at least one large natural slide pulls out on the old rotten snow layers in Bachelor Basin.

With little avalanche activity this season, the complexity of our layered snowpack continues to grow. Faceting under sun crusts eats away at stability on sunny aspects, and the weak layers on shady aspects aren't going anywhere soon. Avalanche hazard remains spotty, but widespread and insidious. The weak slab of new snow on top of the house of cards doesn't seem strong enough to propagate significant failures, but continuing avalanche incidents in a region plagued by unusual (but typical La Sal) conditions says otherwise.

Extensive collapsing and cracking dog backcountry tours. Out of habit, most recreationists slog around on familiar, shady slopes but the faceted layers underneath are punchy and unsupportable above a minefield of snags, stumps and rocks. Meanwhile, stunning powder skiing conditions atop supportable old crusts reward the more imaginative with world-class turning conditions on S and W aspects.

February
Another 1" falls on the 1st to end the storm cycle. The sun angle slowly rises and days lengthen. Warm temperatures and strong sun arrive at the end of the month's first week, along with strong winds that peak at 95 mph. This one-two punch of heat and wind absolutely wrecks the snow surface, sending everyone back to the roads above the parking areas for winter recreation.

Snow begins to trickle in again freshening up the skiing conditions but also adding weight to our precarious snowpack. The mountains pick up 6"-10" between the 15th and 17th and powder skiing is excellent. The strong sun comes out and wrecks the skiing for a day but by the 19th, a moist, southwesterly flow returns and the snow again begins to fall. 9" fall overnight on the 24th, and we are prompted to post a High hazard rating. Field work on the 25th and 26th reveals numerous natural avalanches that came down during the storm. Most are on NE aspects and many are into old snow.

We stay entrenched in a moist, southwesterly flow and the mountains pick up another foot of snow by the 28th bringing totals since the 23rd to up around 2 feet. We are again prompted to issue a High avalanche hazard, and by March 1, several more, large natural avalanches occurred. This time things wrap around into the N and NW aspects. The "Exxon's Folly" slide path produced the most notable avalanche breaking to the ground, 500'-600' wide, and running for about 1000'.

March
Light snow continues to add up through the first couple weeks of the month. 10"-14" of windless snow falls on the weekend of the 9th –11th. Avalanche activity consists of loose snow sluffing on steep, high elevation, NE, N, and NW aspects. On Wednesday, the 14th, a wind event of epic proportions descends upon on us from the NW. For about a 6-hour period, winds average 50 mph from the WNW with gusting up to 90 mph. Snow transport is intense, and mountain peaks take on the appearance of volcanoes spewing giant plumes of ash. This rapid transport piles 6"-12" of snow an hour on to leeward slopes. The result is a natural, deep slab avalanche cycle on upper mid elevation slopes with N-NW aspects.

The rest of the month is rather anticlimactic as an unsettled weather pattern on a NW flow keeps the mountains under mostly cloudy skies with little to no new snow accumulations. Warm temperatures with periods of sun late in the month allow melt freeze crusts of varying strength and thickness to develop on most aspects. For the intrepid, embryonic corn conditions develop on select SE, S, and SW aspects. Light snow returns to finish off the month, and fine dust on crust conditions are found on slopes with a smooth, supportable crust underneath.

April
Budgetary constraints necessitate a halt to the posting of regular avalanche advisories though winter again returns to the mountains. On Friday, April 6th, 8" of snow falls in the mountains with another 4"-6" by Saturday. Local enthusiasts report excellent powder skiing. Moderate to strong SW winds accompany this storm causing some concern here at the Center. The moist, SW flow continues to bring stormy weather to our area, and the mountains pick up a few inches of new snow on a near daily basis through the week of April 8th-14th.

Utah Avalanche Incidents and Accidents

This season saw an astounding 161 avalanche incidents reported to the UAC, which is significantly above the average of around 100. Also this season, six avalanche fatalities ties the record for the most in a season. Nationally, it was a similar story. As of this writing, 34 people died in avalanches, which breaks the old U.S. record of 33. The season was almost made to order for avalanche danger. First, we had a thin snowpack in the early season, which rotted out from temperature gradient metamorphism to become very weak, sugary faceted snow that stays persistently weak and brittle throughout the season. With this kind of persistent weak layer as the foundation, every avalanche person hopes for a huge storm, which will make everything slide at once and wash all out troubles away. Then there is a chance to start over building a solid foundation instead of a weak one. But that was not to be the case. The

storms teased us along all season, just adding enough weight to bring the snowpack up to the edge but seldom pushing it into a major avalanche cycle. This meant that people spent the season trying to tiptoe around booby traps and often were not successful at it. With 161 unintentional human triggered avalanches in the backcountry, it's amazing that there were only 6 deaths. As usual, there were a number of very close calls with 71 people caught, 17 partially buried, 12 totally buried and 2 injured.
Here are short synopses of the incidents and accidents. See www.avalanche.org for the complete reports of these accidents.

Willard Basin Snowmobiler Fatality
On December 14th, three snowmobilers were getting out for some early season riding and testing a new sled in Willard Basin, a remote backcountry area northeast of Ogden, UT. After six days of gradual accumulation, the weak Wasatch snow pack was on the verge of a large natural avalanche cycle. The trio had already triggered several small slides when a big one took the lead rider off the road. Without rescue gear, the remaining two called for help on a cell phone and began searching for their missing companion. When the rescue team arrived several hours later, they quickly located the deceased victim with a probe line.

Sledders at Alta – A Very Close Call
On the afternoon of December 16, a couple of teen-age extreme sledders (of the plastic variety, not snowmobiles) were playing on the sides of the steep gullies above the town of Alta. Avalanche people call gullies like these "terrain traps", because even small avalanches can bury someone very deeply. While they give many of the locals avoid them, the X-Generation loves playing in these natural half pipes. A 14 year-old male was in the bottom of the gully waiting to film his partner jumping the corniced lip. The partner jumped, the cornice broke, triggering a slab avalanche. The photographer was totally buried (sans beacon). Several people in the area began a search. The Alta Ski Patrol spotted the activity and began an organized response. But before the arrival of the rescue team, backcountry folks with shovels and probes had located and uncovered the young man. He was unconscious, but alive, after a burial time of about 30 minuets.

Out of Bounds Skier Killed near The Canyons Resort
The next avalanche fatality occurred on February 27th, involving a middle age woman vacationing from the northeast with her family. She had exited The Canyons 9,990 gate and ventured into the backcountry with several family members looking for untracked powder. She entered the slope first but soon fell, losing a ski. A couple of her companions dropped in to help her, triggering the slide, which released on faceted snow near the ground. Three were caught and carried, one partly buried and two were totally buried. One of the survivors heard shouting from under the snow and quickly located one man. The deceased woman was found after a couple of hours by The Canyons rescue team with a probe line.

Two Snowmobilers Killed in the Uinta Mountains
On March 10 a pair of snowmobilers were caught and killed in the Uinta Mountains. A small storm had dusted northern Utah, including the Uintas, with 4 to 6 inches of new snow. The Uinta Mountains have a snow climate more like Colorado than the Wasatch Range. Thick layers of faceted snow are quite common and the range is receiving increasing use from snowmobilers. The accident followed a common pattern. A high-marking snowmobiler became stuck and his two friends went up to help him. The weight of the three people and machines released a large hard slab avalanche running on

faceted snow near the ground. One of the three was only partly buried and the sleds were on the surface. The search for the missing two men focused on the vicinity of the sleds. Eventually the search widened and both men were found via surface clues but resuscitation efforts proved futile.

Snowmobiler Close Call on the Wasatch Plateau

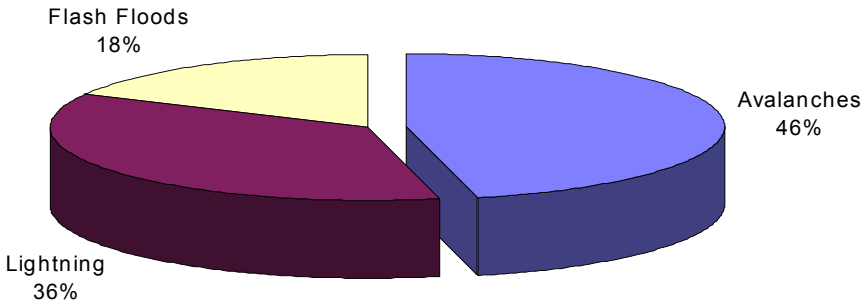
A similar but happier incident occurred on March 24 in central Utah's Wasatch Plateau. A snowmobiler was totally buried by a large slide for an hour while bystanders searched for him. Finally someone thought they heard a voice coming from under the partly buried snowmobile. They moved the sled and there they found a very lucky man.

Two Climbers Killed by a Glide Avalanche in Stairs Gulch

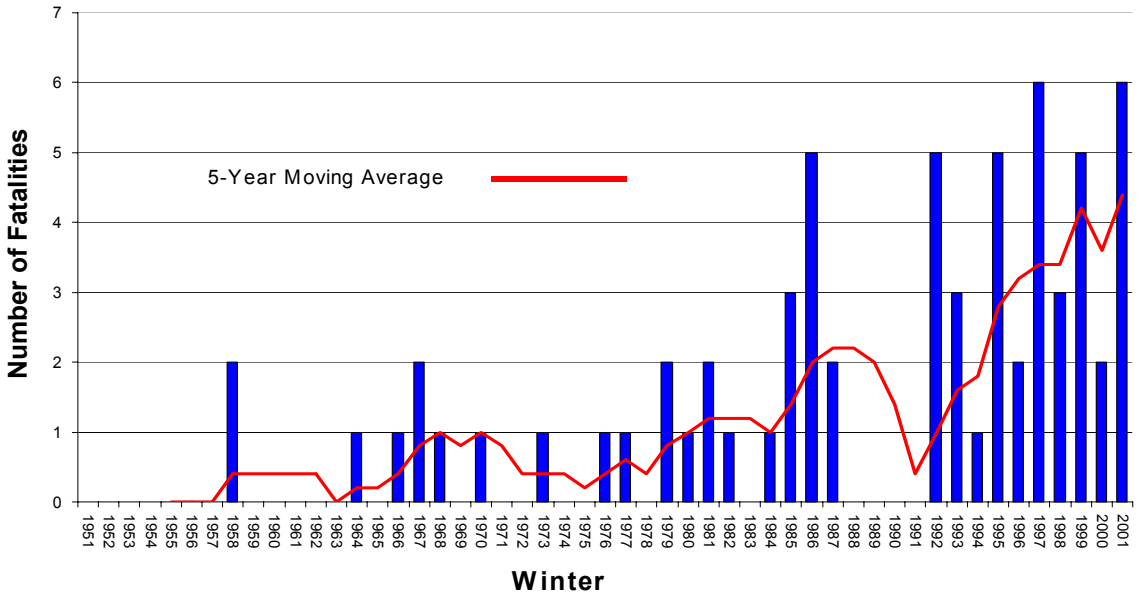
During very warm, springtime conditions, a local doctor and his friend from Alaska (also a doctor) left at 4:00 am on April 28th to climb Stairs Gulch with crampons, ice axes and a rope, but no beacons. Stairs Gulch is a very steep and very large avalanche path (5,000 vertical feet) near the bottom of Big Cottonwood Canyon. Few people venture into Stairs Gulch during the winter but sometimes climbers like to test their snow skills there in spring. As the pair ascended in the early morning darkness a large glide avalanche released high above them and descended into the narrow gully they were ascending. When they failed to show up by their scheduled noon return time, searchers found the boot of one victim sticking out of the snow and a search dog located the second victim about four hundred yards above the first victim and he was buried about 8 feet deep.

This is the first known fatality from a glide avalanche in Utah and perhaps the only one in the U.S. Glide avalanches occur when wet snow slides slowly on the ground, similar to a glacier, often for several days, until they randomly release.

Utah Deaths by Natural Hazard
1951 - 2001



Avalanche Fatalities in Utah 1951-2001



Incidents and Accidents 2000-01

Date	Location	Details	Triggered	Caught	Partially Buried	Totally Buried	Injured	Killed
10/31/2000	Alta Baldy, Armpit	human triggered	1	1	1			
10/31/00	Alta, West Russler	slide triggered by ski cut	1					
11/14/01	Deseret Peak	triggered by hikers	1	2				
11/16/00	Murdock Peak	skier triggered	1	2				
11/17/01	Gobblers Knob	human triggered	3					
11/29/00	Snowbird area	skier caught and carried	1	1	1			
12/1/01	Cardiac Ridge	human triggered	1					
12/12/00	Meadow Chutes	remotely triggered	1					
12/12/01	Big Water	skier triggered	1					
12/14/00	Pink Pine Ridge	human triggered	1					
12/14/01	Willard Peak	snowmobiler caught and killed	1	1		1		1
12/14/00	Park City Mine Dump	remotely triggered	1					
12/15/01	Solitude	ski cut mid slope after explosive control	1	1				
12/16/00	Reynold's East Face	remotely triggered by skier	1	1				
12/16/01	Flagstaff Gully	triggered by sledders and boarders	1	2	1	1		
12/16/00	Park City, Conehead	snowboarder triggered	2					
12/16/01	West Monitor	remotely triggered	1					
12/16/00	!0,420 Peak	human triggered	1					
12/17/01	Daniel's Summit	remotely triggered	1					
12/18/00	West Willow Ridge	human triggered	1					
12/19/01	Uintas, Coop Creek	snowmobiler triggered	1	2		1		
12/21/00	Park City White Pine	snowmobiler triggered	1					
12/25/01	Raymond Peak	skier triggered	1					
12/26/00	Little Pine	human triggered	3					
1/13/01	Squaretop	skier triggered, 2 sympathetic	3	1				
1/14/01	Days Fork	skier triggered	1					
1/15/01	Squaretop	skier triggered	1					
1/15/01	Main Days	skier triggered, mid-path	1	1				
1/16/01	Desolation Lake	human triggered	1					
1/16/01	Kessler Peak	triggered by two skiers on slope	1					
1/18/01	James Peak	human triggered	1	1				
1/19/01	Park City Ridge, near 9,990 Peak	human triggered	1					
1/20/01	Wilson Fork	skier triggered	1					
1/20/01	Brighton backcountry	skier triggered	1					
1/20/01	Mt. Tuscarora	snowboarder triggered	1	1				
1/20/01	Reynold's NE Face	Several pockets, one sympathetic	3					
1/20/01	Red Rock Cliffs	human triggered	2	3				
1/20/01	Corn Bowl	skier triggered	1	1				
1/20/01	Logan, Bobcat Bowl	skier triggered	1	1				
1/20/01	Squaretop	skier triggered	3	1	1			
1/21/01	Trailer Ct. Canyon	snowboarder triggered	1					
1/23/01	X-Chute, Tuscarora	human triggered	1					
1/24/01	Squaretop	skier triggered	2					
1/26/01	Snowbird area	cornice fall triggered slide, caught skiers	1	3	2	1		
1/27/01	Days Fork	skier triggered	1					
1/27/01	Reynolds' Peak	skier triggered	1	2	1		1	

1/27/01	Gobblers Knob	skier triggered	1					
1/28/01	Uintas	skier triggered, after ski cuts w/no results	1	1				
1/28/01	East Bowl Silver Fork	human triggered	1					
1/29/01	Big Springs	skier triggered	1	1				
2/2/01	White Pine	remotely triggered	1					
2/2/01	Argenta	remotely triggered from below	1					
2/3/01	Ben Lomond Peak	human triggered	1					
2/3/01	Logan Mountains	human triggered	1	1		1		
2/10/01	Deer Valley area	snowmobiler triggered	1					
2/12/01	Deer Valley area	human triggered	1	1				
2/12/01	Uintas	skier triggered	1					
2/13/01	Solitude area	skier triggered	1					
2/13/01	West Monitor	human triggered	2					
2/13/01	Days Fork	remotely triggered cornice fall	1					
2/13/01	Scott's Peak	snowboarder triggered	1					
2/13/01	Little Water Peak	skier triggered	1					
2/14/01	Snowboarder Alley	skier triggered	1					
2/14/01	Logan Mountains	snowmobiler triggered	1	1	1			
2/14/01	Clayton Peak	snowboarder triggered	1					
2/15/01	Squaretop	human triggered	1					
2/15/01	Twin Lakes Pass	human triggered	1					
2/15/01	Scott's Peak	human triggered	1					
2/15/01	Thousand Peaks	human triggered	1	3	1			
2/15/01	Desolation Lake	human triggered	1					
2/16/01	Birthday Chutes	human triggered	1					
2/16/01	No Name Bowl	skier triggered	1	1				
2/17/01	Dry Fork	snowmobiler triggered	2					
2/17/01	Squaretop	snowboarders building jumps	2					
2/19/01	Pioneer Ridge	snowboarder triggered	1	2				
2/19/01	Days Fork	human triggered	2					
2/19/01	Silver Fork	human triggered	2					
2/20/01	Mt. Millicent	skier triggered after control work	1	1				
2/21/01	Ant Knolls	skier triggered	2	1				
2/22/01	Snake Creek	snowboarder triggered	1					
2/23/01	Snake Creek	remotely triggered by skier	2					
2/23/01	Brighton backcountry	skier triggered	2					
2/23/01	Holy Toledo	skier triggered	1					
2/23/01	Snake Creek	skier triggered	1					
2/24/01	Summit Parl	snowshoer triggered	1	4	2			
2/24/01	Cinder Chutes	snowboarder triggered	1					
2/25/01	West Monitor	snowboarder triggered	2	1				
2/25/01	South Monitor	triggered by small cornice drop	1					
2/25/01	Banana Days	skier triggered	2					
2/26/01	Chablis Bowl	skier triggered	1					
2/27/01	Red Rock Cliffs	skier triggered	1	4	3	1		1
2/28/01	Logan Peak	snowmobiler triggered	1	1		1		
3/1/01	Cascade Ridge	skier triggered	1	1				
3/1/01	Fairview Canyon	snowboarder triggered	1	1				
3/2/01	North Ogden Pass	skier triggered	1					
3/3/01	Wasatch Plateau	snowmobiler triggered	2					
3/4/01	Cardiff Fork	skier triggered	2					
3/10/01	Chalk Creek	snowmobiler triggered	1	3	1	2		2
3/12/01	Murdock Peak	triggered by cornice drop	1					

3/12/01	Mineral Basin	skier triggered	2					
3/12/01	Easter Bowl	skier triggered	1					
3/12/01	Cardiac Ridge	skier triggered	1	2				
3/13/01	South Monitor	skier triggered	1					
3/13/01	Mary Ellen	skier triggered	1					
3/13/01	Tuscarora	human triggered	3					
3/15/01	Uintas	skier triggered	1	1				
3/15/01	Current Creek	snowmobiler triggered	1					
3/17/01	Monitor Bowls	cornice drops	2					
3/17/01	Taylor Canyon	human triggered	1					
3/18/01	Sunset Peak	human triggered	1					
3/18/01	Ogden Mountains	skier triggered	1	1		1		
3/20/01	Y Couloir	skiers caught in wet slide	1	2			1	
3/23/01	Tony Grove	snowmobiler triggered	1	1				
3/24/01	Sunset Peak	human triggered	1					
3/24/01	Seeley Canyon	snowmobilers	1	2	1			
3/25/01	Snake Creek	snowmobiler triggered	1					
3/25/01	Caribou Basin	snowmobiler triggered	1					
3/28/01	Primrose Cirque	skier triggered	1	1				
3/28/01	Veil Ridge, Alta	skier triggered	1	1	1			
4/3/01	Emma Ridge	remotely triggered by skier	2					
4/4/01	Patsy Marley	skier triggered	1					
4/5/01	Cardiff Pass	skier triggered	1	1				
4/8/01	No Name Bowl	human triggered	1	1				
4/7/01	Snowbasin Backcountry	human triggered	2					
4/10/01	Alexander Basin	remotely triggered by cornice drop	1					
4/12/01	Big Springs	skier triggered	2					
4/17/01	Miller Flats	skier triggered	1					
4/21/01	Mineral Fork	remotely triggered by skier	2					
4/28/01	Stairs Gulch	Two climbers killed		2		2		2
		Total	**161**	**71**	**17**	**12**	**2**	**6**

Avalanche Fatalities in Utah 1958-2001 - By Activity

Date	Deaths	Sex	Location	Activity	Skier	Climber	Snow boarder	Snow mobiler	Other Recreation (snowshoe, hiker, hunter)	Worker	Resident
09-Mar-58	2	Males	Snowbasin	Rescuer						2	
29-Mar-64	1	Male	Snowbasin	Worker						1	
31-Dec-65	1	Male	Park City	In-bounds skier	1						
12-Feb-67	2	Males	Pharoah's Glen	Climbers		2					
19-Feb-68	1	Male	Rock Canyon	Hiker					1		
29-Jan-70	1	Male	Alta	In-bounds skier	1						
29-Jan-73	1	Male	Park West	In-bounds skier	1						
06-Jan-76	1	Male	Alta	Out of bounds skier	1						
03-Mar-77	1	Male	Snowbird	In-bounds skier	1						
19-Jan-79	1	Male	Helper	Worker						1	
02-Apr-79	1	Male	Lake Desolation	Backcountry skier	1						
11-Jan-80	1	Male	Evergreen Ridge	Out of bounds skier	1						
01-Feb-81	1	Male	Cardiff	Hiker					1		
01-Mar-81	1	Male	Millcreek	Backcountry skier	1						
22-Mar-82	1	Male	near Park West	Backcountry skier	1						
02-Jan-84	1	Male	Superior Peak	Backcountry skier	1						
22-Feb-85	1	Male	Near Powder Mountain	Backcountry skier	1						
19-Mar-85	1	Female	Park City	In-bounds wet slide	1						
13-Nov-85	2	Males	Sunset Peak	Backcountry skiers	2						
06-Jan-86	1	Male	Provo Canyon	Backcountry skier	1						
17-Feb-86	1	Male	Big Cottonwood Canyon	Backcountry snowboarder			1				
19-Feb-86	1	Male	Alta	In bounds skier	1						
20-Nov-86	1	Male	Sugarloaf, Alta	Hiker in unopened area					1		
15-Feb-87	1	Male	Twin Lakes Reservoir	Backcountry skier	1						
25-Nov-89	1	Male	Tony Grove Lake, Logan	Backcountry skier	1						
12-Feb-92	4	3-M/1-F	Gold Basin, La Sal Mtns	Backcountry vskiers	4						
01-Apr-92	1	Male	Mineral Basin, near Snowbird	Backcountry skier	1						
16-Jan-93	1	Male	Sundance (closed area)	Backcountry skier	1						
25-Feb-93	1	Male	Pinecrest, Emig. Cyn.	Backcountry skier	1						
03-Apr-93	1	Male	Wolverine Cirque	Backcountry skier	1						
18-Feb-94	1	Male	10,420 Peak, B.C.C.	Backcountry skier	1						
07-Nov-94	1	Male	Snowbird (pre-season)	Backcountry skier	1						
14-Jan-95	2	Males	Ben Lomond, near Ogden	Snowmobilers				2			
23-Jan-95	1	Male	Midway	Resident killed in roof slide							1
12-Feb-95	1	Male	Gobbler's Knob, B.C.C.	Backcountry skier	1						
02-Feb-96	1	Male	Solitude patroller	Worker						1	
27-Mar-96	1	Male	Maybird Gulch, L.C.C.	Backcountry skier	1						
07-Dec-96	1	Male	Bountiful Peak	Snowmobiler				1			
26-Dec-96	1	Male	Flagstaff Peak	Backcountry snowboarder			1				
11-Jan-97	3	Males	Logan Peak	Three campers					3		
25-Jan-97	1	Male	Provo Canyon	Climber		1					
17-Jan-98	1	Male	Near Coleville	Snowmobiler				1			
18-Jan-98	1	Male	Sanpete County	Snowmobiler				1			
26-Feb-98	1	Male	Near Weber State	hiker (possible suicide)					1		
07-Nov-98	1	Male	Snowbird (pre-season)	Snowboarder			1				
02-Jan-99	2	Males	Wasatch Plateau	Snowboarders			2				
29-Jan-99	1	Male	Mt. Nebo	Snowmobiler				1			
06-Feb-99	1	Male	Little Willow Canyon	Hiker					1		
11-Jan-00	2	M/F	Squaretop	Out of bounds skiers	2						
14-Dec-01	1	Male	Willard Basin	Snowmobiler				1			
27-Feb-01	1	Female	Near Canyons Resort	Out of bounds skier	1						
10-Mar-01	2	Males	Uinta Mtns near Oakly	Snowmobiler				2			
28-Apr-01	2	Males	Stairs Gulch, BCC	Climbers		2					

Total **66**

62 Males, 4 Females

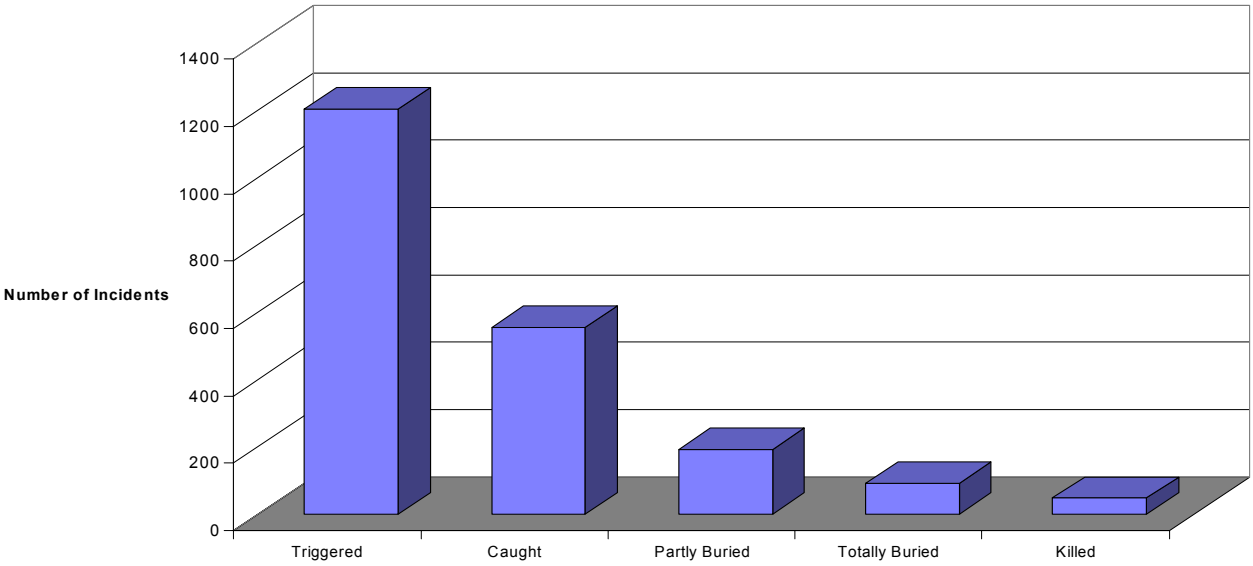
Shaded areas indicate greatest concentration of fatalities.

	Skier	Climber	Snow boarder	Snow mobiler	Other Recreation	Worker	Resident
1958 season - Present	33	5	5	9	8	5	1
Past 10 seasons	15	3	4	9	5	1	1
Past 5 seasons	4	3	4	7	5	1	0

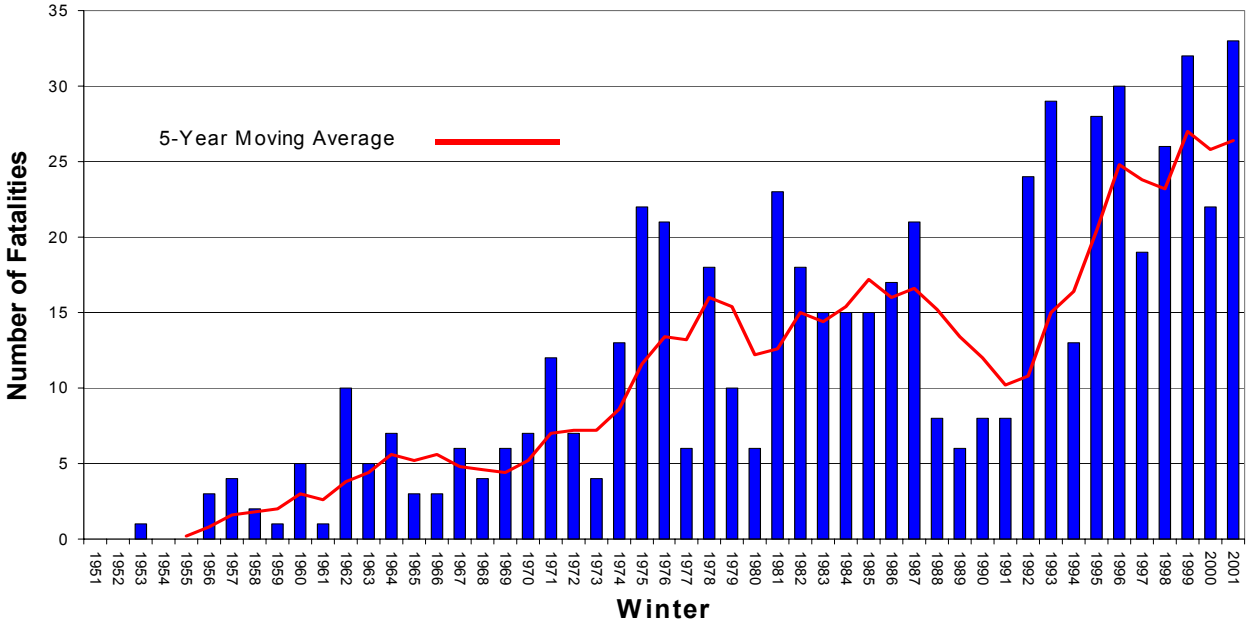
Avalanche Incidents in Utah 1951-Present

Season (year ending)	Triggered	Caught	Partly Buried	Totally Buried	Killed
1951					0
1952					0
1953					0
1954					0
1955					0
1956					0
1957					0
1958					2
1959					0
1960					0
1961					0
1962					0
1963					0
1964					1
1965					0
1966					1
1967					2
1968					1
1969					0
1970					1
1971					0
1972					0
1973					1
1974					0
1975					0
1976					1
1977					1
1978					0
1979					2
1980					1
1981					2
1982					1
1983					0
1984					1
1985	79	39	15	6	3
1986	66	27	12	5	5
1987	50	18	6	3	2
1988	39	6	1	1	0
1989	64	9	1	0	0
1990	65	34	14	2	0
1991	46	19	7	1	0
1992	76	27	14	9	5
1993	65	29	9	5	3
1994	74	42	5	3	1
1995	79	31	7	9	5
1996	51	15	3	2	2
1997	84	62	37	9	6
1998	96	57	17	8	3
1999	68	48	19	7	5
2000	42	22	8	9	2
2001	161	71	17	12	6
Total 1951-present	**1205**	**556**	**192**	**91**	**66**
Total 1985-present	**1205**	**556**	**192**	**91**	**48**
Average of past 15 seasons					**2.8**
Average of past 10 seasons					**3.5**
Average of past 5 seasons					**4.0**

Avalanche Incidents in Utah 1985-2001

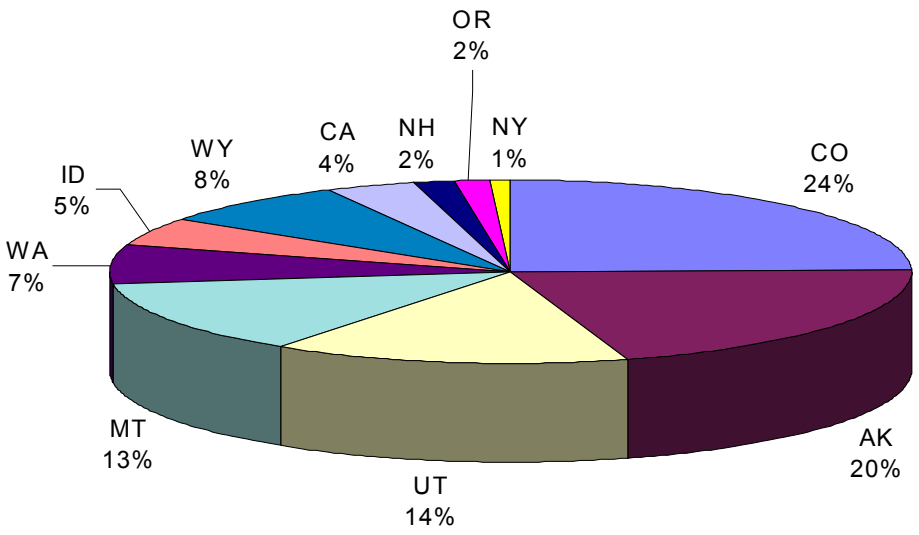


U.S. Avalanche Fatalities 1950-2001

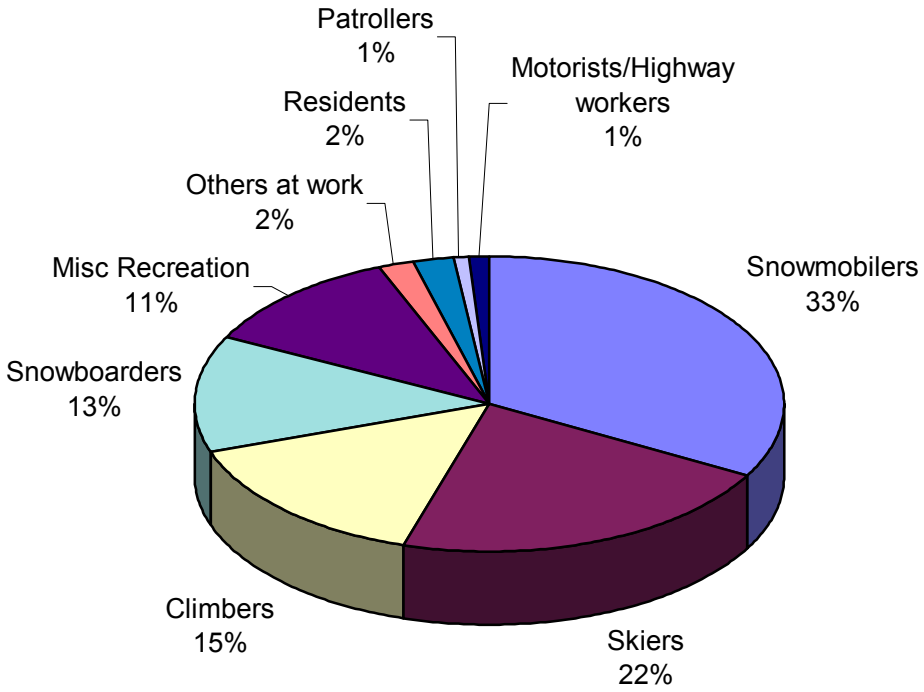


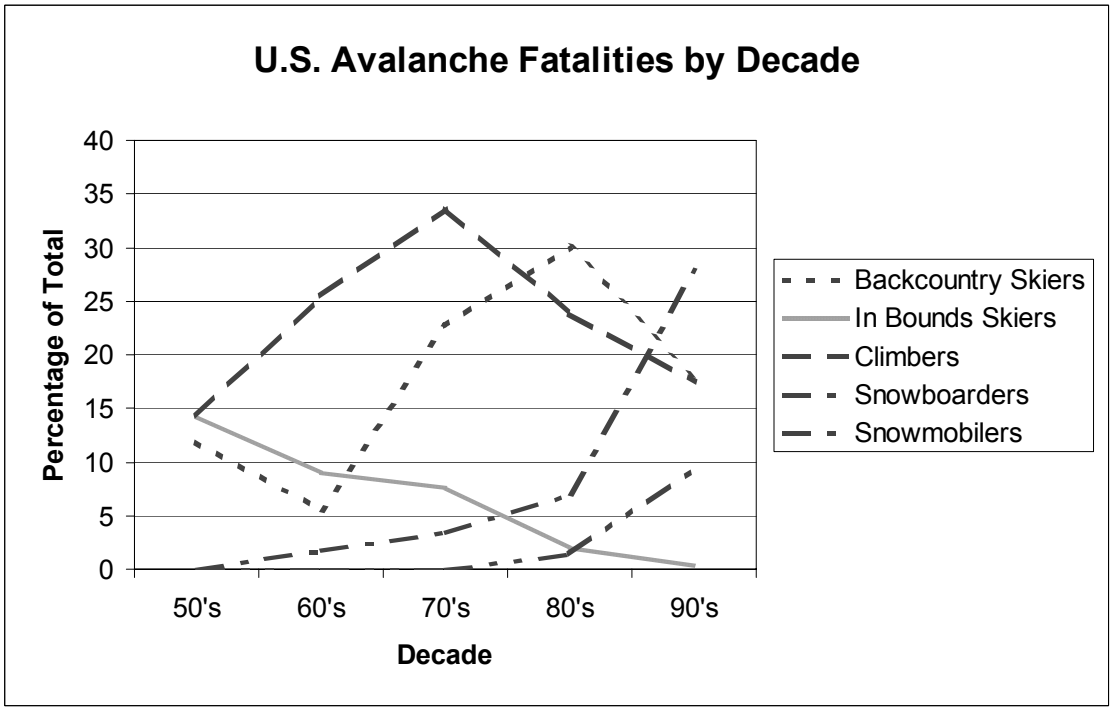
U.S. Avalanche Fatalities by State 1991-2001

(N = 234)

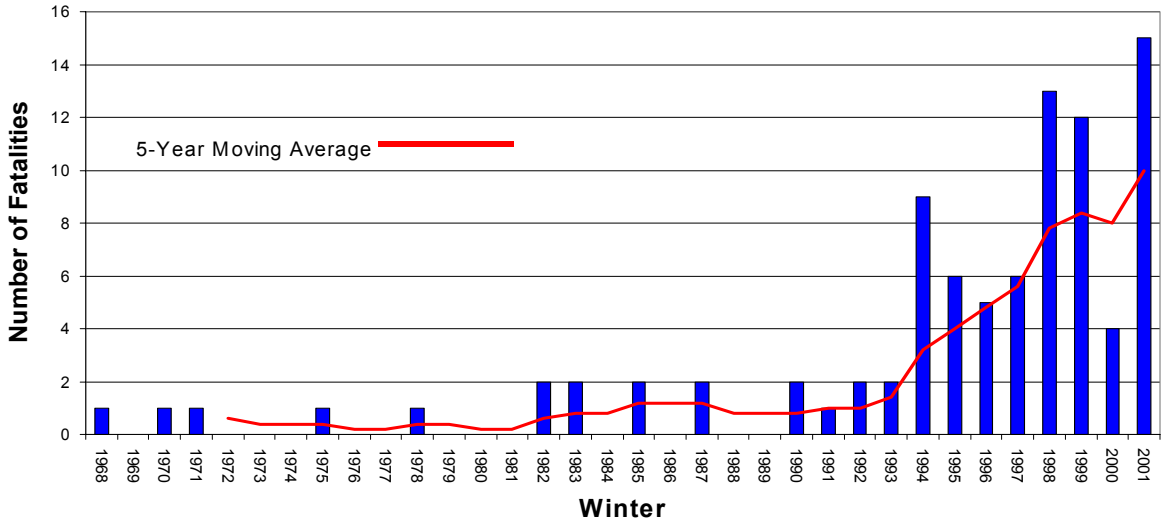


U.S. Avalanche Fatalities by Activity
1995-2001
194 Total Fatalities

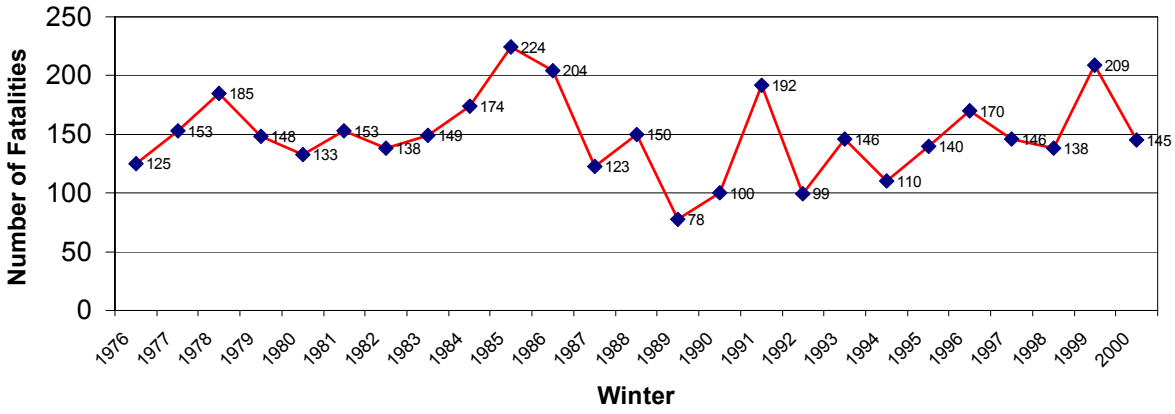




U.S. Snowmobile Avalanche Fatalities by Year 1968-2001



World Avalanche Fatalities 1976-2000

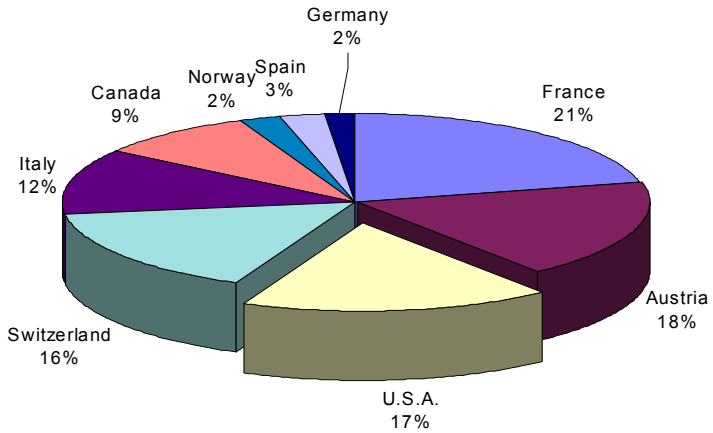


Avalan

World avalanche fatalities have remained relatively constant in recent years while U.S. fatalities have risen alarmingly.

Avalanche Fatalities by Country - 1990-2000

(N=1348)



With an ever-increasing number of people recreating and having accidents in Utah's mountains each winter, avalanche education has become increasingly important. We offer free avalanche awareness classes to the public—many with standing room only--and encourage them to take more detailed courses offered through the private sector. With this multi pronged approach, we believe that more people will return home safely after a day of snowmobiling, skiing or snowboarding in the Utah backcountry.

Our staff includes 11 people distributed between the Logan, Salt Lake City, and Moab offices, two of who are able to focus on avalanche education tailored for snowmobile groups. We provide education to a wide variety of other groups as well, including skiers, snowmobilers, alpine climbers, snowboarders, snowshoers, scout troops, search and rescue groups, ski patrollers, and university students. Our staff also provides lectures and field guidance at a number of 3-day avalanche workshops offered by the private sector, which provide more in-depth information and demonstration of important skills like stability evaluation and route finding. We taught, or participated in a total of 49 avalanche classes during the 2000-01 season and directly reached 2926 people.

For the second year in a row, Eric Trenbeath and Craig Gordon concentrated on education for snowmobilers, bringing badly needed avalanche knowledge and technology into the snowmobile community. Each year the number of snowmobilers heading into the backcountry increases significantly, and they need critical avalanche skills to recreate safely. The recent advances in snowmobile power, combined with weight reduction and traction systems, allow snowmobilers to easily access very dangerous avalanche terrain. In addition, snowmobiles can cover nearly 100 times the amount of terrain that a skier can travel in a single day. Snowmobilers account for about half of the avalanche related deaths that occur in the U.S. each year. This winter season, 3 of the 6 avalanche fatalities in Utah involved snowmobilers. We feel that providing avalanche advisories and classes designed specifically for snowmobilers will help to raise much-needed awareness and promote safety in the snowmobile community.

Another step forward in avalanche education came in the form of scholarships for snowboarders to attend avalanche workshops. Generous donations of $500.00 each from Voile Equipment and Milosport went to the Friends of the Utah Avalanche Center. This money was put into ten $100.00 scholarships for snowboarders who wanted to attend the 3-day avalanche workshop organized by the Friends' organization. These local businesses help to bring knowledge into the snowboarder community not only by their generous donations to the scholarship fund, but also by promoting awareness of avalanche hazard.

This season our staff continued efforts to reach out to younger members of the local communities. We taught free avalanche awareness seminars to local scout groups, middle schools, and high schools. Education helps people to make better decisions when recreating in hazardous terrain, and we figure it's never too early to start learning about avalanches and developing good, safe habits.

We also worked with ski patrollers and local search and rescue groups, in order to refresh the skills and transfer new technology and knowledge to those groups.

UAC Avalanche Education 2000-01

Date	Staff	Event	No. people
10/2/00	Tremper	International Snow Science Workshop	500
10/28/00	Staff	Sundance Ski Patrol Refresher	22
11/30/00	Brown	Snowboard Retailers, Brighton	80
12/6/00	Ciliberti	Meteorology Dept., University of Utah	30
12/6/00	Tremper	Wasatch Mountain Club	90
12/6/00	Staff	REI	100
12/12/00	Kimbrough	AAI Level II Avalanche Class	50
12/12/00	Staff	REI	150
12/14/00	Tremper/Lees	Black Diamond, SLC	57
1/1/01	Staff	Sno-Zone Snowmobile Club	21
1/9/01	Ciliberti/Greene	Snow Hydro Class, Univ. of Utah	30
1/10/01	Tremper	Patagonia Store	80
1/11/01	Staff	Coalville High School	23
1/13/01	Staff	Timp. Ridge Runners Snowmobile Club	26
1/13/01	Staff	FUAFC Avalanche Workshop	35
1/14/01	Staff	FUAFC Avalanche Workshop	35
1/14/01	Staff	Utah Valley State College	61
1/15/01	Staff	FUAFC Avalanche Workshop	35
1/16/01	Kimbrough	Forest Service/Ntnl Park Service	18
1/18/01	Tremper	Forest Service	15
1/19/01	Johnson	Avalanche Awareness, Banff Film Festival	650
1/21/01	Staff	Salt Lake Snowmobile Club	47
1/22/01	Staff	Kamas Middle School	35
1/23/01	Staff	Timp. Ridge Runners Snowmobile Club	44
1/23/01	Tremper	Science of Avalanches Talk	100
1/25/01	Tremper	Red Butte Gardens	60
1/26/01	Staff	Carbon County SAR	26
1/27/01	Staff	Carbon County SAR	18
1/27/01	Staff	Snow Buddies Snowmobile Club	18
1/30/01	Tremper	Outdoor Retailers Show	5
2/2/01	Staff	Moab Avalanche Awareness	12
2/3/01	Staff	Moab Avalanche Awareness	12
2/3/01	Tremper	National Ski Patrol Instructors	80
2/16/01	Johnson/Gordon	Caribou County SAR	14
2/17/01	Johnson/Gordon	Caribou County SAR	11
2/17/01	Staff	FUAFC Avalanche Workshop	30
2/18/01	Staff	FUAFC Avalanche Workshop	30
2/19/01	Staff	FUAFC Avalanche Workshop	30
2/24/01	Staff	Utah Snowmobile Association	60
2/27/01	Ciliberti	SLC Girl Scouts	15
3/2/01	Staff	Dinahland Snowriders	18
3/3/01	Staff	SnoScoop Editor Field Day	1
3/3/01	Staff	Dinahland Snowriders	8
3/9/01	Staff	Sanpete County SAR	10
3/9/01	Tremper	Snowsports Industry of America	10
3/10/01	Staff	Sanpete County SAR	8
3/10/01	Tremper	Snowsports Industry of America	20
	Logan/Johnson	Avalanche Awareness	18
	Logan/Johnson	Avalanche Awareness	18
	Logan	Avalanche Workshop	60
		Total	**2926**
			49 Classes

Media

With the 2002 Olympics on our doorstep, the Utah Avalanche Center once again attracted significant attention from both local and national media. Bruce Tremper flew to Washington D.C. for a live half-hour interview on Discovery Channel about the science of avalanches. NBC Nightly News, the Weather Channel and Earth and Space Channel in the U.K also interviewed him this season. Ethan Greene was filmed by the Discovery Channel for a documentary about current avalanche research in the scientific community. Carol Ciliberti interviewed with reporters about her involvement in the rescue of a snowshoer who was totally buried in an avalanche for 1.5 hours. This rescue event took place in February 1997, and has attracted attention from local and national media every year since then. Jeff Brown spoke with several national outdoor magazines about avalanche related issues, which included providing information about Forest Service avalanche centers throughout the U.S. Finally, local radio stations, newspapers and television networks consistently called us for details on current conditions and general avalanche information.

The UAC staff logged a total of 60 media contacts during the 2000-01 winter season, including 5 national television interviews, 24 national print interviews, 12 local television interviews, two local radio interviews (in addition to our 3 regular broadcasts performed each morning), and nine interviews with local newspaper reporters. Finally, national television documentaries about avalanches, featuring member of our staff, continue to play on the Discovery Channel, The Learning Channel, TBS and on PBS.

UAC Media Contacts 2000-01

Date	Staff	Agency	Subject	Naional or Inter-national Television Interview	National or Inter-national Television Information	National or Inter-national Print Media	Local Television Interviews	Local Radio Interviews	Local Print Interviews
10/17/00	Tremper	Television Rennessance	Information		1				
10/1/00	Tremper	CTV - Canadian TV	Avalanche footage		1				
10/23/00	Tremper	Pioneer Productions in U.K.	Information		1				
10/23/00	Tremper	Breckinridge CO TV station	Avalanche footage		1				
10/25/00	Tremper	History Channel	Avalanche photos		1				
11/7/00	Tremper	Utah Outdoors	Avalanche information						1
11/13/00	Tremper	Salt Lake Tribune	Avy Awareness						1
11/29/00	Brown	Outside Magazine	Website Information			1			
12/3/00	Tremper	Snowboard Life Magazine	Interview on avalanche safety			1			
12/5/00	Tremper	Standard Examiner	Current Conditions						1
12/6/00	Tremper	PBS - Montana	Avalanche footage		1				
12/7/00	Kimbrough	KPCW	Current Weather					1	
12/7/00	Brown/Felix	Standard Examiner	Avy Awareness						1
12/11/00	Kimbrough	KPCW	Current Conditions					1	
12/11/00	Brown	Channel 5 SLC	Avy Awareness				1		
12/13/00	Tremper	Discovery Channel interview in Washington D.C.	Avalanche Science	1					
12/15/00	Brown	BYU Student Newspaper	Avy Awareness						1
12/16/00	Lees	SL Tribune	Avy Awareness						1
12/16/00	Lees	KSL TV	Avy Awareness				1		
12/17/00	Tremper	Channel 4 SLC	Avalanche conditions				1		
12/18/00	Brown	Salt Lake Tribune	Avy Fatality						1
12/18/00	Brown	Tooele Transcript	Avy Fatality						1
12/18/00	Brown	Gear Magazine	Avy Awareness			1			
12/19/00	Tremper	Environmental News Network	Avalanche Cycle		1				

12/19/00	Tremper	Engelwood Studios, CA	Avalanche footage		1				
12/19/00	Brown	KUER	Avy Awareness					1	
12/20/00	Brown	Tooele Transcript	Avy Information						1
1/6/01	Brown	BYU Student Newspaper	Avy Information						1
1/9/01	Greene	Daily Herald	Avy Fatality						1
1/15/01	Brown	KSL News Radio	Snowmobile Avy Awareness					1	
1/18/01	Tremper	Weather Channel	Interview about avalanches	1					
1/19/01	Tremper	NBC Nightly News	Interview about avalanches	1					
1/21/01	Greene	National documentary	Avalanche research		1				
1/22/01	Tremper	NBC News documentary	Interview about avalanches	1					
1/25/01	Kimbrough	Channel 5 SLC	Current Weather				1		
1/26/01	Brown	Outdoor Retailer Magazine	Avy Awareness			1			
1/27/01	Brown/Felix	Salt Lake Tribune	Avy Awareness						1
1/28/01	Brown	National Reporters	Avy Awareness			8			
2/2/01	Tremper	Baltimore Sun	Interview about avalanches			1			
2/6/01	Kimbrough	KSL TV	Avy Information				1		
2/7/01	Ciliberti	Channel 5 SLC	Avy Awareness				1		
2/13/01	Tremper	Salt Lake Tribune	Avy Information						1
2/18/01	Brown	Channel 2 SLC	Current Conditions				1		
2/20/01	Gordon	Salt Lake Tribune	Avy Awareness						1
2/24/01	Tremper	Associated Press	Avalanche incident			1			
2/24/01	Tremper	UPI	Avalanche incident			1			
2/26/00	Tremper	Channel 4 SLC	Interview about fatality				1		
2/26/00	Tremper	Manchester NH newspaper	Interview about fatality			1			
2/26/00	Tremper	Salt Lake Tribune	Interview about fatality						1
2/27/01	Tremper	Earth and Space Channel, UK	Interview about avalanches	1					
3/5/01	Brown	SL Tribune	Avy Awareness						1
3/10/01	Gorden	Deseret News	Avy Fatality						1
3/10/01	Brown	National Reporter	Avy Information			1			
3/10/01	Brown	SL Tribune	Avy Information						1
3/11/01	Brown	National Reporter	Avy Fatalities in U.S.			1			
3/11/01	Greene	Channel 13 SLC	Avy Fatality				1		
3/11/01	Greene	Channel 2 SLC	Avy Fatality				1		
3/12/01	Tremper	KSL Radio	Info about avalanche fatality					1	
3/13/01	Brown	Outdoor Retailer Magazine	Avy Centers in U.S.			1			
3/17/01	Gordon	Channel 4 SLC	Avy Education, Wasatch Plateau				1		
3/25/01	Gordon	Channel 13 SLC	Avy Awareness				1		
3/27/01	Tremper	USA Today	Interview about avalanches			1			
3/29/01	Ciliberti	Juneau, AK Newspaper	Avy Rescue			1			
3/29/01	Tremper	Juneau AK Newspaper	Avalanches in general			1			
4/4/01	Tremper	Cabin Life Magazine	Interview about avalanches			1			
4/12/01	Tremper	Salt Lake Tribune	Olympic avalanche issues						1
4/13/01	Tremper	Outside Magazine	Fatalities			1			
4/29/01	Tremper	Channel 4 SLC	Fatalities				1		
4/29/01	Tremper	Channel 5 SLC	Fatalities				1		
4/29/01	Tremper	Channel 13 SLC	Fatalities				1		
5/1/01	Tremper	Anchorage Daily News	Fatalities			1			
5/11/01	Tremper	Salt Lake Tribune	Fatalities						1
5/21/01	Tremper	Discover Magazine	Interview about avalanches			1			
5/25/01	Tremper	Magazine in Greece	Interview about avalanches			1			
			Total	**5**	**8**	**24**	**12**	**2**	**9**

60 Total Contacts

Budget

The Forest Service Utah Avalanche Center is the epitome of a successful partnership between the Forest Service and other funding partners. Our Forest Service base operating funds were $37,000 this year. The other cornerstones of our budget include $25,000 from State of Utah Comprehensive Emergency Management Fund, $20,000 from Salt Lake County, $12,000 from a National Recreation Trails Program grant administered by Utah State Parks (approximately 1/3 of the total grant), and a $12,000 donation from the Friends of the Utah Avalanche Center (of which $6000 goes to Logan and $6000 to SLC). The Friends also spent an additional $20,000 outside of the Forest Service budget on projects directly supporting the Utah Avalanche Center. This diversity in funding builds a strong financial foundation for the Utah Avalanche Center.

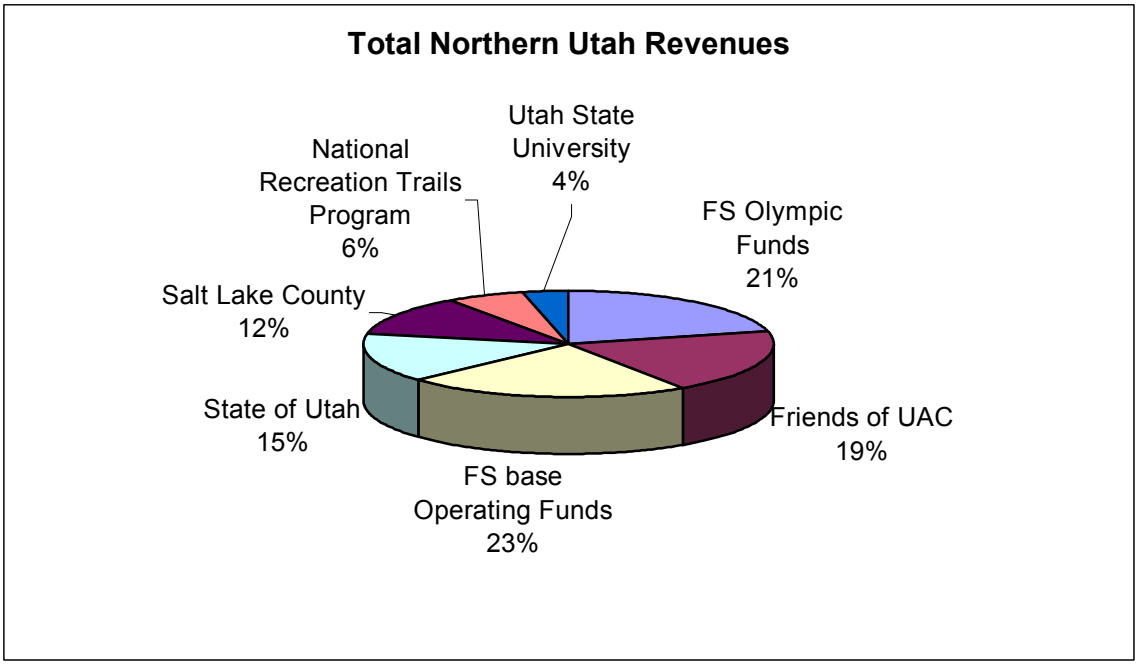
The FS Utah Avalanche Center also receives about $20,000 per year from the Forest Service 2002 Planning Team, which is preparing for the 2002 Winter Olympic Games. UAC Co-Director Bruce Tremper works full time on Olympic related projects. All of these Olympic related projects will directly benefit the Utah Avalanche Center (see section on Olympics).

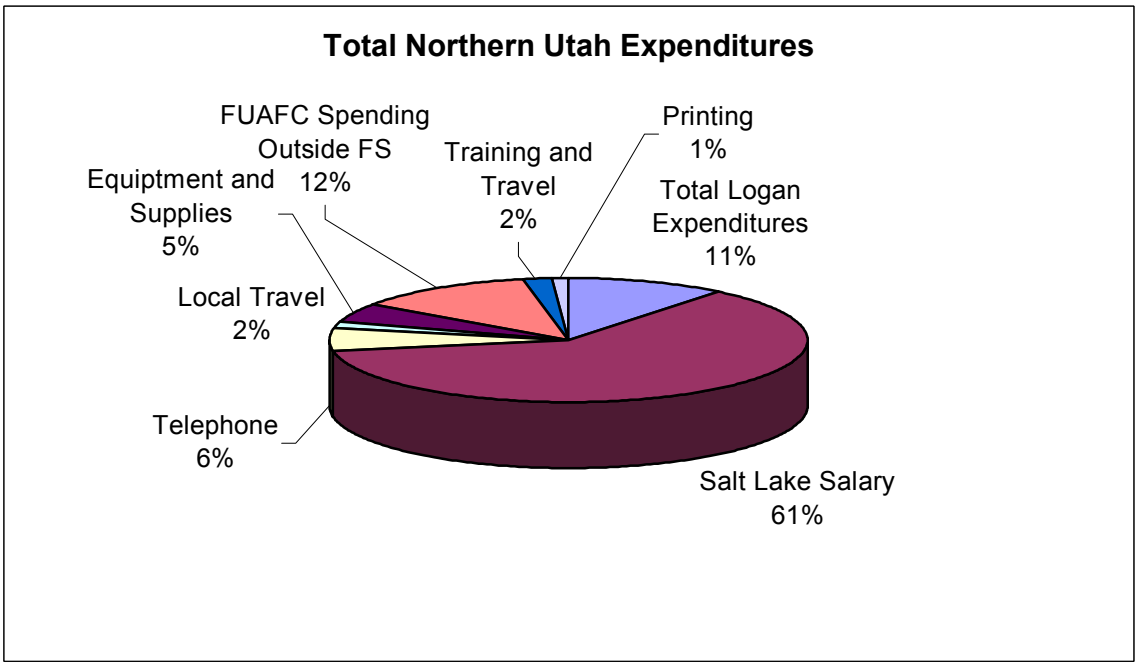
As always, our heads are constantly swimming with great ideas for better ways to communicate critical avalanche information to the public, better and more avalanche education, and expanding the areas our forecasts cover. All this takes time and money, and we're still searching for new and consistent funding sources.

Total Northern Utah Revenues

FS Olympic Funds	$35,000
Friends of UAC	$32,000
FS base Operating Funds	$37,000
State of Utah	$25,000
Salt Lake County	$20,000
National Recreation Trails Program	$10,000
Utah State University	$6,000
Total	**$165,000**

Total Northern Utah Expenditures	
Total Logan Expenditures	18,000
Salt Lake Salary	101,000
Telephone	10,000
Local Travel	2,500
Equiptment and Supplies	8,500
FUAC Spending Outside FS	20,000
Training and Travel	3,000
Printing	2,000
Total	**165,000**


Total Northern Utah Revenues
Utah State University 4%
National Recreation Trails Program 6%
FS Olympic Funds 21%
Salt Lake County 12%
State of Utah 15%
Friends of UAC 19%
FS base Operating Funds 23%


Total Northern Utah Expenditures
FUAFC Spending Outside FS 12%
Printing 1%
Training and Travel 2%
Equiptment and Supplies 5%
Total Logan Expenditures 11%
Local Travel 2%
Telephone 6%
Salt Lake Salary 61%

The Friends of the Utah Avalanche Center

The Friends of the Utah Avalanche Center, a non-profit 501 3 (c), was once again a keystone in the funding of our operation. Through a combination of the annual Black Diamond fundraiser, a ski swap, avalanche classes, video sales and donations, they raised almost $40,000 last year. About $12,000 was donated directly to the Wasatch-Cache National Forest, and was used to support the Salt Lake and Logan avalanche centers. The Friends spent an additional $20,000 outside of the Forest Service, which directly supported FSUAC programs.

Fund raising events and people that deserve special mention include:

The Board of the Friends of the Utah Avalanche Center – A hard working and dedicated board is what makes the Friends a success. We are indebted to Colleen Graham, Katharine Mead, Mark Holbrook, Peter Donner, Karen Kelly, Wendy Zeigler, Amy Abbott, and Nancy King for all the time and energy they put towards helping the Forest Service Utah Avalanche Center.

Black Diamond supports the Friends and the Forest Service Utah Avalanche Center by hosting an annual fundraiser and covering the cost of food, drinks, tents and music, in addition to donating the time and labor of their employees working on the fundraiser. Black Diamond also provides graphic art support through out the year, organization of the ski swap and meeting space for avalanche talks and meetings.

All the individual backcountry users who support the Forest Service Utah Avalanche Center by making personal donations each year to the Friends, including over 700 individuals who contributed at the annual fall fundraiser.

Evolution and Uinta Brewing Company for their generous donation to offset the expenses of the annual fundraiser.

Voile Equipment and Milosport each donated $500 to provide scholarships to help snowboarders attend a Level 1 multi-day avalanche workshop.

REI for providing space for the annual fundraising ski swap, meeting space for avalanche talks, and assistance for signups for avalanche workshops.

Wasatch Mountain Club for donation of the lodge for a three-day workshop.

Banff Film Festival and U of U Outdoor Recreation Program for a generous donation.

Special recognition and thanks to Brad Barber, Al Soucie, Joe Food, John Byrne, and the Salt Lake Roasting Company for their contributions of time and/or money.

Wasatch Plateau/Manti Skyline Avalanche Forecasts and Snowmobile Avalanche Education

The Utah Avalanche Center applied for and was awarded a generous grant of $34,500 from the National Recreation Trails Program, administered through Utah State Parks. The primary project funded was to provide a weekend and holiday avalanche and mountain weather advisory for the Wasatch Plateau/Manti Skyline region. This is an area highly used by snowmobilers and other winter recreationsts that sees numerous avalanche incidents each season. Additional projects funded included more personnel available for statewide avalanche education for both motorized and non-motorized backcountry users, ongoing development and maintenance of educational products, and continuing the daily avalanche bulletin for snowmobilers on the Utah State Parks 1-800 system.

Craig Gordon and Eric Trenbeath began work on many of these programs the winter of 1999-2000, and both continued the work this season as Wasatch-Cache National Forest employees. They alternated the responsibility of covering the Wasatch Plateau/Manti Skyline forecasts and fieldwork. Additionally, Craig concentrated on providing snowmobile avalanche education in northern Utah and Eric in southern and eastern Utah. 2001 season accomplishments include:

- Operation of a weekend and holiday advisory for the Wasatch Plateau/Manti Skyline
- Information available via toll-free telephone hotline and internet
- Installation of a remote weather station partnered through UDOT
- Internet archive of expired advisories for mid-week reference
- Expanded avalanche forecasting for the greater Manti-Lasal National Forest.

Twenty-one **Avalanche Education** courses reached over 450 people, targeting the snowmobiling public and land management and search and rescue personnel. Media contacts included both local and statewide TV and newspaper articles and interviews, and Public Service announcements on local radios. Specific **Snowmobile Outreach Products** included:

- Placemats for local diners containing avalanche safety tips, advisory hotlines and contact information for classes. 5000 distributed.
- Placards promoting the Manti Skyline and other regional advisories distributed statewide to local convenience stores, snowmobile dealerships, County, State and Federal offices.
- An article on avalanche safety for “Snowscoop”, a Utah Snowmobile Association publication.
- Web site link between the avalanche advisory and Utah Snowmobile Association homepage.

Great community support and team work enhanced results of the project. A special thanks to all the partners, including the Wasatch-Cache and Manti Lasal National Forests, Utah Snowmobile Association, Snowscoop, Utah State Parks, Big Pine Sports and backcountry observers.