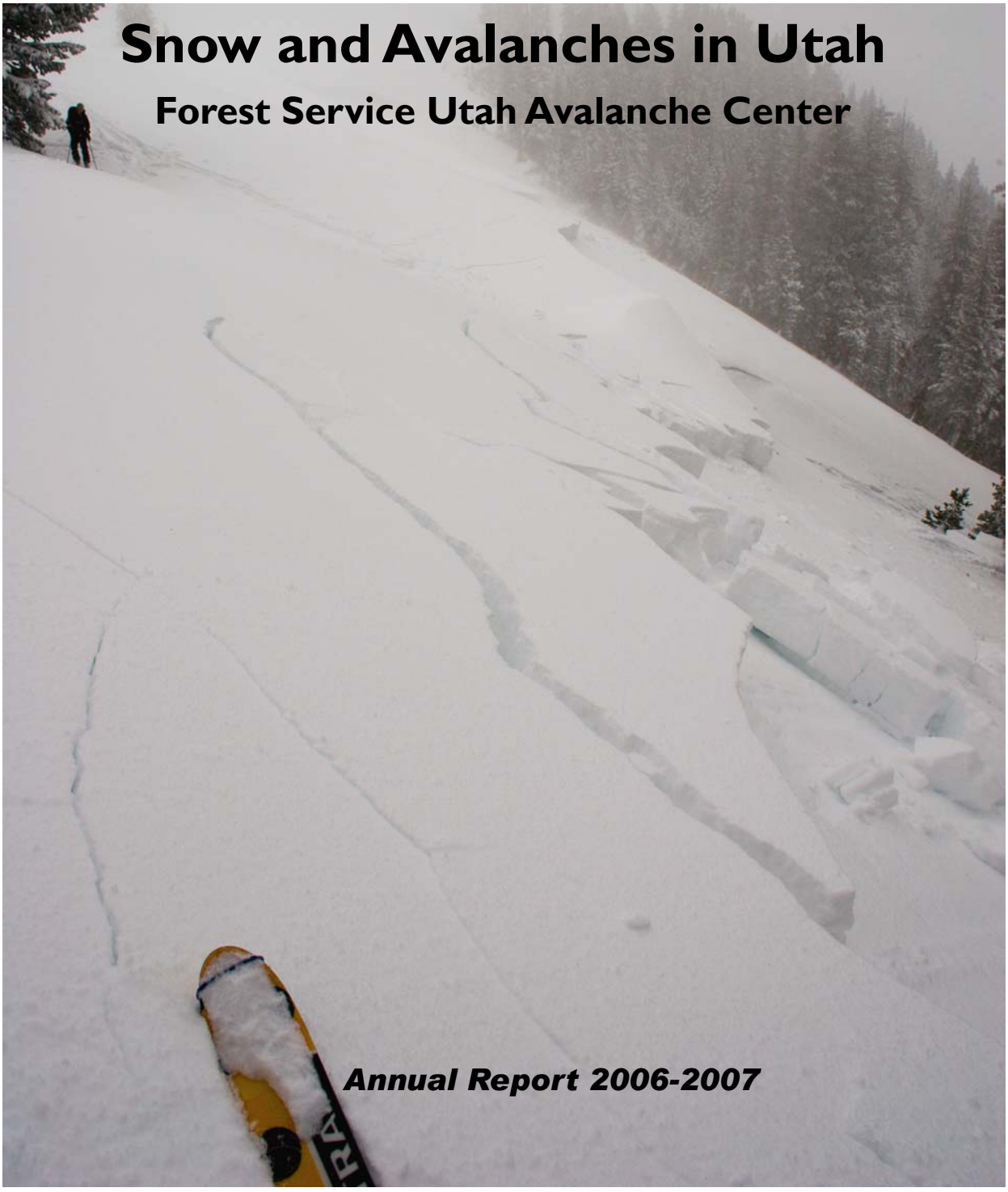
Snow and Avalanches in Utah

Forest Service Utah Avalanche Center



Annual Report 2006-2007

In partnership with:

Utah Division of State Parks and Recreation
Friends of the Utah Avalanche Center
National Weather Service
Utah Department of Public Safety
Salt Lake County

Bruce Tremper examines the fracture of a very large, natural avalanche on the Park City ridgeline. The fracture was 5-8 feet deep and about a half mile wide.

Cover photo: A severe drought in the first half of the winter turned what little existing snow into extremely weak, depth hoar. When snow finally started falling in February, hair-trigger avalanche conditions existed on almost all slopes. Utah Avalanche Center Director, Bruce Tremper was able to intentionally trigger this large avalanche by jumping on a very gentle part of the slope from the ridgeline above. Here, he is examining the crown fracture while his field partner waits in a safe spot. The avalanche was over a quarter mile wide.

All photos in this report are taken by the staff of the Forest Service Utah Avalanche Center unless otherwise noted. Compiled and Edited by Bruce Tremper & Brett Kobernik
All content written by Utah Avalanche Center Staff: Bruce Tremper, Evelyn Lees, Drew Hardesty, Brett Kobernik, Craig Gordon and Toby Weed. Copies of this report can be obtained by writing, calling or e-mailing:

Forest Service Utah Avalanche Center
2242 W. North Temple
Salt Lake City, UT 84116
801-524-5304 phone
801-524-6301 fax
Or view online at: uac@avalanche.org
www.avalanche.org and click on Salt Lake

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In Memory of Ed LaChapelle 1926 – 2007

Ed LaChapelle, generally considered the grandfather of American avalanche research, died of a heart attack on February 1st. He was skiing powder with his two close friends, Knox Williams and Art Mears and his wife Meg Hunt at Monarch Ski Area in Colorado. Although Ed lives in McCarthy Alaska, he was in Colorado to attend the memorial service of his ex-wife and close friend Delores LaChapelle just a week before.

It's fair to say that Ed's figured out most of what we now know about avalanches through his pioneering research at Alta from 1951 through 1972. He directly mentored most of the leading avalanche professionals in the U.S. and indirectly mentored the following generation through his many publications, books and his generous personal communications.

Ed earned degrees in physics and math from the University of Puget Sound in 1949. Following a longtime interest in avalanches and skiing, he spent the winter of 1950-51 studying under avalanche scientists at the Swiss Federal Institute of Snow and Avalanche Research in Davos, Switzerland, including the famous Andre Roch. The following winter, he landed a job as a snow ranger at Alta working for Monte Atwater. Together, they formed a formidable powerhouse of avalanche research an innovation in which they pioneered using hand charges, military weapons and avalaunchers for avalanche control—the same methods routinely used today. Ed also was instrumental in creating the avalanche beacon and he invented much of the technology and techniques we now use for avalanche forecasting.

Ed spent his summers working as a glaciologist in Greenland, the Juneau Icefield and on the Blue Glacier in Washington. After he left Alta in 1972, he worked as an avalanche researcher in the San Juan Mountains of Colorado and then became an instructor in the Department of Atmospheric Sciences at the University of Washington until his retirement.

Ed visited Utah for a couple weeks every winter since he left in 1972 and he was always very generous with his avalanche knowledge and wisdom. I had many wonderful conversations with him through the years and I even sat him down with a tape recorder at one point to capture many of his old stories. I would often tell him about something unusual I had seen in the snowpack and he invariably had a concise, explanation for it in just a few words could completely change the way I thought about the snowpack. For instance, Alaska avalanche expert Doug Fesler has always taught using what he calls the "bull's eye approach" in which you zero in on the essential information—something he learned from Ed always preaching to go for the "low entropy" information. Similarly, I have always preached that, "The snowpack is just like people—it doesn't like rapid change." I stole this from Ed as he used to say, "Any rapid change in the mechanical or energy state of the snowpack is a precursor to avalanching." And finally, at the International Snow Science Workshop in Telluride, Colorado this past fall, Ed set the

room abuzz when he stood up and asked a question after someone's talk. "I see all of these static tests being presented and the snowpack is dynamic. Is there any dynamic testing going on? Otherwise don't you think it is like throwing a blanket over a herd of cats and trying to follow what the cats are doing? Are you really getting to the problem?"

Ed was a wonderful human being, soft spoken, wise, always a smile on his lips and a twinkle in his eye, an engaging, down-home storyteller, with a steel-trap, systematic, ingenious mind. He always seemed to be followed by a small army of friends and admirers. And after an astoundingly productive lifetime studying avalanches, he died with his close friends skiing powder. We all wish we could be so lucky.

Bruce Tremper

Ed LaChapelle with a ring he placed in the Blue Glacier many years ago melted out in more recent times

As a glaciologist in Greenland early in his career.

Operating a ram penetrometer at Alta

Teaching an avalanche class with Monty Atwater at Alta.

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 arrive 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 93 percent of avalanche fatalities, the avalanche was triggered by the victim or someone in the victim's party. Which is actually good, because most 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.

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

Critical, up-to-date avalanche information.

Our avalanche advisories give the public critical avalanche information they need to make their life-and-death decisions in avalanche terrain and we 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.

The public can access these advisories in the following ways:

- The Internet
- Recorded telephone message updated each day

- Live interviews each day on three different public radio stations
- E-Mail
- 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. The Forest Service Utah Avalanche Center staff has been featured on dozens of national and international documentaries about avalanches and they regularly appear on the national television news.

Avalanche Education:
The UAC staff teaches about 30 free, basic avalanche awareness classes each season and the Know Before You Go program teaches 120 classes and reach over 22,000 people per year. 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 web site is our newest focus on avalanche education. Our very popular encyclopedia which explains many terms used in backcountry travel using photos, diagrams and innovative flash animations. Using web photo galleries with captions explaining different aspects and routines in simple terms is a very effective way in teaching inexperienced backcountry users. We are also providing more detailed information for advanced users in the form of snowpit diagrams and seasonal weather history charts.

How We Help Solve the Problem:

Just because people read or hear the information doesn't mean they pay attention. Therefore, we try to make the advisories entertaining so that people will remember what they read and 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. The Internet-based products are graphically-based and easy to understand.

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 weather and snow out 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 forecaster operates in Logan, four in Salt Lake City, one in the western Uinta Mountains and two others cover the Manti Skyline and the La Sal Mountains near Moab.

We believe in a strong field-based program.

Avalanche forecasting is just as much art as 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 forecaster 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 UAC 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.

The number of snowshoers are increasing faster than any other user group because it is inexpensive, easy to learn and it is a wonderful way to enjoy winter. We are working to educate snowshoers and bring them into Utah's avalanche culture.

A Look Under the Hood

The UAC is operationally separated into four entities:

The Logan area Mountains (Wellsville and Bear River Ranges).
Wasatch Mountains (Ogden, Salt Lake, Park City and Provo area mountains)
Western Uinta Mountains (Mirror Lake Highway, Weber Canyon, Evanston WY, Daniel's Summit)
Manti Skyline (FairviewCanyon – Wasatch Plateau)
La Sal Mountains (near Moab)

Toby Weed staffs the Logan operation. A generous contribution from the Utah State Parks funds this position.

Based in Moab, Max Forgensi and Dave Medara forecast not only for the nearby La Sal Mountains but they also issue weekend forecasts for the Wasatch Plateau—Manti Skyline area. The Moab office is located in the Moab Ranger District on the Manti-La Sal National Forest and us supported by both the Moab Ranger district and a generous contribution from Utah State Parks.

Craig Gordon issues forecasts for the western Uinta Mountains, does the lion's share of avalanche education for snowmobilers in northern Utah and runs the Know Before You Go education program. This position is supported by a generous contribution from Utah State Parks.

Last, but not least, the vast majority of the backcountry use occurs in the Wasatch Range of northern Utah. A staff of four full time workers covers 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 21st season, is the Director. The rest of the very experienced Salt Lake staff include: Evelyn Lees, Drew Hardesty and Brett Kobernik. All are Forest Service employees under the Wasatch-Cache National Forest. The Salt Lake office is co-located with the National Weather Service at the Salt Lake International Airport.

Finally, a private, nonprofit group, the Friends of the Utah Avalanche Center, contracts a number of "volunteer" observers, who receive $10 per day for taking the extra time to call or e-mail their observations after they return home at the end of an outing. They also hire 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 Parks and Recreation, 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:

All Areas (courtesy of Backcountry.com)	(888) 999-4019
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
KRCL 91 FM (7:50 am weekdays)
KPCW 92 FM ((8:06 am weekdays)
All other radio stations via both long and short podcasts.

Internet:
www.utahavalanchecenter.com (Friends of Utah Avalanche Center)
www.wrh.noaa.gov/Saltlake (National Weather Service)

E-mail:
We offer daily automated e-mail of the advisories free of charge. About 2,000 e-mails are sent each day.

To contact our office:
(801) 524-5304 (phone)
(801) 524-4030 (fax)
e-mail: uac@avalanche.org

How We Generate Avalanche Advisories

We split our time more or less equally between the mountains and the office. For the Wasatch Range, a staff of four people rotate through the office in which one person comes in at 4:00 am to issue the forecast for the day while the others either head into the mountains to look at avalanche conditions, teach avalanche classes or come into the office at a more reasonable hour to work on various computer or education projects.

Field Day:
A typical field day might begin at 6:00 in the morning. Like most avalanche professionals, we click on our trusty NOAA weather radio shortly after getting out of bed for the latest weather forecast., then, we fire up our home computer to look at the data from all the automated mountain weather stations. Like everyone else, we call our own avalanche advisory to get the latest information. Finally, after calling the forecaster for the day to check out, we jump in the car or on the bus and head for the moun-

tains.

The forecaster in the field usually travels on skis or snowmobile or both, using all the usual safety equipment like electronic avalanche beacons, shovels, probes, belay rope and cell phones. We seldom have a regular patrol area, but simply go to the area that concerns us the most, or to a place that we know is representative, where we can safely 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. Field days are often very labor intensive affairs, using climbing skins on skis to 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. Along the way we dig a number of "snow pits" in which we systematically test the stability of the snowpack. In more remote areas, we use snowmobiles to access avalanche terrain.

Field information comes from many different sources, but the most powerful information usually comes from snow pits we dig on a variety of different slopes, or better yet, from profiles dug at the fracture lines of recent avalanches. A snow pit, like the name implies, is a hole dug in the snow about a 5 feet deep and 5 feet wide. On a smoothed snow pit wall, we perform a variety of stress tests to determine the stability of the snowpack and document the shear properties of weak layers. We also look at the crystallography of the various layers—crystal type, size, strength, water content and density, as well as measure temperature profile. Practiced avalanche professional usually take about 15 minutes for each snow pit. We would rather dig several quick pits in several areas than do one detailed pit in one specific area because we want to know the distribution of the pattern so we can communicate the pattern to the public.

We also test the stability of the snow in other ways, such as sawing off cornices, which bounce down the slope, we keep 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 write up our observation, graph the snow pit profiles and e-mail them to the avalanche center and also leave a detailed message on our answer machine in the office, which the forecaster will hear early the next morning. Often, we post photos of the day on our web site as well. Finally, each evening, we often call the person who will forecast the next day and talk to them in more detail, catch up on news of the day and bounce theories off each other. The days invariably end up being long, often racking up unpaid overtime.

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 have degrees in some kind of physical science such as meteorology or geology. We also have a number of years experience doing avalanche control at ski areas, plus, all are accomplished mountaineers with many decades of accumulated mountain experience and

several are veterans of mountaineering expeditions throughout the world including Nepal, South America and Alaska. Finally, we all stay in top physical condition so we can efficiently cover lots of terrain.

Office:

The forecaster for the day usually rises at 3:00 am—earlier on storm days—and arrives at our office, co-located with the National Weather Service near the Salt Lake Airport, around 4:00 am. There's only one avalanche person in the office, so the pressure and time constraints are intense.

First, the lead weather forecaster for the National Weather Service briefs us on the general weather setup and then it's time to jump on the National Weather Service computers and give the weather an even more detailed look, so it can be adapted to specific mountain areas. Then, we check our answer machines, faxes and e-mails for field observations not only from our staff, but from a dedicated corps of volunteer observers, ski areas, helicopter skiing companies and highway control programs. Next, the forecaster has to face a blank computer screen and type up a detailed narrative of snow stability and mountain weather and customize the advisory for five different zones in northern Utah. After the advisory goes out via e-mail and on the Internet, we begin recording the advisories into six different telephone systems, each located in a different local calling area for northern Utah and each one customized for a different area. Finally, we, do three live radio interviews. By 8:15 am, we're done and we 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. Thousands of people access the advisory over the Internet, even more hear it on the radio and an average of 230 people call the avalanche recording each day.

Then, just when many people are eating their breakfast, we eat lunch. After lunch—or is it breakfast—there's never a lack of telephone calls to answer, reports to write, spreadsheets and web sites to update, computer projects and media contacts. Finally, we issue the detailed mountain weather forecast by about noon, then head home by 1:00 pm.

The National Weather Service: a very valuable partner.

We cannot sufficiently express the gratitude for our partnership with the National Weather Service (NWS). Larry Dunn (an avid backcountry skier in his free time) is the head of the NWS in Salt Lake City. The NWS provides office space, internet connections, space on the NWS computer server, as well as, most importantly, weather data and weather forecasting.

Since weather sculpts avalanche conditions, weather is obviously important in avalanche forecasting. Each morning the avalanche forecaster on duty speaks with the NWS lead forecaster on duty about current and upcoming weather. Then we use the state-of-the-art, NWS computers to refine the forecast for the mountains. Each morning, we serve as the intermediary and exchange a plethora of information back and forth between the NWS forecasters and all the avalanche workers in the mountains responsible for public safety.

We would like to thank all of the lead forecasters along with everyone else who works in "the Circle" at the NWS for providing such great info and being a pleasure to work with. Randy Weatherly, a computer programmer at the NWS, also deserves thanks for putting up with pesky questions from the UAC forecasting staff on computer issues. He is unfortunate enough to have an adjoining cubicle and he routinely provides simple fixes to everyday computer issues along with insight to computer programming languages.

Season Highlights

- Utah experienced a very dry winter—the driest winter since 1977 and the fourth driest winter in 62 years of record keeping at the Alta Guard station where 356 inches of snow fell compared to the average of 500.

- A thin snowpack means a weak snowpack. In this case, it was extremely weak, bottomless depth hoar. So when it finally started snowing in February, we experienced an extremely dangerous avalanche cycle with very large avalanches breaking to the ground. The dangerous conditions lasted for most of the month. And when the snowpack warmed up in spring, we experienced a similar cycle of very large wet slab avalanches. Only the old-timers had ever experienced these conditions before and it was a great learning experience for the less experienced.

- Because of the dry winter, Utah experienced fewer unintentional, human-triggered avalanches in the backcountry than usual—88 compared to the usual average of around 100. Unfortunately, we still experienced our average avalanche fatalities per season of four. One of these fatalities was in central Utah near Richfield, which is outside our forecast area. The others include two skiers and a snowmobiler. Total there was 88 unintentional human triggered avalanches in the backcountry, 43 people were caught, 17 were partially or totally buried, 9 were injured and 4 killed. In addition, four other Utah residents died in avalanches out of state, two snowmobilers in Idaho and Montana and two climbers in Alaska during the spring mountaineering season on Mt. McKinley.

- We received 2.5 million hits to our web site making the UAC the most heavily used avalanche center in North America. The Internet is by far the most popular way to get avalanche information as only 4 percent of the people who access the advisory do so over the telephone.

- The Know Before You Go program, which is directed to young adults is administered by UAC staff member, Craig Gordon. Instructors include Craig Gordon and a cadre of trained, local avalanche professionals. The KBYG program taught an incredible 119 presentations, which directly reached over 22,00 people. In addition, the UAC staff taught in 33 avalanche classes this season, which directly reached over 3,000 students.

- Because of the dry winter, national and international media contacts were much less than normal although local contacts remained about the same. For the first season in many years, we did not do any interviews for national or international television. We did interviews and/or were quoted by seven national publications including the New York Times, the Wall Street Journal and the Boston Herald Journal. We were interviewed 19 times by local television stations, seven times by local radio and nine times by local print media.

- The Utah Legislature voted for an additional $122,000 in one-time funding to the Utah Avalanche Center for next winter, which would come through the Utah Division of State Parks and Recreation. Unfortunately, State Parks also decided to cancel their usual $82,000 contribution to the Utah Avalanche Center for next winter, which comes from diminishing snowmobile registration fees. Instead, they want us to apply for the same money through the Recreation Trails Program grant program. Because the grant money is not guaranteed and it does not arrive until too late in the season we would not be able to use the funds for the 2007-08 season So combined with an estimated $40,000 shortfall from rising costs, it appears that we will have the same amount of money next season as this season.

Backcountry Observers Program

Once again, both paid and unpaid observers through out northern Utah helped keep us informed about avalanche activity, their thoughts on snow pack stability, and photos and snow profiles of recent avalanches. As we only have one to two people in the field each day, these extra eyes and brains out there are a tremendous help.

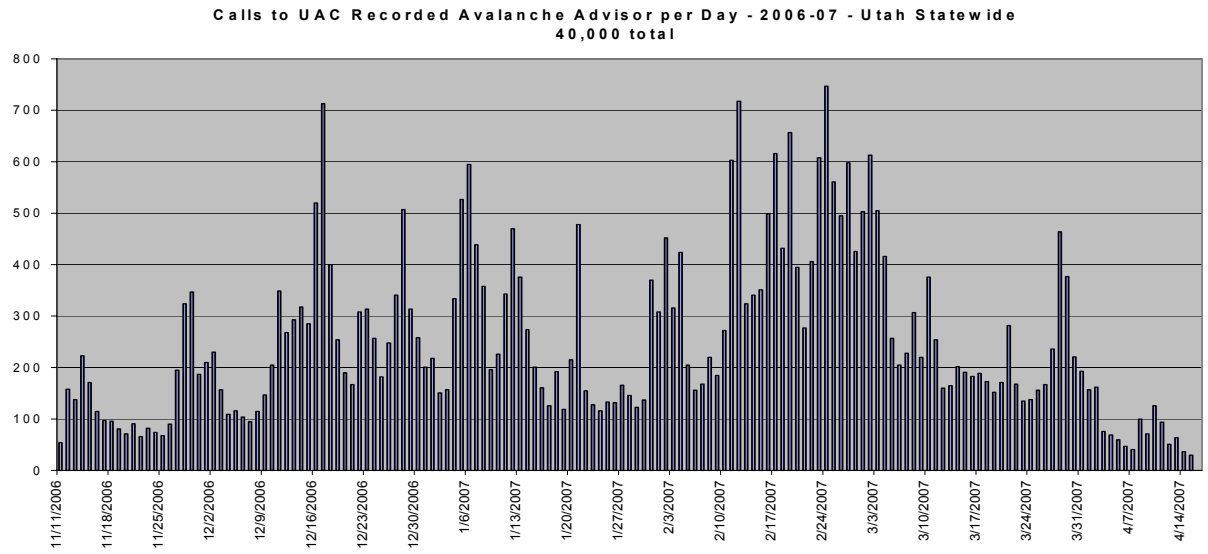
A big thanks goes to the unpaid and underpaid observers whose steady stream of information keeps our email and phone answering machines in-boxes full. Whether it's just once a season or on a weekly basis, every observation we receive is another piece in the snow stability puzzle we're trying to complete.

The excellent paid volunteer observer's program was started in the late 80's under Brad Meiklejohn, and continues to provide indispensable snowpack information to the staff forecasters. These people receive a very small token of thanks each time they make the effort after a long day in the backcountry to email or phone in an organized observation, often accompanied by photos and pit profiles. The extra effort made by these knowledgeable backcountry travelers and observers to email and phone in great observations makes a huge difference in the morning for us. There have been big changes in the last 15 years, including many more observers, an increased quality in observations and the use of the Internet to send information.

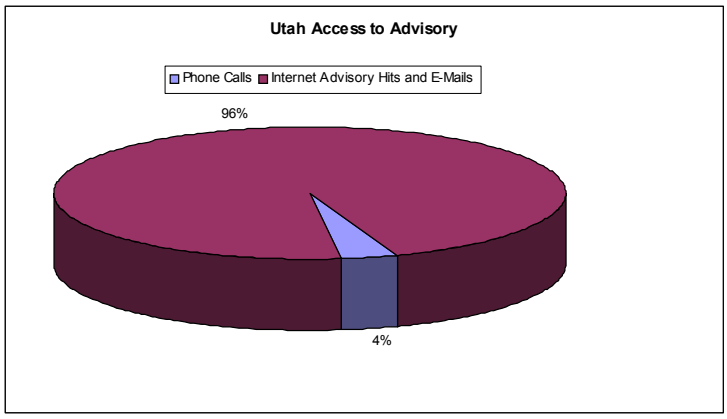
In addition, the Friends of the Utah Avalanche Center's observers program was again an incredible success. The program is made up of two parts, contract observer Bob Athey and the paid "volunteers". Starting in the early 1990's , Bob Athey was contracted by the Friends of the Utah Avalanche Center to do observations in the field and report his daily findings. He also is an instructor for the two avalanche education courses the Friends offer each year. Bob's detailed compilations of text, photos and snow profiles that document his observations are informative and accurate. Bob also has a very keen sense of the winter snowpack and years of backcountry travel experience that makes it possible to investigate avalanches in areas where many other avalanche workers would not be willing to visit. Bob's years of experience in the Wasatch are probably his biggest asset to the UAC. Through the years, Bob has become Utah's most recognizable denizen of the Wasatch backcountry with his long red hair and beard along with his colorful personality. He is otherwise known as the Wizard of the Wasatch.

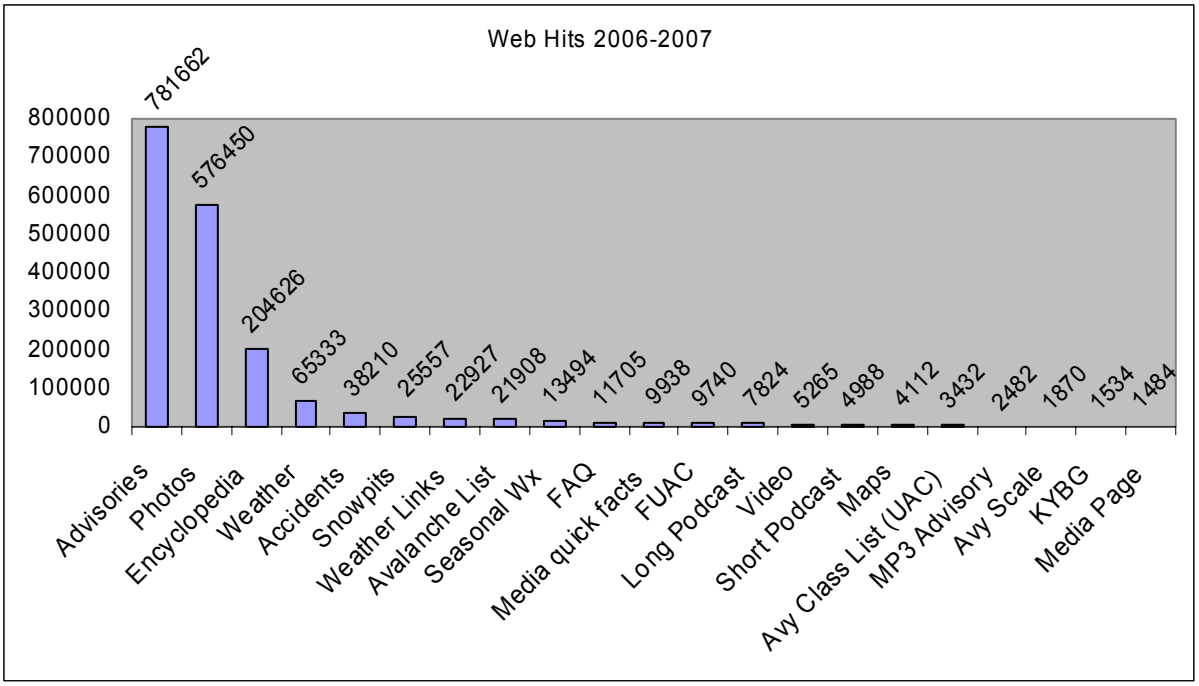
Next season, however, it appears that Bob Athey will no longer work as a full time observer. Because of funding issues and changing priorities, both the UAC staff and the board of the Friends of the UAC decided that limited funds would be better spent in other areas. Also, field work is the part of our job we enjoy the most, so it makes little sense to pay some else to do it. We would rather spend the money on computer programming and administrative help so we can spend more time in the field, which will improve the quality of our forecasts. This decision was not an easy one and it has been the subject of much debate over the past several years. This decision has nothing to do with the quality of Bob's fine work, but it just reflects changing priorities and changing times. There is no way we can properly thank Bob for his many years of hard work and the benefit of his hard-earned wisdom.

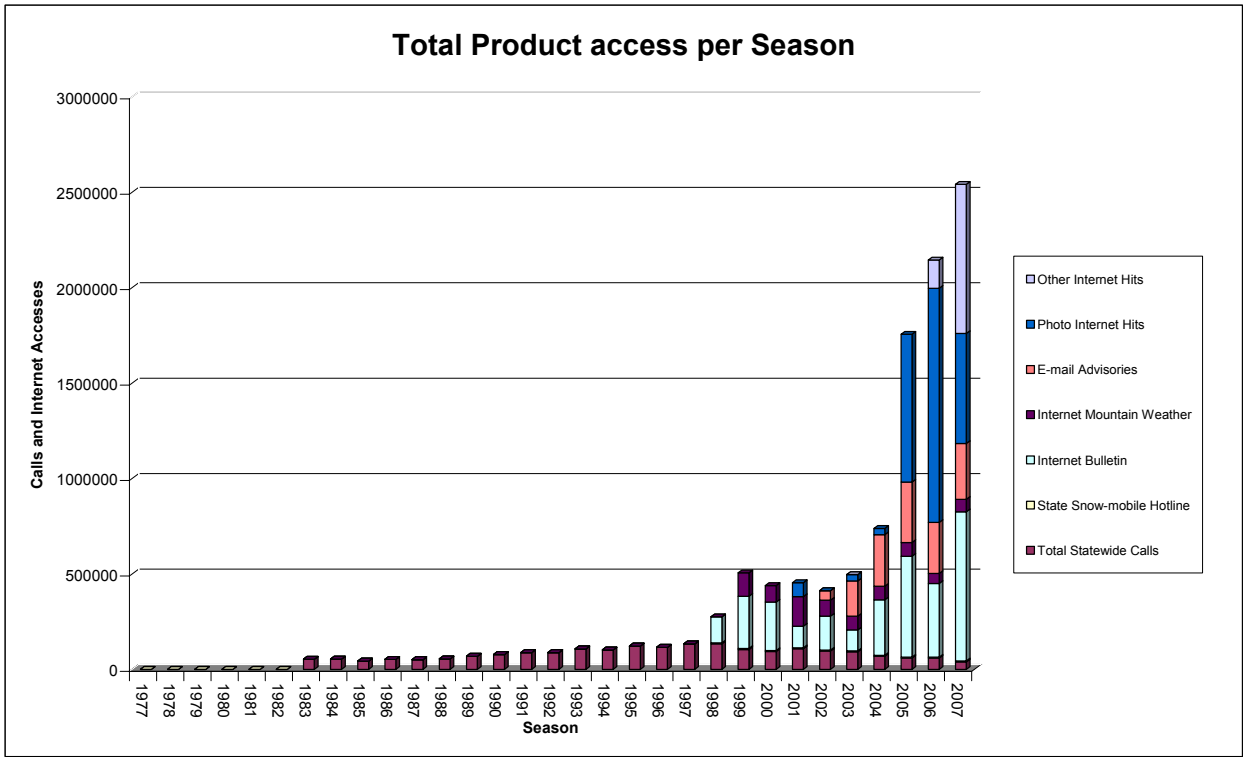
The experienced and active group of Ogden observers continued to keep information about the Ogden area mountain snowpack flowing into our office on an almost daily basis, and they also helped with accident site investigations. Their information is seasoned by many years of skiing and boarding in the Ogden area mountains, a true locals knowledge. We are still looking for growth in our observer



Only 4 percent of the people access the forecast via the telephone. Although it is a low number, we find that many people use the telephone on days they are going into the mountains so it is essential to continue this service.



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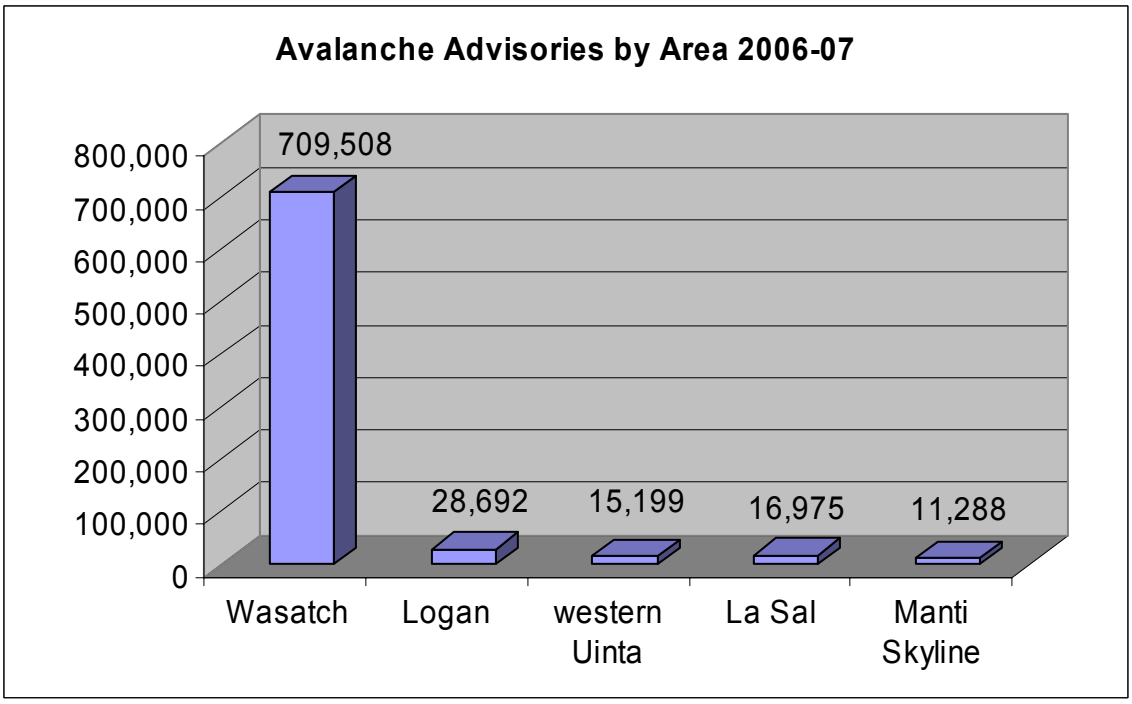
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15,199
16,975
11,288
Wasatch
Logan
western Uinta
La Sal
Manti Skyline

New for the 2006-2007 Season

The Utah Avalanche Center implemented many new items and procedures for the 2006-07 season to help provide more people with a wider range of avalanche information for all types of users. The staff began working on a tiered approach to providing the appropriate information to the appropriate users.

While much of our most visible work occurs during the winter, many behind the scenes projects happen when it's blistering hot and the last thing on anyone's mind is snow. The FSUAC applied for and received a Forest Service Centennial Grant for $30,000 allowing us to further our outreach efforts in an attempt to curb the recent tide of avalanche fatalities involving uninformed winter recreationists. Since nearly 90% of all avalanche fatalities in Utah involve backcountry users who either don't know our services exist or simply fail to get updated information, we felt the first thing to do is become more recognizable, branding ourselves and our product with a bold new logo.

NEW LOGO

The Friends of the Utah Avalanche Center updated their logo, which is used on the web page that hosts Utah Avalanche Center products, fundraising and outreach programs. Scott Aucutt, a local graphics designer, hammered out a number of different concepts, before the FUAC and the UAC staff agreed on a clean, visibly distinguishable logo. It proved to be a very popular bumper sticker and the smaller stickers now appear on many snowboards, skis and snowmobiles. It has been hard to keep them in stock, which is the sure sign of success.

NEW WEB DOMAIN AND TOLL FREE TELEPHONE HOTLINE

We felt we needed to make it easier for people to remember how to get our information, whether by Internet or phone line. Last year the Friends of the UAC purchased the domain name utahavalanchecenter.com. As for telephone lines, in the past we had a different telephone line for each local calling area in northern Utah, which was hard to publicize, and impossible to fit into a 10-second TV sound bite. We had always dreamed of having a toll-free number for all of Utah, but alas, it was the same old problem—too expensive. Luckily, longtime partner Backcountry.com stepped up to the plate offering us a toll free phone number, routed through their all-ready-existing phone system. After much debate, the avalanche center chose 1-888-999-4019 as the number. We debated between an easy-to-remember number and a cleaver acronym, but most of us from the non-text-messaging generation find it easier to dial numbers than letters. So the number was the easiest-to-remember number we could find that was available. It has been a huge hit and we want to thank Backcountry.com for their ongoing partnership and commitments, helping us save lives.

US CIVIL EMERGENCY WARNING SYSTEM

A new procedure this year was implemented by all of the avalanche centers across the United States officially becoming part of the US Civil Emergency Warning System. This gives avalanche centers the ability to issue Avalanche Watches and Warnings through the Warning system, helping us to reach a broader segment of the public in times of dangerous avalanche conditions. The UAC implements these procedures through the National Weather Service who generously provides a home to the Utah Avalanche Center in the Salt Lake Forecast Office.

PUBLIC SERVICE ANNOUNCEMENTS

"In the theaters alone, over a million people saw the PSA's. "

We use a tiered approach to avalanche information in which users can get basic, intermediate or advanced information depending on their needs. In the past, we have catered more to the intermediate and advanced users because most accidents came from those user groups. In more recent years, however, more and more beginner users have been getting killed in avalanches in obviously dangerous conditions in obviously dangerous places. Thus, with the Centennial Grant, we could finally reach out to the most vulnerable user- the uniformed backcountry enthusiast. We've always struggled to get our avalanche message to the masses and another prong of our outreach approach was an aggressive partnership with established media outlets. Beginning with local newspapers posting regional avalanche danger ratings, to TV stations who air the next days backcountry danger, we're reaching out to tens of thousands of viewers, but still there's always users who slip through the cracks. In an attempt to reach everyone, especially families where avalanche awareness could be passed along to every user group and generation, we produced two 30 second Public Service Announcements (PSA's) which aired in local Park City and Salt Lake theaters and on three TV stations in the Kamas, Park City and Salt Lake valleys. In the theaters alone, over a million people saw the PSA's. In addition, a popular motorized recreation show, "At Your Leisure", aired the clips during their Saturday morning show reaching another 450,000 viewers over six weeks. This season, thousands people viewed the trailers prior to blockbuster, big screen movies. The in-your-face PSA's where a huge hit and we hope to implement them state wide in the upcoming winter season.

Snowbird ski patrol installing a sign at the area boundary.

"ARE YOU BEEPING" SIGNS

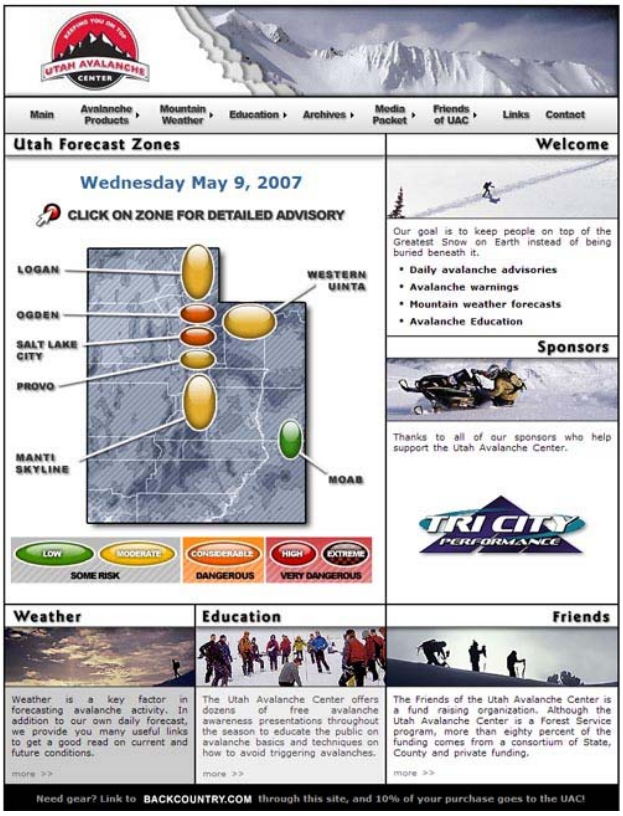
More and more riders are leaving ski area egress gates and venturing into the backcountry totally unprepared. These numbers continue to rise because the gear we ride has improved so much in the recent years. Wider skis and better boards and boots easily allow people to get into avalanche terrain, often with little or no avalanche training.

We had a meeting with various Forest Service personnel—both locally and regionally—to plan a strategy on how to address this problem. In addition, we met with various ski area managers. We agreed on the concept of an eye-catching, informational sign combined with an electronic device that would indicate whether the person passing the sign had a transmitting beacon. Craig Gordon, then took charge of the project. He initially teamed up with Jason Valez, who was a close family friend of Attilio Yazar, a well respected Chilean snowboarder who died in an avalanche last spring on Pioneer Ridge in upper Big Cottonwood Canyon. Jason had a donation from Attilio's family and they wanted to see the funds go to prevent needless avalanche accidents. This got the project rolling. Jared Fitch, a local graphic artist, donated his time to lay out a conceptual sign and a Forest Service grant along with monies from our great partners Wasatch Backcountry Rescue helped to facilitate the design and construction. European avalanche beacon manufacturer, Ortovox helped supply the avalanche detection system. As you walk by the sign the recognition unit will "beep" recognizing your avalanche beacon is on. By no means is this checking for range or strength, it's to serve as a reminder that your beacon is working. In addition to this interactive device, bulleted points are outlined—where to call for avalanche informa-

tion, reminders of the gear you need and the consequences of your actions. Finally, we've listed the "red flags" of snow instability to give people clues to look for when traveling in the backcountry.

Brighton Ski Resort was the first to take the lead in this cutting edge approach, but these signs were also installed at Snowbasin, The Canyons, Snowbird and the Town of Alta. We hope this revolutionary program will help folks make educated decisions when leaving the controlled environment of the ski areas, ultimately helping us accomplish our goal of keeping riders on top of the greatest snow on earth rather than buried beneath it.

The UAC brings all user groups from a variety of backgrounds together in a common goal to prevent avalanche accidents. Nowhere is this more pronounced than the efforts of long time snowmobile enthusiast and part-time inventor Bill Farley who helped design several solar powered units, which were installed at ski areas late this season. Bill's desire to save lives across the board no matter what we're riding show the diverse partnerships the UAC has fostered over the years and we want to thank him for his outstanding efforts. And special thanks to Craig Gordon who worked tirelessly on this project throughout the season in his "spare time" from his regular avalanche forecasting duties.



Internet Products

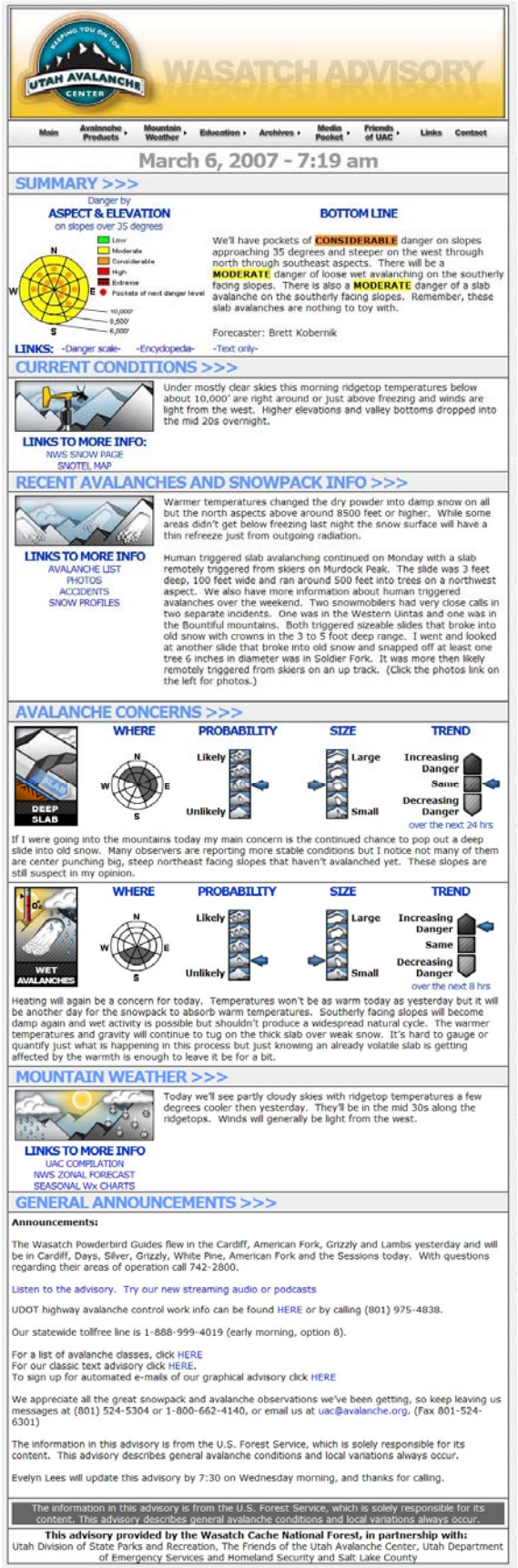
The internet is a powerful way to provide information to the public. It is the most comprehensive source for the public no matter what level avalanche experience they have. Brett Kobernik continued to refine his computer programming techniques during the season in learning languages such as Perl, PHP, HTML, and Java script, all which are used behind the scenes to produce the various internet products. Walt Haas was, and continues to be an important resource for computer programming as well.

Internet Homepage

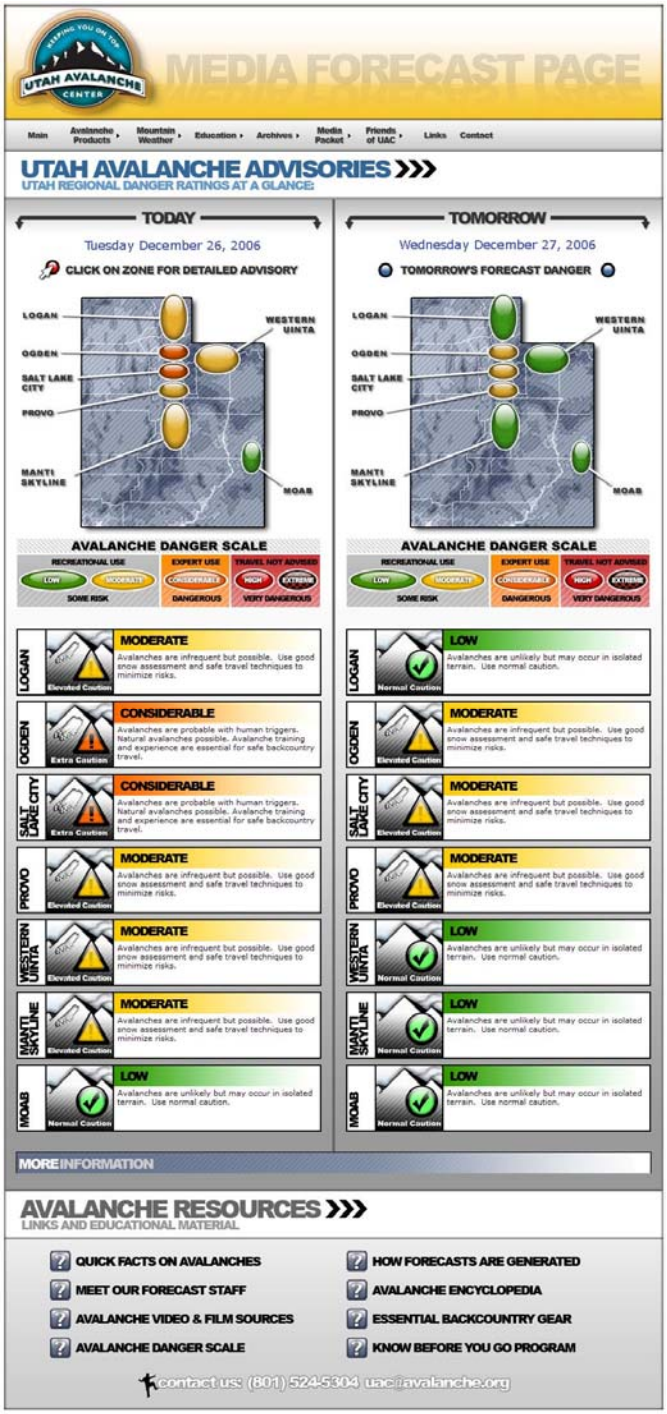
Improvements to the UAC internet products continued with the "tiered" approach. The Utah Avalanche Center homepage is the user's first peek at the UAC's information. Therefore, we felt that it should contain the most basic avalanche information which is danger ratings for individual mountain ranges within the state. The new homepage includes a map of the state with the danger ratings indicated by region. When users mouse over an area, a message pops up with basic information on that danger rating. This is what we call tier 1 information. When the users click on a certain area, they are then directed to the most recent avalanche advisory issued for that area. This begins tier 2 information.

Graphic Avalanche Advisory

In the 05-06 season, the UAC produced a graphic based avalanche advisory for the internet that replaced the plain text version. The advisory layout was produced by web designer and extreme-skier, Jim Conway, and the programming for the forecaster interface was written by Chris Lundy of the



The graphic based advisory (pictured left) in its refined format was popular with internet users. The Media Page (pictured below) was introduced in 07 to help print, radio and television media get accurate and up to date information on danger ratings, avalanche watches and warnings.



Sawtooth Avalanche Center. This was a big success with the public.

After using the new advisory for half of the 05-06 season the forecasters had a good feel on what changes should be implemented for the 06-07 season. Improvements included more links to other products, re-arranging the order of the information, and adding special headers that appear during avalanche Watches and Warnings as well as a heading for special announcements. Again, Jim Conway put his creative talent to work on updating the graphics and Brett Kobernik took over the back-end programming work. Toby Weed at the Logan branch was the next to start using the graphic advisory mid season. The advisory will be used in the Uintas as well as the LaSals and Manti Skyline areas in 07-08.

Media Page

For the past ten seasons, we estimate that 85 percent of the people killed in avalanches in Utah did not consult the avalanche advisory before heading out. In addition, most avalanche victims were killed on slopes where the avalanche danger was rated as Considerable or High. In other words, we have a problem with people who are largely uninformed about avalanches and who go out on obviously dangerous days. Unfortunately, this group takes a lot of effort to reach. We feel one of the best ways to get the word out is to use the media they already use, such as newspapers, radio and local television news.

The media has been our valuable partners in this endeavor, and this year provided excellent coverage of the changing avalanche conditions, avalanche warnings and watches, and timely stories that undoubtedly saved lives. A timely avalanche story on the evening news or in the morning paper often reaches more backcountry users than the daily forecast, and steers them toward finding more avalanche information before heading into the backcountry. We'd like to give huge thanks the local TV and print news media for their outstanding efforts in helping us.

We built upon the pilot program we started last year of providing an overall danger rating to the print media. This year we changed our daily emails to a media portal web page that each media source could bookmark and expanded the access to all media outlets, including TV and newspaper. Each forecast region independently updated the danger rating for their region, which they can do this any time of day or night. In this way, the page reflected the latest information. The overall danger ratings were colored coded onto two Utah maps, one for today and one for tomorrow. The today Utah map was mirrored on our home page. Many thanks to Walt Hass for all his hard work on this project, taking our ideas and turning them into reality with his top notch programming skills.

Podcasting

A hectic number of morning duties for the avalanche forecaster on duty each day forced another way of reaching more people through radio media. Live radio slots timed very close together doesn't leave much room for error so the UAC decided to record a 30 to 60 second long recording that any radio station could receive after around 7:30 am at their leisure and broadcast it when they wanted to. A

new internet technology known as "podcasting" proved the best choice for distributing this recording which is in an "MP3" format. This fits into the tiered approach as being tier 1information. After implementing the 30 second podcast it was very easy to produce a podcast of the normal daily avalanche advisory as well which is available from the UAC website.

Online Videos

The UAC started experimenting with short video clips located on the UAC website. The clips include examples of snow behavior, avalanches running, and instructional clips on stability testing techniques. These were received well by the public along with other avalanche workers from different states. The UAC feels this is an excellent way for people to learn and will no doubt continue to produce these in the future.

Craig Gordon unveils his Are You Beeping signs to ski patrollers at the annual Blasters Refresher at Snowbasin, an event attended by most ski patrollers in northern Utah. The signs generated much interest.

Thank you to everyone who contributed to make the Utah Avalanche Center possible.

The Forest Service Utah Avalanche Centers would not exist without support from a broad base of partners and the public. This brief thanks does not represent the value of what each of these entities contributes to our program. Many of these organization's long term commitments have lead to the stability of the Forest Service Utah Avalanche Forecast Center and allowed us to expand our forecast area and pursue innovative communication and education programs. So however small this thanks is, we would like to acknowledge the following people and organizations.

Utah Division of State Parks and Recreation almost single handedly funds three avalanche programs - the Western Uinta Mountains, Manti Skyline and the Logan area mountains – to the tune of $82,000/year. In addition, they generously support the Know Before You Go education program with the loan of a power point projector. Many thanks to Fred Hayes and his cohorts for their generous support.

The Friends of the Utah Avalanche Center keeps our engine running, filling in numerous gaps in our funding, from staffing to observers, education projects and equipment, often raising and spending over $50,000/year. They coordinate innumerable fund raisers and function as a 501c3, smoothing the way for potential partners to work with us. A very special thanks to the volunteer board for all their hours of work and to the miracle worker, President **Colleen Graham**.

Black Diamond Equipment, the company that started it all, both on a local level and as a model nation-wide for company partnership with avalanche forecast centers. It's not just the $30,000 they raise each year at the fall fundraiser, the hundreds of hours of staff time, or the hosting of the annual fund raising party, but also the way they bring the outdoor community together.

Utah Department of Public Safety, one of our oldest dependable partners, who contributes generous $25,000/year.

Salt Lake County for their generous long term support of $25,000/year.

The Byrne Family for their annual financial donation to the Friends of the Utah Avalanche Center.

The Jim Shea Family Foundation. Jim Shea generously sponsored a fundraiser at the Canyons Resort for the Know Before You Go program this season, which raised around $8,000. He also helped to sponsor the Avalanche Awareness Ride in the Uinta Mountains, which raised around $5,000.

National Weather Service for their generous and long term in-kind support of office space and office supplies, not to mention the unlimited access to personalized mountain weather forecasts.

Snowbird Ski and Summer Resort for hosting the wildly successful Know Before You Go fundraiser with The Friends, raising about $15,000, and for hosting Backcountry Avalanche Awareness week.

Backcountry.com donated $5000, some of the original seed money to start the Know Before You Go program, plus annual donations of a portion of their sales. In addition, they generously provided a toll-free, statewide avalanche hotline number, which was used by 40,000 callers this season.

The Utah Snowmobile Association partnered with the **International Snowmobile Association** for a $4000 grant for the Know Before You Go Program and donated $1000 toward the Windy Peak weather station.

REI provided space for the Friends annual ski swap, rooms for avalanche awareness talk.

Uinta Brewing Company for a donation of $1200.

Wasatch Backcountry Rescue donated a power point projector and a laptop and $2,000 to the Know Before You Go project. They also installed several Rescue Training Centers with help from **Red Pine Rescue** at **Snowbird, The Canyons, Solitude and Snowbasin.**

Backcountry Access donated a complete Beacon Basin, an avalanche beacon training center that was installed at a snowmobile trailhead in the Uinta Mountains. Each year they also loan us avalanche safety equipment for teaching and demonstrations.

Although we moved to a toll-free, statewide avalanche hotline this season, thanks to the entities that provided the phone lines before the transition this fall: the Outdoor Recreation Departments at: **University of Utah, Brigham Young University, Weber State University, and Park City Ski Area**.

Deer Valley, Brighton, **The Canyons and Ski Utah** who each donated $1000 to the Know Before You Go avalanche education program.

Utah State University for use of their phone lines and for observers/ forecasters salary.

And of course, the long list of our **individual supporters** who support the Friends of the UAC with their annual financial donations and their volunteer time, we couldn't do it without you.

Olympian, Jim Shea of the Jim Shea Foundation speaks at a fundraiser at the Canyons Resort he sponsored for the Know Before You Go avalanche education program.

"Know Before You Go" Avalanche Education Program

"This year we gave 119 talks reaching out to 22,450 young adults. In the past three seasons, Know Before You Go has been seen by over 50,000 teens and not one person attending these talks has been killed in an avalanche."

Unlike a scene from a second rate sci-fi thriller or a James Bond movie, avalanches don't strike without warning. As a matter of fact, plenty of clues to unstable snow usually present themselves and most avalanche accidents are preventable. That's the good news. The bad news is these clues are often ignored due to lack of basic avalanche awareness skills. Now you don't need to be a snow scientist to enjoy the mountains during the winter and most recreationists either don't have time or aren't interested in becoming a snow geek. That's ok because in many cases just a little bit of avalanche knowledge can help people make life saving decisions. With this in mind, basic avalanche education is perhaps the biggest single component in keeping winter backcountry users alive.

History

The Know Before You Go avalanche awareness program was inspired by a tragic avalanche accident, killing three teenagers in Utah. It's the day after Christmas 2003 and the largest storm to hit Salt Lake City in nearly 30 years has been slamming the state for two days with about 18" of snow falling in the city itself. In the nearby Wasatch Mountains, it's raging. Winds are strong and out of the southwest at speeds of 25-40 mph, gusting to 60 and 70 mph along the exposed ridgelines. Since the 25th, 28" of heavy snow has fallen. The Provo area mountains, 30 miles southeast of Salt Lake, have received 22" of dense, wet snow. By all accounts it's an epic storm and cities along with outlying rural areas are crippled. Throughout northern Utah trees are snapped, power lines down, and roads are barely passable. Most ski resorts struggle to keep their areas open, battling strong winds, blinding snow and occasional power outages.

A small local ski resort near Provo Utah is busy with young riders enjoying their Christmas break; however, the resort closes early because so many factors are working against it. As a result, a number of snowboarders and skiers, in separate parties, decide to drive up the road to a popular trailhead for some powder riding. They come to the end of the road, and start ascending a popular hiking trail, Aspen Grove. Arriving at different times, but still within about a half an hour of each other, three groups find the visibility poor and decide to charge up the closest slope, a large north facing avalanche path, Elk Point. The slope rises to an elevation over 10,800' with a base elevation at Aspen Grove of 6700', affording a vertical drop of 4100'. No one is wearing avalanche rescue gear and communication among the groups, in total 14 people, is almost non-existent as they all head up the slope. The group never got to their destination. A series of four large natural avalanches are triggered from above and pandemonium ensues. At the end of the day, three young men were buried and killed, and the last body wasn't recovered until April 8, nearly three months after the slide was triggered. Covered extensively by both local and national news, the event kept avalanche awareness in the spotlight for an unusually long time. The tight knit, family-oriented community is devastated.

Unfortunately, the story is one we've heard before. While the characters change each time, the theme remains the same and the outcome is tragic for the victim's family and friends alike. The bottom line in so many cases is frustratingly apparent—technology far outpaces even basic avalanche awareness skills. In addition to high-tech gear, which riders quickly master and then look beyond the ski area boundary for "freshies", today's riders are also inundated with high-octane action sports videos, which can often give an unrealistic impression to the complexity of snow and avalanche safety. Throw in an unstable snowpack, some youth, a dose of testosterone, and mix well with a little lack of situational awareness

and you have a potentially lethal combination.

Just two seasons prior to the Aspen grove slide, Craig investigated a deadly avalanche in upper Big Cottonwood Canyon, approx 18 mi southeast of Salt Lake City. A group of ten young snowboarders, mostly in their mid to late teens triggered a large avalanche, killing two males in the party. Much like the Aspen Grove slide in 2003, other than a few shovels used mainly to build backcountry kickers, no one had avalanche rescue gear or even rudimentary avalanche skills.

The two events convinced Craig a teen-specific basic avalanche awareness program must be created. He thought if we could get this younger crowd thinking about avalanches, calling the hotline and wearing avalanche safety gear, lives would be saved. In the long run, a generation of riders would be educated on what to do before traveling in the backcountry.

In January 2004, Craig proposed the idea to Bruce Tremper, the director of the Forest Service Utah Avalanche Center (UAC). He expressed the need to develop a program specific to young adults in the state of Utah. This course would be unique, going right to the source—junior highs, high schools, and colleges—preaching the avalanche gospel to the masses. The program would be a massive undertaking, because as with most federal agencies the UAC gets by on minimal funding and personnel.

Bruce and Craig worked on a business plan and decided early on, the program would last for about an hour. To keep teens' attention it needed to be fast paced and energetic. The presentation would be given in three parts. An avalanche professional would go to a school assembly and start with a 15-minute, narrated video that would show avalanches, people triggering avalanches, and the destructive power of avalanches. Next, they would tell a dynamic story about a close call they had and what they have learned over the years. The presenter would follow this up with a 15-minute PowerPoint presentation about avalanche basics. A question and answer session would wrap up the assembly. We wanted to create a successful program, administered by the Friends of the UAC, which could be shared with all snow professionals and regional avalanche centers across the United States.

Rescuers search for survivors of the Aspen Grove avalanche. This tragedy was the impetus for the Know Before You Go program development.
Bruce Tremper photo

Partnerships and Funding
Past and present and future

The "Know Before You Go" program was established in the summer of 2004 and funded solely by donations and in-kind support. The majority of the annual operating budget is generated from a fundraising dinner held at a local ski resort in February. However, like any new product to hit the market, financial support hasn't been all that cut and dry.

While preliminary funding from the Friends of the UAC got the project off the ground, it took visionary partners who trusted us to come on board and partner with this innovative program. Fortunately, Backcountry.com saw the need and planted the first seed monies, getting the venture through its initial stages. They trusted the reputation of the UAC and thought we had the expertise to give this program the attention to detail it deserved. Little by little, donations started to come in as people began to hear about this exciting new program. R.E.I. who has been a partner with the UAC for many years, were next to come on board with another generous donation.
Also, over the years, Craig developed great working relationships with the Utah Snowmobile Association (USA) and wanted to get them involved. Bridging the gap between motorized and non-motorized users, the USA stepped up to the plate and applied for an education grant from the International Snowmobile Manufacturers Association (ISMA). This organization represents the four major snowmobile manufacturers and has two grant cycles each year, in which they grant monies for certain projects, usually education or safety related. This was the first avalanche project of its kind to ever receive grant

monies from this organization. This unto itself was a major breakthrough for the program because it showed the strong commitment the snowmobile community has to avalanche safety and the well developed partnership the FSUAC has with the USA.

In the fall of 2004, the Division of Utah State Parks and Recreation came on board as a partner and donated more money than all the other partners combined! The productive, fruitful relationship with State Parks and particularly Fred Hayes, the OHV coordinator, goes back several years. This significant donation was vital to the longevity of the program and all the hard work that went into it.

A few new ski industry partners came to our rescue in the summer of 2005. First was Brighton Ski Resort, a long time partner of the FSUAC in avalanche education. While previous in-kind support included lift tickets and parking for the Friends three day Level One avalanche awareness courses, last year Area Manager Randy Doyle offered to help the program out financially. In addition, Brighton's proactive approach to avalanche education with their employees is a benefit to anyone working there. For the past three years, Brighton invited Craig to provide an avalanche presentation to its employees. There's a twofold benefit to everyone attending. Not only do attendees take with them life saving skills, at the end of the talk they're also rewarded with a free day pass at the resort. Positive incentives like this help us to further spread the avalanche message and pack the house with several hundred employees each year.

Ski areas are an important partner in the avalanche equation and we're excited to see the additional financial support from Deer Valley, The Canyons and Ski Utah. Bob Wheaton, Scott Pierpont and Nathan Rafferty respectively, were instrumental in getting their organizations to donate monies and we look forward to their continued partnership.

Craig also applied for a grant through the Park City Chamber of Commerce which helped to supplement a number of Summit County talks and defray video re-editing costs. In addition, Kennnecott Copper donated funds to help with avalanche presentations on the west side of the Salt Lake valley.

Finally, in-kind donations from Wasatch Backcountry Rescue (WBR) facilitated the program on the road. WBR contributed a PowerPoint projector in 2004 and purchased a laptop computer for the 2005 season.
This winter during a WBR training class where dog teams throughout the country attended, Dean Cardinale presented Craig with a $2000.00 donation. Over the summer we hope to create an all inclusive AV package presenters can grab and go. Support from valued partners like WBR help to make this program a success.

Program Development

Prior to its phenomenally successful first year, Know Before You Go was a tough sell. Craig worked

diligently to open the door of the school system and it wasn't always an easy task. After all, we were up against some stiff competition. The only programs welcomed by the Utah schools on a massive scale before were those that taught drug, alcohol and tobacco avoidance. This was a different type of program. However, once on the road, the programs dynamic message along with a very active avalanche year of 2004-05, propelled the program into the Utah schools spotlight.

With a seasons worth of presentations under our belts, we regrouped; saw what worked and what didn't and made the necessary tweaks to the original PowerPoint presentation. In addition, the original video was re-edited over the summer of '05, adding a few more interviews and new avalanche footage. With additional funding, we hope to update both the PowerPoint presentation and video this summer to keep the message fresh and up-to-date.

New Partnerships

Late last spring a new partnership was formed with the Jim Shea Foundation. Jim, an Olympic gold medal athlete and Park City resident, wanted to get involved in avalanche education. His foundation, mainly aimed at youth programs, contacted Craig, wanting to partner with the Friends and Know Before You Go**.**

We thought this was a great opportunity to add the notoriety of an Olympic athlete to an already popular program, helping us reach out to even more young adults. Craig worked with the foundation, teaming up with Jim for his third annual Shea Foundation Golf Tournament held at the Park Meadows Golf Club in Park City. Brighton, Deer Valley and Ski Utah, partners with the Friends for years, helped to sponsor the 17th hole.

Jim Shea and his Family Foundation are the newest partners helping the Friends and Know Before You Go. Anita Gordon photo.

Nuts and Bolts

Personnel, presentations and scheduling

The first year objective of Know Before You Go was to reach out to 5,000 students. Word got out about the program and we easily doubled our intended goal, speaking to over 12,000 students. Like a rock star with a hit album wondering if they could be as successful the second time around, we set our 05-06 season sights on just trying to tie the watermark set the year before. By seasons end we were able to eclipse last year's wildly successful start by giving 110 presentations, reaching out to just over 18,500 students. This year we gave 119 talks reaching out to 22,450 young adults. In the past three seasons, Know Before You Go has been seen by over 50,000 teens and not one person attending these talks has been killed in an avalanche.

The program is well represented with snow professionals from Ogden to Payson to Park City to Salt Lake City. Up north, ski patrol personnel from Snow Basin included Doug Wewer, JR Fletcher and Aleph Johnston-Bloom. In the Salt Lake area Dean Cardinale, Mike Morris, and Ralph Whatley from Snowbird as well as Gabe Garcia and Dave Richards from Alta helped to cover a bulk of the talks. Darce Trotter who worked as snow safety and ski patrol director at Sundance for nearly two decades provided immeasurable assistance by covering talks in the Heber Valley, Park City and Provo areas. Finally, in Park City, a natural choice was to have Jake Hutchinson help us out. He's the snow safety and ski patrol director for The Canyons. Jakes local expertise was utilized in Summit and Salt Lake Counties. This dynamic team of dedicated snow professionals deserves a tremendous amount of credit. It was their hard work and commitment to avalanche education that makes the program so successful.

Craig answers a question at Westminster College, demonstrating how a slab avalanche works during the question and answer session with his last slide on the screen. Liz Rogers photo.

Jake Hutchinson, seen here in the middle of the group, takes a moment to smile for the camera while teaching a group of advanced users how to practice with their avalanche beacons. Craig Gordon photo.

Backcountry Awareness Week/February Fundraiser:

Roger Kerr, the mastermind behind Backcountry Awareness Week, is Snowbird Expeditions program director and originally proposed the idea to the Governor's office four years ago. The Governor agreed that the last week of January should be dedicated to raising the level of avalanche awareness statewide. The week kicks off with Utah's Governor signing an avalanche awareness proclamation, followed by a media blitz during the week, which includes interviews with snow professionals. It all wraps up with an evening fundraiser and weekend avalanche classes given by forecasters with the UAC. Colleen Graham, the Friends president, teamed up with Roger and their hard work and dedication to avalanche awareness brings a diverse group of users together for a very special, one-night event. The proceeds go directly to the program's operation and expansion budget. This year Scott Pierpont and the Canyons Resort were gracious enough to host both the fundraiser and weekend classes and we want to thank them for being such a devoted partner. In addition, Olympic Gold Medal winner Jim Shea was the key note speaker.

Utah's Governor Jon Huntsman and Craig Gordon pictured here at the proclamation signing. *State of Utah photo.*

Future Direction

We would like to see the "Know Before You Go" program become a mainstay in the Utah school system. On the heels of another successful season, we expect we'll be busier next year as even more schools have expressed interest in the program. Also, working in conjunction with the Utah Board of Education, Craig will develop a curriculum for the program so it can pilot as a state-wide, 8th grade physical education elective for the 2007-08 school year. This would be the first of its kind in the nation and could act as a successful model for other mountain communities to follow. The future for Know Before You go looks bright and the message is well received.

Craig was invited to Cedar City this fall to present the program to physical education and health specialists from all over the state. Nearly 100 educators attended the conference and many schools welcomed the presentation to their schools last winter. Anita Gordon photo.

Presentation reviews

Craig Gordon
Utah Avalanche Center
2242 West North Temple
Salt Lake City, Utah 84116

May 9, 2007

Dear Craig,

I wanted to thank you for presenting the "Know Before You Go" program to the Winter at Westminster students. Your enthusiasm and knowledge truly inspired the group, and many students furthered their avalanche education because of your introduction. In fact, at the end of the semester, every stu-

dent ranked your presentation at the top of the activity list and highly recommended it for next year's program. I look forward to having you present for us again next January!

Sincerely,

Liz Rogers
Outdoor Recreation Coordinator
Westminster College

I appreciate the opportunity to have worked with Craig Gordon. This was an incredible experience for our students and staff. Living in Morgan and our students having access to many snowmobiling areas this was an exceptional assembly and on of great importance. I heard many positive comments about the assembly from students and from staff members. It was great to be able to have an educational assembly that was also entertaining. This was a great learning experience for our students and would recommend we participate in this assembly in the future.

Thank You
Wade Murdock
Morgan High School

Hi Craig,

The presentation was absolutely wonderful. Our youth were very well instructed, and the message took on as especially poignant meaning. One of our young women excused herself, as the presentation hit very close to home for her. Two years ago her uncle was killed in a back country avalanche. When teaching youth, as every parent knows, they don't always learn the lesson from being "told." The presentation was perfect, followed up by this young woman's testimony of its relevance, made an indelible impression on our young men and young women.

Thank you very much.

Best wishes,
Dave Ellis

Thank you for the presentation. All of the feedback I heard was excellent. It went well and held both the youth and the adults attention.

The effectiveness of the presentation was probably increased by all of the avalanche activity in the news during the following couple of weeks.

I did hear that several of the young men had seen the presentation at school, so it appears the message is getting out.
Great program! Let me know how we can help you continue to get the word out.

Jim Child

Craig –
Park City High School has been extremely fortunate to have the "Know Before You Go" avalanche awareness program at our school for the past three years.
Over 1500 students have participated in this program and have been presented with information and knowledge that is critical in this ski town. We have students on the resort, mountains and back country every day, in every kind of conditions. With this number of ski days it is obvious that this program has helped our students avoid avalanches which are so prevalent in Utah's mountains. We plan on having this program for every sophomore in school and every student in out "Adventure Activities" class. The staff looks forward to the presentations every year knowing that it will help some student avoid
dangerous, life threatening situations. Thanks to Craig and his group. BobBurns - PE Department Chair - Park City High School.

Very special thanks go out to the following supporters:

- **Backcountry.com**
- **The Friends of the Utah Avalanche Center**
- **R.E.I.**
- **The Utah Snowmobile Association**
- **The International Snowmobile Manufacturers Association**
- **Utah State Parks and Recreation**
- **Wasatch Backcountry Rescue**

- **Snowbird Ski and Summer Resort**
- **Dirk Collins- Teton Gravity Research**
- **Steve Kroschel- Kroschel Films**
- **Steve Winter- Matchstick Productions**
- **Richard Cheski- Mindset Media**
- **Jim Phelan- Big Sky X / Thunderstruck Films**
- **Greg Painter-Mountain Mod Mania**
- **David Craig- David Craig Films**
- **KTVX and KSTU News**
- **Tahoe Films**
- **Ben Dejong**
- **Canadian Mountain Holidays**
- **Andy Jacobsen**
- **Brighton Ski Resort**
- **Deer Valley Ski Resort**
- **Snowbird Ski and Summer Resort**
- **The Canyons Ski Resort**
- **Ski Utah**
- **Park City Chamber of Commerce**
- **Kennecott Utah Copper Corporation**
- **Jim Shea Foundation**

Wasatch Season Summary

By Drew Hardesty

If the winters of 04/05 and 05/06 were years to remember, the winter of 06/07 was one to forget. The weather pattern of a nearly continuously splitting jet stream and resulting cut-off Low pressure systems produced a thin, continental snowpack with lingering basal and mid-pack instabilities. We limped into the May 1st finish line with just 356" at the Alta Guard station—well under the average of 500 inches. Historical records for snow stations across the state sadly pointed out that this was one of the top four leanest years on record, along with '76/'77 and '00/'01. Instead of 'skiing and riding the radical lines with impunity' like the last two years, folks would be looking over one shoulder most of the way down the slope. Even some of the cagiest backcountry folks and avalanche professionals experienced close calls with what we describe as a 'persistent' slab problem, that is, a weak layer of surface hoar or faceted snow that remains reactive for quite some time. By our count, which is far from exhaustive as not all incidents are reported, there were 88 unintentionally triggered avalanches, of which 32 were caught, 29 carried with 14 full or partial burials. Of these unintentionally triggered slides, 33 were remotely triggered, that is, triggered at a distance rather than at the individual's boards, snowshoes, or snowmachine. Three people died in separate incidents on February 17th and 18th, with another fatality on the 21st. Four is our ten year running average. The breakdown demographic was two snowmobilers, an out of bounds skier, and a backcountry skier. All male.

October and November

A juicy storm track in late October that produced torrential rains, flash flooding, and dramatic erosion in the canyon country produced a moderate early blanket of snow in the Wasatch. High pressure returning for the end of the month and the first week of November significantly weakened the early season snows, setting us up for a few early season incidents in upper Little Cottonwood Canyon. The second week of November, one skier in the yet unopened Alta terrain was completely buried with only a hand sticking out of the snow. A few days later, an experienced group remotely triggered a very large slab avalanche in north facing Silver Fork, partially burying two and completely burying one of its party. Heroically, one member extricated himself to perform a beacon search and live recovery of the other completely buried victim. A few artificial respirations brought color back to the victim's face, who soon skied out on his own. A 30" storm of 7% density brought the yearly total to 92" and it looked like we might be off and running for another banner year. Had we only known.

Pictured is Jason West who joined Brett & Bruce from the UAC during the accident investigation. Jason was a victim as well as one of the rescuers

December

A dry spell for the first 10 days of December fostered the growth of near surface faceted grains and

many thinner snowpack areas became altogether unsupportable, rotting from both the ground up and the top down. 40" of snow fell from the 10th to the 17th, with just as many slides in the backcountry running on newly buried faceted snow and surface hoar as on intra storm failure planes. As the new slab stiffened, collapse failure and remotely triggered slides pulled out with more regularity on the shady aspects at the mid and upper elevations.

January

January snow totals came in at 35"/1.52". A wind event on the 6th produced widespread natural activity, but otherwise, the stagnant snow continued to weaken, awaiting the next storm cycle that never came.

An unusual stretch of dry weather prompted the UAC staff to use humor to retain the public's attention. The goal was to make people aware of the unusually weak snow that the dry spell was producing.. This picture was the 4th most viewed of all the photos from 06-07

February

February began dry, but with stronger winds, resulting in a close call on the Pfeifferhorn, where two snowshoers triggered a shallow drift near the summit of the peak, and ragdolled down the south side over some cliffbands. One man was severely injured and remained hospitalized for some time with a head injury. It was only a portent for one of the deadliest months in Utah history. Snowfall began on the 10th producing a widespread natural cycle from Logan to Provo. While issuing an avalanche warning, the forecaster on the 11th wrote "the sheer amount of water weight in the last 12 hours, the at-times snowfall rates of 2-3" of snow/hour and the expectation of another half inch to inch of water weight will easily snap the rubberband of our hapless snowpack. The new snow is falling on a variety of old snow surfaces, but will be enough to step down into some of the weakest sugary faceted snow we've seen in years." It was the proverbial cast iron skillet on the house of cards. Snowfall lasted

Once the weak layer that formed in January was covered up with 2-3 feet of snow,, which created obviously-dangerous conditions.

through the 16th when the 17th, a Saturday, dawned cold and clear. The natural cycle was over, but many of the other slopes were hanging in the balance, waiting for a trigger. Over the next five days, four men died in avalanches, with another Utahn dying in an avalanche in the Snake River range in Idaho. The danger never dropped below Considerable through the end of the month.

February was a very dangerous month. This is a photo of a skier triggered avalanche on Cardiac Ridge. The skier was caught and carried about 1000 feet and received only minor injuries.

March

Another 20" and strong northwesterly winds continued where February left off, and another natural cycle was on the way. The floodgates soon closed with few, if any, anticipating the heat wave and subsequent wet shedding of the snowpack on all but the high, shady slopes. By midmonth, daytime highs at 8000' routinely hit into the mid to upper 50's and 60's, with overnight refreezes few and far between. Water percolating through the weak, layered snowpack produced many natural wet sluffs and slabs, with some pulling out up to 3-6' deep and 500 yards wide. Temperatures started to cool around the end of the month with snow and water totals coming in at 48"/3.61". For many, this dry March was the iron stake in the average backcountry enthusiast's heart.

April

With April 2nd being the last daily advisory, it was the earliest we had closed shop in years. Totals for the month were around 50" of snow.

A warm stretch of weather in March again re-activated the weakness formed earlier in the year. This is a 180 degree panoramic image of a large avalanche on Gobblers Knob. The starting zone is in the very upper left corner of the photo. The wet debris gouged a long-running trough for a long distance into the flats.

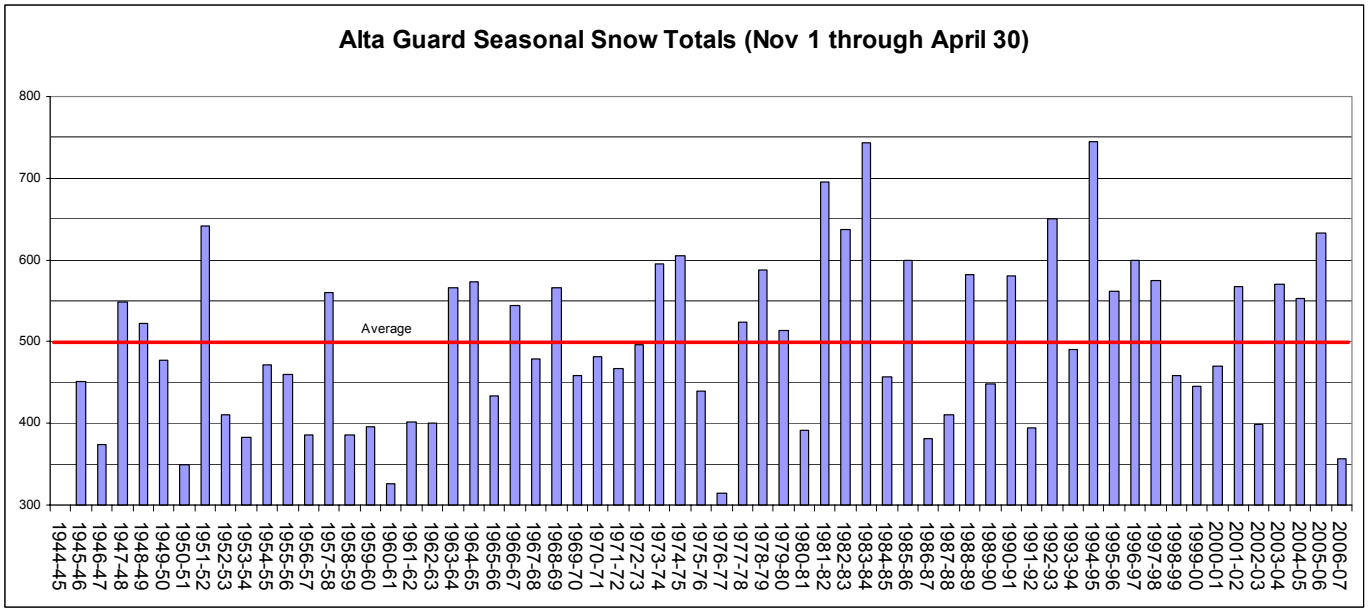
The combination of an unusually weak layer and the rapid warm up in March kept the ski resort snow safety workers busy. These conditions produced many large avalanches in skier compacted terrain which doesn't happen all that often. This one occurred at Park City with explosive control work around noon.

Snowfall at Alta Guard 1945- Present

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

Snowfall at Alta Guard 1945- Present

Season	Year ending	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Total
1989-90	1990	76.0	49.0	107.5	100.5	84.0	31.0	448.0
1990-91	1991	109.5	91.0	82.8	49.7	110.9	**136.3**	580.2
1991-92	1992	133.4	57.2	41.8	85	50.1	27.5	395.0
1992-93	1993	118.8	119.2	165.3	102.9	63.0	81.2	650.4
1993-94	1994	40.7	64.85	122.7	134.05	47.2	80.8	490.3
1994-95	1995	**205.9**	73.8	**199.7**	56.3	128.9	80.7	**745.4**
1995-96	1996	57	53	187	104	82	79	562
1996-97	1997	78.3	164.8	141.5	91	53.8	69.7	599.1
1997-98	1998	46.3	81.8	128.9	**156.6**	92.3	69	574.9
1998-99	1999	76.5	43.1	105.3	98	46.5	89	458.4
1999-00	2000	30.0	97.0	100.0	119.5	84.0	15.5	446.0
2000-01	2001	88.0	71.0	66.2	79.5	53.0	112.0	469.7
2001-02	2002	137	86.1	100.9	53.4	142.2	48.1	567.7
2002-03	2003	42	78.7	26	84.1	93.8	74.8	399.4
2003-04	2004	110	151	74.3	130	62	43.5	570.8
2004-05	2005	62.7	86.4	113.5	77.9	153.6	59.5	553.6
2005-06	2006	81	132	148	61.5	135	76	633.5
2006-07	2007	63	51.5	38.5	107	63.5	32.5	356
Average		**73.0**	**92.7**	**95.3**	**83.4**	**91.4**	**66.0**	**502.2**
Maximum		**205.9**	**244.5**	**199.7**	**156.6**	**183**	**136.3**	**745.4**
Year of Max		**94**	**83**	**95**	**97**	**64**	**91**	**95**



Western Uinta Season Summary

A large hard slab avalanche, near Thousand Peaks Ranch, buckles under the influence of a well placed explosive. John Marshall photo.

Program history:

The western Uinta avalanche-forecasting program in its fourth season is made possible through a generous grant provided by Utah State Parks and Recreation. Craig Gordon, the forecaster for this region issues three avalanche advisories per week plus an update on holidays for nearly one million square acres of terrain. Craig jokingly calls it "the postage stamp" and the immense amount of terrain stretches from Daniels Summit near the town of Heber, Utah to Bear River, near Evanston, Wyoming.

The western Uinta Mountains, located east of Park City are a unique range, running east to west they harbor the highest peaks in the state, with many over 13,000 feet. Approaches are long and arduous and access to the high terrain is a Herculean event for non-motorized users, so the bulk of traffic in this region is mostly snowmobilers. From what we can tell, at least 60,000 snowmobilers recreate in these mountains each season.

The Uinta's are a challenging range to forecast for. First off, the continental snowpack is unlike any other range in the state. Shallow snow depths, cold temperatures and strong ridge top winds conspire

to make the Uinta pack similar to our Colorado neighbors. Secondly, snow and avalanche observations from users are infrequent. As a matter of fact, we usually don't hear about avalanches unless someone triggers an unusually big slide or if there's a close call or fatality.

Advisories are issued Wednesday, Saturday, Sunday and all holidays. These products are available via the internet or two toll free phone lines- one provided by Utah State Parks, the other new addition by Backcountry.Com. While there's no way to track call counts, the internet hits nearly double each season and this year the site received 15,200 hits. Sixty-eight avalanche and mountain weather advisories were issued from November to early April.

While it often feels like a one-man-band, Craig couldn't do all of this work plus a grueling avalanche education schedule without the help of some very vital partners. Both the Kamas and Evanston Ranger Districts have supported the program by supplying him with field partners, snowmobiles, vehicles and support staff. On the Kamas side of the range former forecaster and ski patrolman Dave Ream, assists Craig in the field. In Evanston, district ranger Steve Ryberg, Rick Schuler and Ted Scroggin help pick up the slack on the North Slope. Ted is a talented person and a huge asset to the program. His outstanding snow and avalanche observations not only help Craig more effectively cover terrain he can't always analyze himself, Ted also interacts with riders at trailheads and is now taking on a larger role with avalanche education in the Evanston area. Ted is an integral part of this program and we hope to utilize his skills even more in the future.

Finally, Bill Nicholson and the staff from the Park City Powder Cats were very helpful by providing snowpack and avalanche observations. In addition, the Powder Cats were instrumental in helping to install and maintain the Windy Peak weather station. They also help Craig by offering him snowcat access to remote terrain.

Season Highlights

Weather instrumentation:

We analyzed two seasons worth of wind data from the Moffit Peak weather station and in conjunction with physical field observations, decided to move the instrumentation to a more representative location. We decided on the appropriately-named, Windy Peak, at the head of Weber Canyon, would offer the best upper elevation wind data, representing a vast array of above tree-line terrain throughout the range. Bill Nicholson and Park City Powder Cats operate a commercial snowcat ski operation out of Thousand Peaks Ranch in Weber Canyon and a unique partnership benefiting all involved was formed. They would help our operation out by installing an extra phone line at their base facility and provide manpower and transportation of the weather station to the peak. In turn it gave their operation real time wind data they never had access to before. The installation went smooth enough and we were able to download a few hours of wind and temperature data. However, high fives were quickly

eclipsed by the realization of glitches in a base station unit. Fortunately our good friends and long time partners at the National Weather Service (NWS) came to our rescue, helping to trouble shoot and ultimately get the site up and running. All of this data is available to the public on the NWS homepage. We look forward to our continued partnership with the Powder Cats and plan to reinstall the site again this coming winter.

The hard working Powder Cat guides turned Sherpas take a break after the successful installation of the Windy Peak weather station. Craig Gordon photo.

Beacon Basin:

This season allowed the continued partnership between the western Uinta avalanche forecasting program and Back Country Access (BCA). For the third winter in a row we installed a semi-permanent avalanche beacon training facility exclusively for snowmobilers. "Beacon Basin" located at the Nobletts trailhead, is about 14 miles east of the town of Francis. The parking at this trailhead is free and on a sunny weekend with fresh snow, vehicles not only pack the parking lot, they also string for a mile or so down the shoulder of the highway. It's not unusual for there to be close to 200 rigs, equating to 400-600 sledders parking at this trailhead.

Bruce Edgerly, BCA's Marketing Vice President, has been very instrumental in continued avalanche education for all user groups and this hands-on facility is a huge asset to the avalanche center and the snowmobile community alike. Once again this winter, several members from the Utah Snowmobile

Association (USA) supported the project by donating their time and back muscles to bury the locators. In addition, Bill Farley not only hard wired all the locaters, making for a seamless installation; he also transformed the site to the first ever solar powered unit. Bill has helped us on a number of fronts and his McGiveresque ingenuity is extremely valuable to both the UAC and the snowmobile community alike.

The site, within walking distance of the parking lot, is well received. On busy days, 20-30 riders will visit the area either before or after their rides. In addition, it provides a great training site when Craig teaches "on snow" avalanche awareness clinics. Beacon Basin was utilized by a wide variety of people including private groups, snowmobile clubs, and state and federal agencies. We look forward to yet another upcoming season, employing this facility at the same popular location.

Even after a recent storm, members of the Utah Snowmobile Association took time out of their powder day to help install Beacon Basin on a cold January day.
Craig Gordon photo.

This efficient group, consisting mostly of members from the Utah Snowmobile Association made short order of the task at hand- trenching through the snow to bury the targets for Beacon Basin. Craig Gordon photo.

Tri-City Performance/Polaris Partnership:

For the first few years of the Uinta advisory program, Craig was able to perform field work utilizing a "loaner" sled from the Kamas Ranger District. After the program was established, he began to pursue partnerships with snowmobile manufacturers, much like other regional avalanche centers already incorporate. There were several hurdles to jump and the tragic 2004-05 winter season, in which three snowmobilers were killed in avalanches, put things into motion. In the spring of 2005, Doug Page, an avid snowmobiler and member of the USA, began making contacts with local snowmobile shops and found a willing participant in Tri-City Performance of Centerville, Utah. Mike Paulson arranged an agreement with Polaris and they supplied Craig with a sled for the 2005-06 season. After the winter is over, Craig returns the sled; the shop sells it and absorbs any monetary loss in the transition of owners. This season Tommy George and Tri-City Performance of Springville stepped up to the plate to sponsor the UAC Uinta forecast program. Strong partnerships with Polaris and Tri-City help save lives by providing Craig a state-of-the-art snowmobile, allowing him to cover vast amounts of terrain, helping him to more accurately forecast snow and avalanches in an area predominately used by snowmobilers.

Tommy George and the crew at Tri-City Performance of Springville, Utah present Craig with a 2007 Polaris RMK. Polaris, in partnership with Tri-City and the Friends of the UAC help Craig each year with a sled so he can effectively cover the vast amount of terrain he forecasts for. Craig Gordon photo.

Without a sled and valued partners like Polaris and Tri-City, Craig could only cover about an eighth of the terrain he forecasts for now. Over the past few years Craig has fostered strong relationships with both snowmobile manufacturers and local dealers. Craig Gordon photo.

Avalanche Center Fundraising Ride

The first annual fundraising ride was a huge success! The idea behind the event was hatched at a USA board meeting last August and is the brainchild of the Rocky Mountain Sledders, Wasatch Snowmobile

Association and the Utah Snowmobile Association. In addition to the Heber Valley Chamber of Commerce, Olympic gold medal winner Jim Shea and his family foundation jumped on board to support the event. Nearly 180 people eagerly signed up for both the ride and dinner, with all the proceeds going to help the Friends of the Utah Avalanche Center. The Friends will in turn assist the western Uinta avalanche advisory program and hope to add another person next season, assisting Craig in the role of avalanche forecasting and education, specifically for snowmobilers.

While there was no new snow to cushion the rock hard old tracks, the ride went off without a hitch. Dave Copeland brought his beautiful, custom made Peterbilt tractor-trailer to the Strawberry parking lot, allowing us to use it as a staging area for the registration. Starting at Strawberry and heading south, riders had the option to ride with the likes of the Thunderstruck or Boondockers crew or they could just play around in the meadows and trails. Thanks to everyone who helped to guide the various groups, keeping them together and returning safely without incident.

The ride ended around 3:00 and we all regrouped at Soldier Hollow where a social hour, dinner and live auction awaited. Chad Booth the host of "At Your Leisure" was thrown into the fire and with short notice did an incredible job as the evening's master of ceremonies and auctioneer. Following dinner, keynote speaker Jim Shea reflected on the day, obviously enjoying both the ride and the new friends he made.

Donations from the Utah Snowmobile Association, the Shea Family Foundation and a very generous contribution by avid snowmobiler Curt Kennedy were presented to the friends of the avalanche center. This monumental event couldn't have happened without the hard working efforts of those involved in the planning and coordination. In particular, Pam Madsen did an amazing job pulling everything together, ultimately leading to a very successful fundraiser.

Dave Madsen presents Craig Gordon with a check to the avalanche center from Curt Kennedy. (Although the check is incorrectly made out to the Utah Avalanche Center, it is actually donated to the Friends of the Utah Avalanche Center.) Craig Gordon photo.

Pam Madsen organizes early arrivals near the Strawberry trailhead. The first-ever avalanche center snowmobile fundraising ride was a huge success thanks to the volunteer efforts of the Rocky Mountain Sledders, the Utah Snowmobile Association and the Wasatch Snowmobile Association. Craig Gordon photo.

This flyer was distributed throughout the state by a hard working group of volunteer riders who support the UAC and its efforts in snowmobile forecasting and avalanche education.

Uinta Season History:

Coming off the heals of two big snow years we were hoping to achieve a trifecta this winter, but Mother Nature had other plans in store. While the winter looked promising with a foot or so of late summer snow falling at the end of September, more often than not, seasons that start with a bang too early, wind up being a bust. This winter fit that pattern. Rather than list every snow event, which wouldn't amount to much text anyway, I'll highlight the events, which made for a challenging avalanche season on a number of different fronts.

November

The first informational advisory was issued on November 8th, though there was only enough snow to ride around on the roads or on low angle grassy slopes. As is usually the case this time of year, we try to get folks thinking about avalanches and dusting off their rescue gear. We also try to encourage riders to sign up for our free avalanche awareness classes, which quickly fill up each year. By the 15th, a series of energetic storm systems slammed the region doubling our snowpack in 24 hours, creating the first real significant avalanche danger of the season. While several close calls occurred in the Salt Lake area mountains, the Uintas remained quiet, mostly because shallow snow depths didn't allow folks to access the steep, mostly rocky avalanche prone terrain of the region. Mild, Caribbean-like temperatures helped the snowpack heal and adjust to the rapid load earlier in the month and many south-facing slopes shed their early winter coat, reverting back to their fall colors. A promising looking storm on the 23rd turned out to be a bust, falling apart as it hit the entrenched ridge, signaling a consistent pattern we'd have to live with for the next few months- lots of wind and not much snow. A sleeper of a storm did sneak into the region on the 28th, depositing nearly two feet of ultra light density snow along the upper elevations. The champagne powder was easily manageable and backcountry users enjoyed the first over-the-hood riding conditions of the year. November ended without incident.

December

Cold air aloft and cold smoke on the ground made for great powder riding conditions, though we knew it was only a matter of time before high pressure worked against us, weakening the snowpack, setting the stage for dangerous avalanches once winter returned from its hiatus. The weather pattern continued to tease us through the month of December and the predicted "big" storms never came to fruition. A few brush-bys deposited very light density snows, but there was never enough of a load to tweak our ever-weakening snowpack. As is often the case in dry years, one thing we did get was wind. On the 22nd a wind event roared into the area, scouring the upper elevations, transforming much of the big open terrain into an indistinguishable moonscape. Variable snow depths led to variable and pockety avalanche conditions. A splitting storm towards the end of the year nailed Denver and left us on the gradient of yet another blasting wind event. Now with a slab on top of weak faceted snow, people were able to trigger avalanches from a distance and two close calls occurred in the Whitney Basin. Only one of the avalanches was reported to us and Ted stumbled onto the other while performing

fieldwork near Moffit Peak. While there were several human triggered hard slabs reported in the last week of December, the year ended quietly.

January

Winds ushered in the New Year forming another round of shallow hard slabs, leading to another round of human triggered avalanches we stumbled across. We lucked out on the 5th with an unexpected 15" of new snow overnight, but with no wind, sluff management skills were all that were needed to negotiate our recent windfall. A stormy period during the middle of the month produced about a foot and a half of very light density snow, but brutally cold conditions locked the snowpack in place. High pressure returned shortly after our "storm cycle" and the forecasts became a challenge in creative writing. It was the same old…. same old… and I began to feel like Bill Murray in the movie Groundhog Day. The big highlight of the month was the first annual avalanche fundraising ride held at Strawberry. The month paled in comparison.

Dave Ream from the Kamas Ranger District wallows in bottomless, faceted sugar snow created during the unusually dry January. Dave often helps Craig out and will usually accompany him at least one day a week. We're grateful that Kamas helps partner with the UAC, providing experienced field partners like Dave and allowing Craig to use district vehicles and garage space. Craig Gordon photo.

February

We limped along into February and the avalanche danger coincided with the lack of snow. With a generally LOW danger for most of the previous month I made efforts to warn users that once it started snowing… watch out! While there's limited historic snow and avalanche data form the western Uinta's, one thing I did know was I'd never seen a snowpack this weak before and feared for the day it began to storm in earnest. February 10th signaled a change in the weather and by the morning of the 11th an avalanche warning was in effect. Warm temperatures, strong winds and about 10" of new snow with an inch of water fell overnight. Small natural and remotely triggered avalanches were seen throughout the range, but the slides were pockety in nature and the region didn't experience the wide spread avalanche cycle like we expected. One ingredient missing was a bunch of triggers riding around in avalanche terrain. Another system slammed into the region Friday Feb.16th depositing 6"of dense snow and strong northwest winds averaging in the 30's, gusting into the mid 50's for several hours on the night of the 16th.

With a sunny weekend on tap we knew all the elements would come together for at least a number of close calls. All week we warned riders of the avalanche danger through our advisories and utilizing press releases and television interviews, unfortunately the intoxicating mixture of powder and sunshine proved to be a lethal cocktail on the 17th.

The avalanche danger for the western Uintas on February 17th was rated CONSIDERABLE on all slopes steeper than 35 degrees, especially those with an east component in their aspect. The advisory made specific mention of the unusual avalanche conditions- "Our complex snowpack is problematic and it may allow you to ride some steep slopes throughout the range without incident, giving you a false sense of snow stability, luring you deeper into the avalanche dragon's den. Yesterday's strong winds deposited snow in unusual locations and further down slope than you might expect. Today you'll need to carefully assess slopes on an individual basis and be diligent with safe travel techniques by only putting one person on the slope at a time. In addition, think about the consequences of triggering a slide. Avalanches triggered today have the possibility of breaking into deeper buried weak layers, creating a large, dangerous and possibly unsurvivable avalanche."

Five young snowmobilers, four males and one female (16-19 years old), began their day snowmobiling in the terrain surrounding the accident site. Most of them were wearing avalanche rescue gear, though those details are still being sifted through. Many clues to instability were missed along the way, including natural avalanches close to the accident site. In addition, they triggered at least one large hard slab avalanche without incident, about a ¼ mile north of the accident site prior to the fatality. This slide was 2'-3' deep, 250' wide, running about 150' vertically. It most likely emboldened the group, luring them deeper into the avalanche dragons den. This group was very familiar with the terrain and had triggered small avalanches in the area on past outings.

Around 16:00 the group traveled to the southwest of the avalanche they just triggered and regrouped

at the bottom of a south facing slope. Several riders climbed the 32 degree slope above them without incident. Sixteen year old Zachary Holmes began climbing the slope too, but when he neared the top, he began "side-hilling" towards a steeper adjacent slope which had more of an easterly aspect. As he changed aspect and slope angle, he triggered a large hard slab avalanche 2'-4' deep and 300'-325' wide. His partners turned their beacons on to receive and began searching. There was plenty of confusion and several random holes were dug 75' uphill from where Zachary was finally located, buried 3' under his snowmobile which was sticking out of the snow. After he was found, two young men stayed on the scene and began CPR while a male and female rode back to the trailhead to make a cell phone call and alert local authorities. Much to their dismay their phones didn't work at the trailhead, but a family with an "OnStar" system in the vehicle placed a call and Wasatch County Search and Rescue was dispatched.

Back at the scene, as the older brother performed CPR an Airmed helicopter located the accident site and dropped a flight nurse off at the scene. Zachary was flown to a local hospital where he died of traumatic injuries.

Craig's sled, parked on avalanche debris at the bottom of a steep wind loaded slope in Buck Basin. On Saturday February 17th a sixteen year old snowmobiler triggered this avalanche which killed him. Fortunately, the young man wore an avalanche beacon and his partners were equipped and prepared for a self rescue. While he was found rather quickly by other riders in his party, as is the case in a quarter of all avalanche fatalities, trauma inflicted during the avalanche killed this young rider. Craig Gordon photo.

Another powerful storm ripped through the state on the 22nd and the cow-tipping winds overloaded many steep slopes throughout the range sending the region into a natural avalanche cycle. I issued an avalanche warning on the evening of the 22nd which lasted three days as winter roared back with a vengeance. Just getting to the mountains was nearly impossible and lack of access probably saved a few lives.

March

The first week of March brought yet another round of heavy snow and strong winds. Nearly six feet of snow fell from Feb.10th to March 3rd and when we could see, natural avalanching was widespread and significant throughout the region. While many slopes avalanched naturally, some waited for a trigger and on the 3rd a snowmobiler had a very close call when he triggered and was partially buried in a very deep avalanche near Tower Mountain. The crown was over 6' deep and about 100 yards wide. The avalanche ran on weak, surgary snow near the ground and the rider was incredibly lucky to survive this close call.

Craig stands next to the crown of a deep avalanche triggered by a very lucky snowmobiler who was partially buried. Craig Gordon photo.

By the second week of March the deep slab cycle was history and "the winter that wasn't" headed in a different direction, this time throwing us an unexpected curve ball- a March warm up like none of us had ever experienced. Saint Paddy's day was ushered in with record setting high temperatures and shallow overnight refreezes, prompting an avalanche warning for wet slab activity. Again, we utilized local media outlets to help spread the word about the unusual snow and avalanche conditions. There were several large natural avalanches over the course of the weekend and other than one close call late in the day on the 19th we managed to dodge yet another bullet by getting the word out to the masses. The month ended with cooler temperatures and a light dusting of snow.

Dave Ream stands next to a large, bone crushing block of debris the size of a mini van. Craig Gordon photo.

April

The lackluster season ended earlier than usual as interest waned and the snow rapidly disappeared. While the normal forecast season lasts well into the middle of the month, corresponding with the state's grooming schedule, this year both came to an abrupt halt. We ended our regularly scheduled advisories on April 8th, followed by a year end information statement giving users general guidelines and tips to enable them to make educated snow stability decisions in our absence.

This small hard slab triggered the first day of March on a steep rocky break-over was merely a teaser. The big avalanches were yet to come. Jeramy Bristol photo.

This wet slab avalanche was triggered late in the day by a snowmobiler in the Thousand Peaks area of the Western Uinta Mountains during the March heat wave. John Marshall photo.

Logan Area Mountains Season Summary

By Toby Weed

We'll remember the winter of 06-07 as a particularly lean snow year in the Logan Area. A series of windy storms in mid-December led to dangerous avalanche conditions and several very large human triggered avalanches in the backcountry. In January, an extended high pressure system trapped us in the doldrums of smoggy, weak snow producing weather. A series of storms built a slab layer on the resultant faceted snow in February, leading to an extended period of unstable snow conditions and widespread natural avalanches. Knowing accidents were imminent, we issued Avalanche Warnings and Watches through the National Weather Service and pre-weekend press releases aimed at all modes of popular media. The media blitz was successful in Northern Utah. The word got out, and many normally popular slopes in the Logan Area remained untracked during this dangerous time. Thus countless tragedies were avoided, and unknown numbers of lives were saved. An unseasonably warm March essentially put the sorry powder season out of its misery. Many normally popular backcountry access points in the region remained unused all season due to lack of snow at lower elevations.

Below normal snowfall in November limited access to upper elevations in the Bear River Range, and on December 1st, only 29" of snow containing 8 " of water equivalent had accumulated at the Tony Grove Snotel. High pressure in the first week of December caused the development of surface hoar and near surface facets on upper elevation slopes. It started snowing on the 12th, and by Thursday the 14th, a couple feet of heavy snow containing over 3 inches of water accumulated, forming a heavy slab over the sugary weak layers. On a trip to Tony Grove on the 15th haunted by heart-stopping audible collapses, I observed several natural avalanches, which had run well out onto the lake, and I met a party on Chicken Hill whom had just triggered a "larger than expected" hard slab with a cornice-drop. The scene was set for a dangerous weekend in the backcountry, with a considerable danger and numerous powder-starved and high revved triggers set to overwhelm the region. Six more inches of fluffy snow fell on Saturday, and then the winds shifted, coming around from the northeast sustaining 30 mph with gusts in the 50s on Logan Peak. I was breathing a sigh of relief upon not hearing of any fatalities in the region over the weekend, when I rode up the gully approaching Naomi Peak on the 18th and spied evidence of a huge human triggered slab, two to four feet deep and encompassing the entire Castle Rock Cirque. Snowmobile tracks in and near the crown and the eastern flank of the very broad avalanche and those on the bed-surface of a similarly large slide in the nearby Upper White Pine Canyon told amazing survival stories that I have yet to hear in person.

As the New-Year began, the Tony Grove Snotel reported 44 "of snow on the ground containing a bit less than 13" of water. On the 9th a freezing rain or rime event (depending on location) laid down a half-inch-thick, brittle crust on the snow surface across upper elevations of the Central Bear River Mountains. A strange mid-season snow drought and an extended high pressure system in January led to widespread development of depth hoar, and the shallow snowpack in many areas turned to a rotten mess made up of little else than large faceted crystals. On the 19th our friends group held their third annual fundraiser. Although attended by fewer people than in past years and slightly marred by the ongoing skier-snowmobiler land-use debate, it was a successful event. The focus on attracting snowmobilers was effective and a fair number came to the event, but at the sacrifice of many hard-core skiers who had attended in the past. What the friends billed as an opportunity for the community to share a bit of common ground—avalanche knowledge and safety; became a venue for subtle political discussion. Behind the scenes, polarization over access issues cast a negative vibe. Snowmobilers sat together in a group on one side of the room, some wearing politically charged t-shirts. Skiers grouped up around the gear table, a few donning leather Yamaha riding jackets while imitating engine noises in jest. Besides me and the friends, the only minglers between the two groups were mixed users

(snowmobile riding skiers and boarders)…our hope for finding common ground.

There was only 49 inches of snow with 14.7 inches of water on February 1st. Conditions were ripe for avalanches when snow finally started to accumulate again in mid-February. As the slab layer began to build on exceptionally weak underlying snow, people began triggering dangerous avalanches in the backcountry. With persistently unstable conditions present and the most popular backcountry weekends of the year looming, we made a concerted and successful effort to warn the public. In the Logan Area, the Herald-Journal published a handful of articles noting local conditions and I appeared on local T.V., and on Talk Radio (right after Rush Limbaugh) Undoubtedly, well publicized fatalities in and around Utah helped to get the word out, and many suspect slopes and historic avalanche paths remained untracked through the worst of the cycle. Continued storminess tipped the scales on many slopes, and large and long-running natural hard slab avalanches afflicted the Central Bear River and Wellsville Ranges in the last week of February

With 85 inches of snow containing 19.4 inches of water at Tony Grove, things came to a head in the beginning of March. Early in the morning on March 2nd clearing revealed evidence of several very large and destructive natural hard slab avalanches visible with the naked eye from downtown Logan City. Not surprisingly, the largest of these occurred in the Wellsville Range, with very broad avalanches packing explosive air blasts releasing on depth hoar near the ground and running full path lengths of around 2500 vertical feet. Of substantially more interest to local backcountry users were several large naturals in the Logan Peak Area, particularly those in the very popular Providence Canyon. Among these, two large avalanches fell nearly 3000' from near the summit Big Baldy Mountain to the snow-free canyon floor, slamming the well-traveled but seasonally un-maintained Providence Canyon Road. Drought conditions resumed in March, accompanied by exceptionally warm temperatures, and the snow quickly disappeared at lower elevations and on south facing slopes. A couple large wet slab avalanches ran in the Mill Hollow area on the 18th after several consecutive warm days and nights.

On April 1st the Tony Grove site was one of the few in the state with just more than 50 percent of average water contained in the snow. There were 56" inches on the ground, with 24 inches of water equivalent. We found good access to upper elevations via the big avalanche paths in the Wellsville Range that had run in late February or early March. Like straight, 2000' groomed runs, a dozen or so paths led directly from greening maple stands to generally stable spring snow in the Wellsville Mountain Wilderness. In the first week of April, a partly reported a sizable natural wet slab, probably released by cornice fall, in the High Creek Lake Area. In the same area on the 20th, the day after our largest storm in April dropped about 15 inches at the Tony Grove Snotel site, I saw evidence of a very broad natural wind slab (1-3' deep by >800' wide). I noted 14 unintentional human triggered avalanches this season in the Logan Area, amazingly with no known injuries fatalities or property damage. 12 were snowmobiler triggered and 2 were triggered by skiers. All but 3 of these avalanches were observed and unreported....

Avalanche Incidents and Accidents

If not for one fateful week in mid-February, Utah would have had zero fatalities for the season. This, in a year that, except for a few historians and old-timers, few had ever seen. We experienced what the Swiss avalanche scientist Andre Roch defined in the early 1940's as a continental snowpack, one in which snowfall is light and instabilities persistent. Apropos to the season as well was his astute warning, "*Remember, my friend, the avalanche does not know that you are an expert!*" This in a season with such a weak, layered snowpack where collapsing and whoomphing, and remotely triggered slides were de rigeur. Many very experienced people took rides in avalanches this year, with some using some of their nine lives.

By our count, which is far from exhaustive as not all incidents are reported, there were 88 unintentionally triggered avalanches, of which 43 were caught, 17 were partially or totally buried, 9 were injured and four killed. Of these unintentionally triggered slides, 33 were remotely triggered, or triggered from a distance rather than at the individual's boards, snowshoes, or snowmachine. Three people died in separate incidents on February 17th and 18th, with another fatality on the 21st. Four is our ten year running average. The breakdown demographic was two snowmobilers, an out of bounds skier, and a backcountry skier. All male.

11-14-06 Silver Fork – Three skiers caught, one partially buried, one fully buried, all OK. Three skiers left the town of Alta for a ski tour into Big Cottonwood Canyon. They ascended the south facing slope above the town of Alta, then skiied down the gentle West Bowl, an east northeast facing slope. When they regrouped, they decided to ascend the steeper, more northerly facing slope

The crown face on the Silver Fork avalanche averaged 2-3 feet deep and was around a third

to regain the ridge. As they were ascending, the slope fractured 2-3' deep and 2000' wide on the weak early season faceted snow. All three were caught. One grabbed a tree and was not carried far but did lose a ski. Another was carried around 30 feet and was buried enough so that he was not able to move without digging himself out. The third was missing.

The other two, aided by another nearby solo skier, initiated a search with avalanche transceivers and found a strong signal 150 feet downhill from where he was originally caught. The three struck him with the first attempt with an avalanche probe 4' deep. When they uncovered him, he was face down, and fortunately his airway was clear. The victim's labored breathing soon improved and he became coherent. Rescuers were contacted via a cell phone and a life flight helicopter was dispatched. He was able to ski himself down around 200 feet to where the helicopter was able to land.

All of the skiers involved had some formal avalanche training but two of them had more training than the buried victim. With enthusiasm, they successfully skiied the low angle West Bowl without incident and without any signs of instability. It was clearly a different outcome on the steeper skin track to the ridge. Powder fever and Kodak courage played something of a role in this incident, as well as poor communication. Upon follow-up interviews, at least one member of the party had reservations about some of the decisions but did not speak up. Later when the group discussed the accident, the other two had reservations as well but there was not complete communication. This fits into the "no leader" category where no one is in charge of making sure complete communication is occurring. It should be noted that this was a textbook example of a perfect rescue which was accomplished only because the touring party had the proper rescue gear and was trained in using it. The danger had been rated as Considerable.

2-3-07 Pfeifferhorn – Two climbers caught, one seriously injured.
Two 43 year old men who were attempting to climb the east ridge of the Pfeifferhorn triggered a small pencil hard wind slab on the steep southeast flank of the ridge. While the avalanche was reported to be small, both were carried over 150' cliff-bands onto the snow-slope below. Rescue personnel from the both the Utah County and Salt Lake County Sheriff's Department and Wasatch Backcountry Rescue were able to stabilize both men and sled them down to a safe landing zone on the Utah county side, where helicopters transported them down to a hospital in Salt Lake. It is not known whether they carried any rescue equipment, had avalanche training or had called the avalanche advisory.

The Pfeifferhorn, or Little Matterhorn, sits along the exposed Little Cottonwood/American Fork ridgeline at over 11,000' and is a common mountaineering destination in both summer and winter. While the wind slab that the two triggered was only 3-6" deep and 70-100' wide, the danger clearly centered on the radical terrain below. The venerable avalanche researcher, Ron Perla put it this way: "Is the terrain suitable for avalanching? Can the snow slide? And, the last, salient point – what will happen if it does?"

The Wasatch Range received 6-10" of new light density snow from January 30th-early February 2nd. Densities were generally less than 8%. Strong winds the evening of Feb 1st resulted in numerous Class 1 and Class 2 avalanches in steep wind drifted terrain, with most being less than a foot deep and 60 feet wide. Sustained strong west to northwest winds allowed avalanche control teams at the ski areas and backcountry skiers to trigger similar avalanches on Saturday February 3rd as well. The reported avalanches were generally class 1 or 2 (harmless to could potentially bury a person), and localized to steep wind drifted terrain. No natural avalanche activity was reported during the day and the danger had been rated as Moderate.

2-17-07 Western Uinta Mountains- One snowmobiler caught, buried and killed.
Five young snowmobilers, four males and one female (16-19 years old), began their day snowmobiling in the Daniels' Summit portion of the Western Uintas. While most of them were wearing avalanche rescue gear, many clues to instability were missed along the way, including natural avalanches close to the accident site. Additionally, the party triggered at least one large 2-3' deep 250' wide hard slab avalanche ¼ mile north of the accident site prior to the fatality. The group was very familiar with the terrain and had triggered small avalanches in the area on past outings.

This is the sight of the fatality in the Uintas. The slope is relatively small but heavily wind loaded which is evident from the wind-stripped ridge in the right of the photo.

By late afternoon, the group traveled to the southwest of the avalanche they just triggered and regrouped at the bottom of a south facing slope. Several riders climbed the 32 degree slope above them without incident. The 16 year old victim followed, then continued "side-hilling" towards a steeper adjacent slope. As he changed aspect and slope angle, he triggered a large hard slab avalanche 2'-4' deep and 300'-325' wide. His partners turned their beacons on to receive and began searching. After he was found, two young men stayed on the scene and began CPR while the other two rode back to the trailhead to make a cell phone call and alert local authorities. An Airmed helicopter arrived and flew the victim to the local hospital where he later died of traumatic injuries.

A series of storms began to affect the region beginning Saturday Feb. 10th through the 16th, providing the cohesive slab on top of a weak fragile snowpack. The avalanche danger was rated Considerable as the forecaster mentioned that any triggered slide could be unsurvivable.

2-17-07 Signal Mountain in Sevier County near Richfield – One snowmobiler caught, buried, and killed.

A 44 year old man high-marking a steep slope triggered a 3-4' deep 100' wide avalanche that completely buried him and his sled. Companions at the scene called for a rescue, but before rescuers could arrive, they randomly dug the search area, which was fairly small—70 x 30 feet. They found his snowmobile and while digging it out, found the victim's hand. He was buried sitting up with his head 2-3 feet deep and his hand was reaching upward. The victim did not respond to CPR.

The avalanche near Richfield was another example of a small but lethal slide

Although the Forest Service Utah Avalanche Center does not issue advisories or provide avalanche education for that area, the forecast for the avalanche advisory for the nearby Manti Skyline area called the avalanche danger CONSIDERABLE, meaning that human triggered avalanches are "probable". The Forest Service Utah Avalanche Center issued a state-wide press release on Friday, warning the public of especially tricky and dangerous avalanche conditions for the backcountry.

2-18-07 Hell's Canyon in the Snowbasin Backcountry – One Skier caught, carried, and killed.

A father and his two sons, skiing at Snowbasin resort, left the access gate into Hell's Canyon area with the objective to ski untracked powder. Earlier in the day, the ski patrol encountered them in the Porky area while they were hiking inbounds, and pointed out recent avalanches and talked to them about the potentially dangerous conditions. The group had little or no avalanche training and had no rescue gear. Details are still unclear, but the two boys skiied ahead of their father when the 17 year old triggered the slide that swept him 1500 vertical feet down the slope and was buried. He had significant trauma to his face and head and appeared to have died of trauma. His body was later recov-

ered approximately 6 feet deep when ski patrollers probed the area.
The avalanche initiated around 8,600' on a northeast facing slope about 40-45 degrees in steepness with the crown depth was 2-3 feet, failing on weak underlying faceted snow. The slab was most likely composed of new, dense snow from the past two storms, between the 10th and 16th of February. The underlying facets are weak depth hoar that made up the entire snowpack before the recent storms. The Forest Service Utah Avalanche Center called the avalanche danger Considerable on the morning of February 18th, meaning that human triggered avalanches are "probable", and they issued press releases on Friday as well as the morning of the accident, warning the public of especially tricky and dangerous avalanche conditions for the backcountry. It is believed that the father and sons did not consult the avalanche advisory or media reports. Since they were visiting from Massachusetts, it is likely that they knew little about avalanches, especially the potential consequences of getting caught in a slide.

Hell's Canyon is accessed off the tram Snowbasin. Part of the standard tram talk includes the statement "Traveling outside the marked ski area boundary is not recommended". As you leave the top of the tram, avalanche signage includes an "Are You Beeping" sign and the Forest Service Utah Avalanche Center daily avalanche advisory is posted. After leaving the top of the tram, the Hell's Canyon gate is accessed by skiing down, and then hiking up hill for several minutes to reach the Hells Canyon backcountry access gate. This gate is signed with a standard Forest Service brown sign, which displays the standard message of potential avalanche danger and no ski patrol services.

2-21-07 Gobblers Knob – Solo ski tourer caught, carried and killed by trauma
A party of three experienced backcountry skiers from Norway, familiar with the Wasatch terrain, set out for a day of ski touring in the Gobblers Knob/Mt. Raymond area. According to reports, the victim, seeking more challenging terrain, left his two partners at the Gobblers/Raymond divide and continued to the summit of Gobbler's Knob with the plan to meet back at the trailhead within the hour. After waiting at the car for some time, the remaining two called 911 to initiate a search. A helicopter with personnel using night vision goggles verified tracks going into a 1-2' deep and 250' wide avalanche high on the peak with none coming out. The body recovery efforts by both Salt Lake Country Search and Rescue and Wasatch Backcountry Rescue began the following morning. The three Norwegians were all wearing rescue gear and had called the avalanche forecast that morning. The Utah Avalanche Center had rated the danger as "Considerable on slopes steeper than about 35 degrees facing northwest through northeast through southeast, where dangerous avalanches 1 to 3 feet deep can be triggered by people." The forecaster, weary of the three previous fatalities that week, implored people to "Back off the steep stuff – if the close calls continue, someone else is going to get killed or hurt."

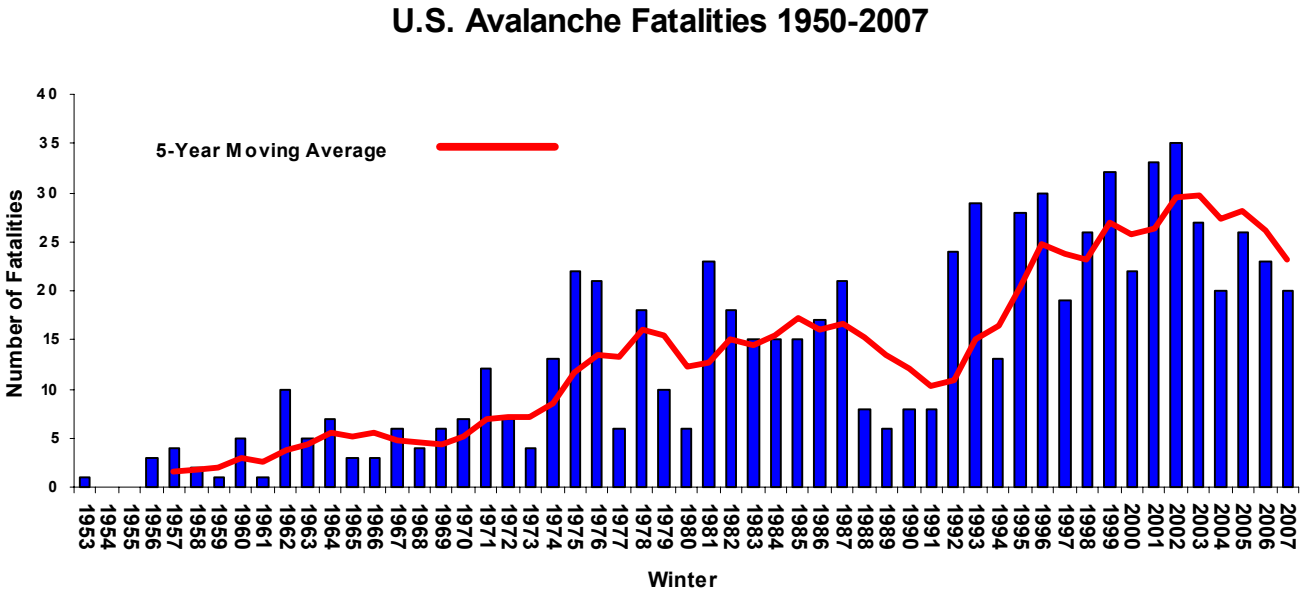
The area of the avalanche is not a classic descent off the peak and it is unknown whether the skier had intended to ski it or whether he was traversing across the starting zone to gain another ridge. A descent would have taken you a few hundred feet through some trees with some wandering to avoid some sections of cliff band. The south ridge of Gobblers is a steep, often corniced ridgeline with avalanche paths falling off both to the east and the west. Descending tourers are generally forced off parts of the ridge as sections of it are rocky and knife-edged. In the big picture, ridges are known to be areas of safety unless A: the ridge becomes steep and rounded, becoming in essence, terrain capable of producing a slide; or B: the terrain forces you off the ridge into a starting zone. Under certain circumstances, it may be warranted to remove skis or board and boot up or down through these features.

2-27-07 Hell's Canyon in the Snowbasin Backcountry - One skier caught, carried, buried to eyes, dug himself out, OK.
Four local skiers in their 20's and 30's, looking for untracked powder, entered the Hell's Canyon area

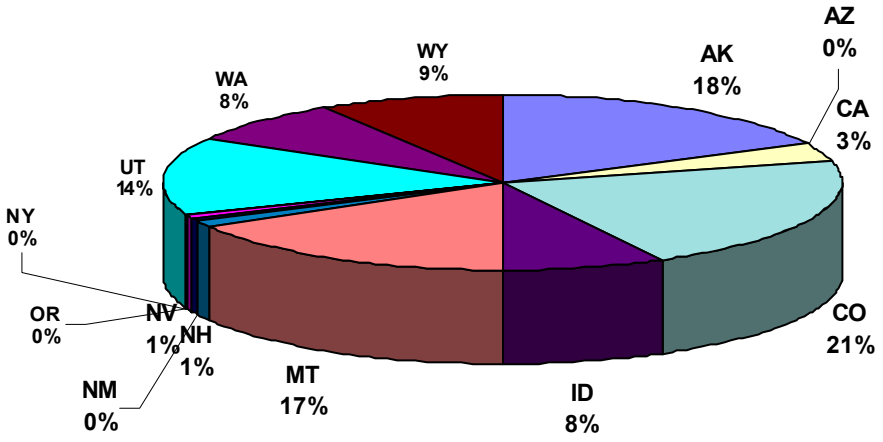
adjacent to the ski area boundary. Even though they knew the terrain well, none of them had more than a minimal understanding of avalanches. The victim, a 21 year old male, brought avalanche rescue gear with him to the area that day, but because the plan was to spend the day in area, he left it in the car. There was no discussion of avalanches, other possible risks, or of travel protocols while traveling in this terrain. The victim made the first few turns into the area, then abruptly changed his mind on the danger, while the other three remained high on the ridge. While traversing back to them, he triggered a 2-3' deep avalanche, carrying him 1000' down the slope. When the snow came to a stop he was tightly buried up to his eyes with his left hand sticking out.

This terrain is very popular because it provides the adventure of backcountry skiing with very easy access back to the Snowbasin ski area. The Canyon faces east with steep shots from the north, east, and south all dropping into the drainage at the bottom. All of the slide paths converge at the bottom of this drainage making it a very dangerous place during high avalanche danger. This group did not really consider the differences between skiing in the ski area where avalanche control has been done, and the very different uncontrolled terrain that is just the other side of the boundary. The close proximity and easy access to backcountry terrain in that area easily lures people into a sense of complacency in dealing with avalanches.

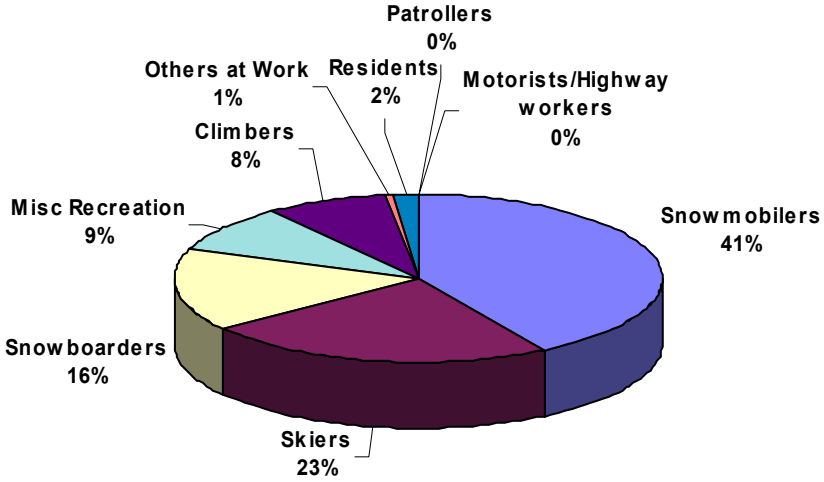
This group did eventually realize that they were getting into dangerous terrain with dangerous conditions. And they made the right decision to not continue. By not having good travel techniques and a good plan from the start they got separated and the victim was left alone. When he was caught in the slide no one in the group was aware of his situation. If it were not for the luck of every thing lining up just right for him this could have very easily had a very tragic ending. The victim later recounted that "things unraveled very quickly once we left the ski area boundary. I was very fortunate the way that things turned out. No matter how euphoric the powder skiing is you still have to use your brain." An avalanche warning had been issued for the mountains of northern Utah that morning.



U.S. Avalanche Fatalities by State
Past 10 years



U.S. Avalanche Fatalities by Activity
Past 5 Seasons



Unintentionally triggered avalanches - Wasatch and Uinta Mountains 2006-07

Date	Region	Location	Avalanche Type	Trigger	Elevation (feet)	Aspect	Steep-ness	Depth	Width (feet)	Vertical (feet)	Weak Layer	Photo (click box)	Profile (click box)	# Triggered	Caught	Carried	Injured	Part/ Full Burial	Fatility	Comments
4-22-07	SLC	Figure 8 Hill near Brighton	Wind Slab	Skier	10,000	NE	40	6"	70	800	new snow	Yes		1	1	1				Skier triggered wind slab on ski cut and carried short distance, ran to bottom. Ran on frozen melt-freeze crust
3-23-07	SLC	Thunder Bowl - Bells Canyon	Wind Slab	Skier	10,500			2-6"	30		new snow	Yes		1	1	1				Skier triggered slide, caught, carried but self-arrested on bed surface. Lost some equipment
3-20-07	SLC	Snake Creek near Brighton	wet slab	snowboard		NE-E	42			600				1						Reported with snowboard tracks as the trigger - unknown exactly when it occurred
3-13-07	SLC	Pioneer Ridge	Slab	Skier		N		2-4'	150'	600'	facets?			1	0					Triggered by a party of four, below them.
3-13-07	SLC	Flagstaff	wet Slab	Skier	10,000'	S		1-3'	200'	1,300'	facets	yes		2	0					Skier remotely triggered two slides, that narrowly missed two people below near road.
3-11-07	SLC	Superior	Wet Loose	Skiers	11k	South				1000'+				1						
3-11-07	SLC	AF-Dry Fork	Soft Slab (2)	Skier	10,500'	SE		2'	200'			yes		2	1	1		1		Triggered second slab while getting off the first. Buried to waist. 930a.m.
3-10-07	SLC	Desolation	Hard Slab	Skier	9600'	NNW		1-3'	50'		facets			1						
3-10-07	SLC	Days Fork	Soft Slab	Snow boarder	10,000'	NE		10"	150'		new snow	yes		1						
3-10-07	SLC	Mary Ellen Gulch	Soft/Hard Slab	snow mobile	11,000'	NE		1-3'	50'	1000'		yes		1	1	1				
3-10-07	SLC	Gobbler's Knob	Hard Slab	Skier-remote	10,000'	NW		2-3'	400'		depth hoar	yes	yes	1						
3-5-07	PC	Murdock PK	Hard Slab	skier	9400'	NW		3'	100'		facets			1						Triggered remotely.
3-4-07	SLC	Grandview Pk (Sessions)	Hard Slab	snow mobile	9200'	N		5'	700'	2000'	facets	yes		1	1	1		1		
3-2-07	SLC	Grizzly Gulch	Hard Slab	Snowboard	9,000	S	40	1-1.5'	100	80	facets	yes		1						People descendig Grizzly Gulch near homes in the area triggered wind slab and partially buried two people, one with just their hand sticking out.
2-28-07	SLC	American Fork	Hard slab	helicopter	9,500	N	40	2-3	200		facets			1						Remotely triggered when a helicopter landed on the flat ridge above
2-26-07	SLC	South Monitor	Cornice Fall	Skier	9,800	E			80'					1						Large cornice broke off 5' from skier on the ridge.
2-26-07	SLC	Mineral Fk BCC	Hard Slab	Skier	9000'	NE		3'	300'		facets			1						Remotely triggered, took out tracks from the previous day from same party.
2-25-07	SLC	Deer Valley Backcountry	Soft/Hard Slab	Skier-remote	8600'	E	30	1-2'	150'					1						Pulled back onto low angle terrain
2-25-07	Ogden	James Peak	Soft slab	Skier	8800'	NNE	30-35	1-2'	100'	400'				1						
2-25-07	SLC	Daly Canyon	Soft slab	Skier	8600'	E		1.5-2'	150'			yes		1						Took out a few layers of new snow.
2-24-07	Ogden	James Peak	Soft Slab	Skier	9000'	N		12-18"	50'					1						
2-24-07	SLC	West Porter	Hard Slab	Cornice	9300'	NE		2-2.5'	80'		facets	yes		1						
2-24-07	SLC	Little Water Peak	Hard slab	Skier-remote	9400'	NE	33	2-3'	150'	400'		yes		1						
2-21-07	SLC	Gobblers Knob - southeast face		skier	9,800	SE	40	2	100		facets			1	1	1		1	1	Fatality. Lone skier triggered on descent. Was missing and rescuers noticed the avalanche.
2-20-07	SLC	out-of-bounds Brighton	Hard Slab	skier	9800'	NW		2'	75'		facets	yes		1	1					"Backdoor" just out form the top of Millicent lift.
2-20-07	SLC	High Ivory, Cardiff Fork	Slab	skier	10,500'	E	35+	2-3.5'	300'	700'	facets	yes		2	1					Broke above 3rd skier, who got out to side. Remotely triggered a second slide.
2-20-07	SLC	Raymond Shoulder	Slab	skier	9600'	SE	35+	1-2'	100'			yes		1	1					Skied out to side.
2-19-07	Ogden	Bountiful area	Soft Slab	?								yes		1						
2-19-07	Ogden	Bountiful area	Soft Slab	Snow mobiler	9000'	N						yes		1						Snowmobiler unintentionally released slide, no one hurt.
2-18-07	Ogden	James Peak	Hard Slab	Skier	9300'	NE		14"						1	1	1				Skier caught and carried
2-18-07	Ogden	Hell's Canyon	Soft Slab	Skier	9500'	NE								1	1	1	1	1	1	Fatality
2-17-07	Richfield	Sevier Plateau	Hard Slab	Snow mobile										1	1	1	1	1	1	Fatality
2-17-07	Uintas	Tower Mountain	Hard Slab	Snow mobile										1	3	3	1	1	1	Fatality
2-17-07	Ogden	James Peak	Hard Slab	Skier	9500'	E								1	1	1		1		
2-17-07	SLC	Little Superior	Hard Slab	Snow mobile	10,500'	NW/NE		1-4'	300'		facets			1						
2-17-07	SLC	Little Water Peak	Hard Slab	Skier	9600'	E		16"	100'		SH	yes	Yes	1	1	1		1		
2-17-07	SLC	Cardiac Ridge	Hard Slab	Skier	10,600'	NE		2-4'	450'	1500'	facets			1	1	1		1		Uninjured, but lost poles in 1000' ride.
2-17-07	SLC	Grizzly Gulch	Soft Slab	Snow boarder	9300'	NE		2'	50'					1	1	1		1		Reportedly buried up to his neck
2-14-07	SLC	Clayton Peak near Brighton	Soft Slab	Snow boarder	10,000	E	40	1	50	250	facets	yes		1	1	1				Spectacular video of a snowboarder triggering an avalanche near Guradsman's Pass. He was caught but escaped to the side, barely missing trees.
2-14-07	SLC	Flanigans - Silver Fork	Hard Slab	Skier	9,400	NW		2			facets			1						Skier collapsed slope at top and about a third of Flanigans avalanched about 2' deep.
2-14-07	Provo	Box Elder North Chute	Hard Slab	Skier	9,800	N		2-3	60	1000		Yes		1						Triggered on ski cut. Barely avoided getting caught. Repeater with faceted snow on bed surface.
2-12-07	Provo	Big Springs	Soft Slab	Skier	7400'			18-24"	50-100'	10-30'	Facets	Yes		1						Skier unintentionally triggered a collapse which released gully walls.
2-12-07	SLC	Clayton Peak	Soft Slab	?	9800'	NE	35+	2'	40-60'	200'	Facets			3						Several pockets triggered from different skiers. Pulling out onto lower angled slopes.
2-12-07	SLC	Tuscarora	Hard Slab	Skier	10,400'									1						Skier triggered, caught and carried, ended up on top.
2-12-07	SLC	Figure 8 Hill	Soft Slab	Skier	9800'	N	38							1						Tracks going into fracture line and coming off of debris at bottom.
2-12-07	SLC	Twin Lakes Pass	Soft Slab	Skier	10,000'	ENE	40	2'	60	300	facets	yes		2						Skier unintentionally had cornice break, triggered slide below. Then intentionally triggered another.
2-12-07	SLC	White Pine		Skier										1						Skier triggered, separate from below. Details also vague.
2-12-07	SLC	White Pine	Soft Slab	Skier	9,600	NE	40	2	1500	1000	facets	yes		1						Very wide avalanche took out 3 slopes at once. Skier triggered on descent and slide took out up and down tracks-very lucky.
2-11-07	PC	S. of Deer Valley near road to Midway	Soft Slab	Snow boarder	8,500	SE?		2			facets			3	1	1				Snowboarders triggered 2-3 avalanches while while they videoed. One caught and carried.
2-11-07	SLC	Canyons Backcountry	Soft Slab	Skier-remote	9100'	N	40	8-10"	25'		facets			1						
2-5-07	SLC	Cinder Chutes	Soft slab	Skiers	9,600	ENE	35-40	19"	200	600	Facets	Yes		2						Skiers unintentionally triggered slides on 2-4-07. Snow safety avalanched adjacent 2-5-07.

Unintentionally triggered avalanches - Wasatch and Uinta Mountains 2006-07

Date	Region	Location	Avalanche Type	Trigger	Elevation (feet)	Aspect	Steep-ness	Depth	Width (feet)	Vertical (feet)	Weak Layer	Photo (click box)	Profile (click box)	# Triggered	Caught	Carried	Injured	Part/ Full Burial	Fatility	Comments
2-4-07	SLC	Little Water Peak	Soft slab	Skier-remote	9600'	NNE		1'	35'		facets	yes		1						triggered from 15-20' away.
2-3-07	SLC	Murdock PK	Soft Slab	Dog	9400'	NNE	40	8"	10-15'					1						Dog was able to dog-paddle off to side and avoid burial in 3-4' debris pile.
2-3-07	SLC	Scott Peak	Hard Slab	Skier	10k	NE		2-3'	65'		facets			1	1			1		4th skier on slope, avalanche partially buried one of skiers below.
2-3-07	SLC	Pfeifferhorn	Hard Slab	Snow shoers	11,000'	SE		3-6"	70'	700'	wind slab	yes		1	2	2	2			Accident report here.
2-3-07	Provo	Timponeeke	Soft/Hard Slab	Skier-remote	9000'	E		10-24"	up to 400'		facets/ SH	yes		3						Remotely triggered from ridgeline: all three slides.
1-6-07	SLC	Soldier Fk	Soft slab	Skier	9000'	NE	35	4-8"	60'		wind slab	yes		1						Remotely triggered from ridgeline
1-5-07	SLC	Twin Lakes Pass	Soft Slab	Skier	10,100'	NE	38	8"	15'	150'	new snow	yes		1						Very minor slide but triggered remotely from about 15' away.
1-5-07	SLC	Superior	Soft Slab	Skier	10,500	SSE	38	6-10"	40'	800'+	new snow			1						Fracture propagated above skier about 50', no one caught.
12-27-06	SLC	Red Pine	Hard Slab	Skier	10,000	W	40	.5 - 2.5	100	100	Facets?			1						Skier unintentionally triggered a wind slab and skied off to the side.
12-27-06	SLC	Days Fork	Hard Slab	Skier	9,500	E	35	1-2	50	50	Facets	yes		1						Skiers triggered hard slab from flat slopes nearby. Slide was on wind loaded gully side
12-24-06	SLC	Home Run/PC ridgeline	Soft slab	Skier-remote	9200'	E		12"						1						
12-24-06	SLC	Scott Peak	Soft slab	Skier-remote	10,000'	East		6-12"	75'	300'	Facets	yes		1						remotely triggered from ridgeline
12-24-06	SLC	American Fork/Eagles Rup	Soft/Hard Slab	Skier	9800'?	E		1-2.5'						1	1					No other info
12-24-06	SLC	Scott Peak	Soft Slab	Skier	10,000'	NE		10-16"	100'	200'				1	1	1				arrested on bed surface
12-23-06	SLC	Pioneer Ridge	Soft/Hard Slab	Snow-boarder	10,300'	NNE	39-40	8-24"	130'	800'	Surface Hoar	yes		1						Neither were caught. Suspect it was remotely triggered from shallow superweak zone 5' above.
12-21-06	SLC	Tuscarora	Wind Slab	Skier	10,500	E	40	8"						1						Skier triggered shallow wind slab on hard jump turn halfway down. Broke at skis and skied off to side. Not caught.
12-20-06	SLC	Snake Creek	Soft Slab	Skier	10,000	E	35-40	10-24"	45'	400'	Facets		yes	1	1	1				Collapse failure of facets under a crust caused slide that took skier for a short ride, caught tree.
11-30-06	Ogden	Whiskey Hill	?	Snow-mobile	?	?	?	?	?	?	?			1						Vague details of a snomobiler triggering a slide from the top that ran into the trees.
11-15-06	SLC	Little Superior	Hard	Skier	10,500	NE	40	3	100		Facets			1	1					Lone skier skied of moving slab. Reported by another party
11-14-06	SLC	Grizzly Gulch	Hard	skier	9,700-9,900	N	>35	1-2'	400'+		Facets			2						Two slides, at least on remotely triggered from below and to the side.
11-14-06	SLC	Silver Fork	Hard	Skier	10,000	N	35-40	2-3'	1500'	1000	Facets			1	3			2		3 people caught on up track, one completely buried, dug out alive. Preliminary report.
11-13-06	SLC	Albion Basin	soft slab - remote	Skier	10,200'	NE		12-24"	70'	400'	Facets			1	1	1		1		Skier remotely triggered slide engulfing another skier below who was buried to their neck.
11-12-06	SLC	Albion Basin	soft slab	Skier	10,000'+	NW	?	1'	30	100	Facets			1						Skier triggered slide in terrain trap
11-12-06	SLC	Albion Basin	soft slab	Skier	10,000'	NE	35+	1.5'	50-75	?	Facets	Yes		2						2 skiers triggered 2 slides. Flanks connected
														88	32	23	5	14	4	

A very close call in White Pine Canyon. Here an avalanche covers the climbing track of a group of experienced skiers. They triggered the avalanche while descending. Luckily, they were in a safe spot.

Avalanche Fatalities in Utah 1958-2006 - By Activity

Date	Male Deaths	Female Deaths	Location	Activity	Skier	Climber	Snow boarder	Snow mobiler	Other Recreation	Worker	Resident
9-Mar-58	2		Snowbasin	Rescuer						2	
29-Mar-64	1		Snowbasin	Worker						1	
31-Dec-65	1		Park City	In-bounds skier	1						
12-Feb-67	2		Pharoah's Glen	Climbers		2					
19-Feb-68	1		Rock Canyon	Hiker					1		
29-Jan-70	1		Alta	In-bounds skier	1						
29-Jan-73	1		Park West	In-bounds skier	1						
6-Jan-76	1		Alta	Out of bounds skier	1						
3-Mar-77	1		Snowbird	In-bounds skier	1						
19-Jan-79	1		Helper	Worker						1	
2-Apr-79	1		Lake Desolation	Backcountry skier	1						
11-Jan-80	1		Evergreen Ridge	Out of bounds skier	1						
1-Feb-81	1		Cardiff	Hiker					1		
1-Mar-81	1		Millcreek	Backcountry skier	1						
22-Mar-82	1		near Park West	Backcountry skier	1						
2-Jan-84	1		Superior Peak	Backcountry skier	1						
22-Feb-85	1		Near Powder Mountain	Backcountry skier	1						
19-Mar-85		1	Park City	In-bounds wet slide	1						
13-Nov-85	2		Sunset Peak	Backcountry skiers	2						
6-Jan-86	1		Provo Canyon	Backcountry skier	1						
17-Feb-86	1		Big Cottonwood Canyon	Backcountry snowboarder			1				
19-Feb-86	1		Alta	In bounds skier	1						
20-Nov-86	1		Sugarloaf, Alta	Hiker in unopened area					1		
15-Feb-87	1		Twin Lakes Reservoir	Backcountry skier	1						
25-Nov-89	1		Tony Grove Lake, Logan	Backcountry skier	1						
12-Feb-92	3	1	Gold Basin, La Sal Mtns	Backcountry vskiers	4						
1-Apr-92	1		Mineral Basin, near Snowbird	Backcountry skier	1						
16-Jan-93	1		Sundance (closed area)	Backcountry skier	1						
25-Feb-93	1		Pinecrest, Emig. Cyn.	Backcountry skier	1						
3-Apr-93	1		Wolverine Cirque	Backcountry skier	1						
18-Feb-94	1		10,420 Peak, B.C.C.	Backcountry skier	1						
7-Nov-94	1		Snowbird (pre-season)	Backcountry skier	1						
14-Jan-95	2		Ben Lomond, near Ogden	Snowmobilers				2			
23-Jan-95	1		Midway	Resident killed in roof slide							1
12-Feb-95	1		Gobbler's Knob, B.C.C.	Backcountry skier	1						
2-Feb-96	1		Solitude patroller	Worker						1	
27-Mar-96	1		Maybird Gulch, L.C.C.	Backcountry skier	1						
7-Dec-96	1		Bountiful Peak	Snowmobiler				1			
26-Dec-96	1		Flagstaff Peak	Backcountry snowboarder			1				
11-Jan-97	3		Logan Peak	Three campers					3		
25-Jan-97	1		Provo Canyon	Climber		1					
17-Jan-98	1		Near Coleville	Snowmobiler				1			
18-Jan-98	1		Sanpete County	Snowmobiler				1			
26-Feb-98	1		Near Weber State	hiker (possible suicide)					1		
7-Nov-98	1		Snowbird (pre-season)	Snowboarder			1				
2-Jan-99	2		Wasatch Plateau	Snowboarders			2				
29-Jan-99	1		Mt. Nebo	Snowmobiler				1			
6-Feb-99	1		Little Willow Canyon	Hiker					1		
11-Jan-00	1	1	Squaretop	Out of bounds Skiers	2						
14-Dec-01	1		Willard Basin	Snowmobiler				1			
27-Feb-01		1	Near Canyons Resort	Out of bounds Skier	1						
10-Mar-01	2		Uinta Mtns near Oakly	Snowmobiler				2			
28-Apr-01	2		Stairs Gulch, BCC	Climbers		2					
31-Jan-02	1		Windy Ridge, Uinta Mtns.	Backcountry Skier	1						
16-Mar-02	2		Pioneer Ridge near Brighton	Out of bounds Snowboarders			2				
15-Feb-03	1		Gobbler's Knob, B.C.C.	Skier	1						
26-Dec-03	3		Aspen Grove, Timpanogos	Snowboarders			3				
26-Feb-04	1		Empire Canyon - Park City	Snowshoer					1		
10-Dec-04	1		Twin Lakes Pass	Skier	1						
11-Dec-04	1		Trout Creek, Uintas	Snowmobiler				1			
11-Dec-04	2		Mineral Fork	Snowshoer					2		
8-Jan-05	1		Ephriam Canyon, Wstch Plt	Snowboarder			1				
8-Jan-05	1		Choke Cherry, Wasatch Plt	Snowmobiler				1			
14-Jan-05	1		Dutch's Draw	Snowborder			1				
31-Mar-05	1		Eccles Peak, Monte Cristo Rg	Snowmobiler				1			
31-Dec-05	1		Mt Timpanogos	Snowshoer					1		
11-Mar-06	1		Taylor Canyon near Mt Ogden	Snowboarder			1				
3-Apr-06	1		Pioneer Ridge near Brighton	Snowboarder			1				
17-Feb-07	1		Signal Mountain, Sevier County	Snowmobiler				1			
17-Feb-07	1		Tower Mountain, Uintas	Snowmobiler				1			
18-Feb-07	1		Hell's Canyon-Ogden Mtns	Skier	1						
21-Feb-07	1		Gobbler's Knob, B.C.C.	Skier	1						
	Male	**Female**	**Male & Female**	**1958 season - Present**	**38**	**5**	**14**	**14**	**12**	**5**	**1**
Totals	**85**	**4**	**89**	**Past 5 seasons**	**5**	**0**	**9**	**5**	**4**	**0**	**0**
Percentage	**95.5%**	**4.5%**	**100%**	**Past 10 seasons**	**8**	**2**	**12**	**11**	**6**	**0**	**0**

Avalanche Education

We feel that avalanche education is an essential part of staying alive in avalanche terrain. For the past two winters, we have emphasized reaching the people who are unaware of avalanches, don't understand their potential danger and power, or don't recognize that they travel in avalanche terrain. Our program tries to not only give people the basics of avalanche knowledge, but to also create and maintain an avalanche culture, where people learn from their peers.

We teach many free avalanche awareness classes throughout the season, partially to give people the basics of how to stay alive, but also to inspire them to take a more detailed, multi-day avalanche class from the private sector. The Know Before You Go program gave an incredible 119 talks to 22,000 youth. In addition, our staff taught 33 avalanche classes and directly reached over 3000 people. Evelyn Lees staffed the Avalanche Awareness booth at the 3-day Natural Resources Fair in Richfield, which had an attendance of over 2,000 students and families.

Avalanche Awareness Week, created four seasons ago by Roger Kehr, was very successful again this year. Jon Huntsman, Utah's Governor, helped kick off the week with a proclamation signing, declaring the last week of January "Avalanche Awareness Week". The week consisted of a media blitz along with several classes offered both indoors and in the field, culminating with a fundraising dinner featuring our newest partner in avalanche education, key note speaker and Olympic gold medalist, Jim Shea. The Canyons Ski Resort, another instrumental partner in avalanche awareness, in conjunction with the Friends of the Utah Avalanche Center helped host the events. Many thanks go out to Roger Kehr, Colleen Graham and Scott Pierpont for organizing the event, and to our great partner, The Canyons Ski Resort, for being such gracious hosts.

Bruce Tremper demonstrates the Extended Column Test on the crown face of a recent avalanche.

UAC Avalanche Education 2006-07

Date	Staff	Event	No. people
12/1/2001	Weed	Avalanche Awareness Talk - Private Home in Syracuse (Ken Spomer)	30
10/4/06	Tremper	International Snow Science Workshop - Telluride CO	600
11/10/2006	Tremper, Gordon, Hardesty	Blasters Cinic	250
11/16/06	Tremper	Kirkhams - Avalanche Awareness	60
11/21/2006	Weed	Avalanche Awareness Talk - LRD offices	20
11/28/2006	Hardesty	SLC REI Avalanche Awareness	200
12/4/2006	Lees	ACE Womens avalanche clinic	12
12/6/2006	Weed	Avalanche Awareness Talk - The Directive (snowboard shop in Logan)	10
12/7/06	Lees	Sandy REI Avalanche Awareness	50
12/7/2006	Weed	Basic Avalanche Class - Utah State University Outdoor Recreation Center	40
12/9/2006	Weed,Louviere, Kikkert	ORC Basic Avalanche Field Session - Garden City/Swan Peak	
12/12/2006	Tremper	REI - Science of Avalanches	120
12/14/06	Tremper	Wasatch Mountain Club - Avalanche Awareness	150
12/14/2006	Weed	Avalanche Awareness Talk - LRD offices	20
12/17/06	Tremper	Rosignol class - Canyons Resort	50
12/22/06	Hardesty	Pleasant Grove Ranger District	12
1/3/07	Tremper	Life Flight - Avalanche Awareness	60
1/5/07	Tremper	Park City - Science of Avalanches	100
1/8/07	Tremper	Snow Hydrology class U of U - Avalanche Safety	25
1/17/07	Tremper	Avalanche history and awareness	20
1/19/2007	Tremper, Hardesty, Gordon	Backcountry.com course at Canyons	100
1/19/2007	Weed	Avalanches in the Logan Area - FUAC in Logan Fundraiser	50
1/26/07	Tremper	Outdoor Retailer Show - Avalanche Awarness	25
1/26/2007	Weed	Level One Avalanche - Classroom LRD offices	10
1/27/2007	Weed, Kikkert	Level One Field Session #1 - Beaver Mountain	10
2/3/07	Tremper	Snowbird Neurosurgeons Conference - Avalanche Awareness	50
2/3/2007	Weed, Kikkert	Level One Field Session #2 - Maple Bench-Coldwater Trail	10
2/8/07	Kobernik	Sandy REI Avalanche Awareness	
2/13/2007	Weed	Avalanche Awareness for Rescuers - Rich County SAR	15
3/22/07	Lees	ACE Womens avalanche clinic	12
3/29/2007	Weed	Avalanche Talk - Boy Scouts - Providence	20
1/13/07-1/15/07	Lees, Hardesty, Kobernik	FUAFC 3-day Level I Avalanche class	30
2/17/07-2/19/07	Tremper, Hradesty, Kobernik	FUAFC 3-day Level I Avalanche class	30
4/19-21/07	Lees	Richfield Natural Resources Fair - Booth and information	1000

KNOW BEFORE YOU GO 2006-2007			
Date	Staff	Event	No. people
7/5/2006	Gordon	National Wildlife Foundation	47
10/6/2006	Morris	Ames Academy	94
10/7/2006	Gordon	Ames Academy	101
10/19/2006	Gordon	Hill Airforce Base	36
10/24/2006	Gordon	Cedar City BOE	84
10/25/2006	Gordon	Kaysville Scout Group	33
11/2/2006	Gordon	William Pen Elementary	319
11/6/2006	Gordon	Hill Airforce Base	36
11/7/2006	Gordon	Salt Lake Rotary Club	216
11/9/2006	Gordon	Davis County Search and Rescue	48
11/10/2006	Wewer/Bloom	Davis County Scout Group	104
11/14/2006	Lee	McGillis School	24
11/18/2006	Gordon	Our Lady of the Snows	83
11/20/2006	Lee	Park City High School (4 talks)	360
11/20/2006	Garcia	Butler Elementary	98

11/21/2006	Lee	Park City High School (4 talks)	328
11/27/2006	Lee	Treasure Mtn Middle School (5 talks)	205
11/28/2006	Lee	Treasure Mtn Middle School (5 talks)	221
11/29/2006	Wewer	Hyrum Middle School (2 talks)	1017
11/30/2007	Morris	Churchill Junior High School	254
11/30/2006	Gordon	Sandy REI	103
12/1/2006	Gordon	Evanston High School (4 talks)	637
12/1/2006	Gordon	Evanston Middle School	412
12/4/2006	Hutchinson	Rocky Mountain Middle School(2 talks)	595
12/7/2006	Gordon	BYU Ski Club	37
12/9/2006	Gordon	U of U Ski Club	19
12/11/2006	Gordon	Salt Lake Ranger District	11
12/11/2006	Fletcher/Whatley	South Davis Junior High School (6 talks)	822
12/12/2006	Wewer/Fletcher	Eden Scout Group	60
12/13/2006	Gordon	Morgan Junior High School	648
12/14/2006	Gordon	Timponogas Hospital	67
12/15/2006	Morris	Brigham Intermediate High School	637
12/18/2006	Bloom	Snowcrest Junior High School	352
12/18/2006	Garcia	Entheos Academy	27
12/19/2006	Lee	Hunter Junior High School	88
12/20/2006	Lee	North Summit Middle School	295
12/20/2006	Lee	North Summit High School	303
12/20/2006	Lee	South Summit High School	412
12/21/2006	Richards	Bonneville Junior High School	1100
12/21/2006	Gordon	Sandy REI	63
1/1/2007	Gordon	The Residences at Deer Valley	15
1/4/2007	Richards	Olympus Junior High School	846
1/5/2007	Morris	Fort Herriman Junior High School(2 talks)	931
1/5/2007	Morris	Indian Hills Middle School	1210
1/6/2007	Gordon	Westminster College	41
1/8/2007	Whatley	Saint Ambrose Catholic Church	43
1/10/2007	Gordon	Sandy REI	71
1/10/2007	Trotter	Springville Scout Group	129
1/12/2007	Gordon	Steeps Camp	18
1/16/2007	Trotter	Utah County EMS	31
1/16/2007	Gordon	Wasatch Backcountry Rescue	88
1/16/2007	Gordon	Goldman Sachs	23
1/16/2007	Trotter	Salem Scout Group	43
1/18/2007	Trotter	Utah Valley State College	29
1/18/2007	Gordon	Backcountry.Com	31
1/19/2007	Morris	Butler Middle School	1127
1/19/2007	Morris	Roy Junior High School	897
1/20/2007	Gordon/UAC Staff	Backcountry.Com(Field Day)	52
1/20/2007	Trotter	Wasatch County Search and Rescue	10
1/20/2007	Trotter	Rocky Mountain Search and Rescue Dogs	14
1/22/2007	Gordon	AMES School	37
1/22/2007	Garcia	Central Davis Junior High School	1100
1/24/2007	Richards	Kaysville Scout Group	68
1/24/2007	Gordon	REI Sandy	43
1/25/2007	Lee	Itineris Early College High School	167
1/25/2007	Richards	Kennedy Junior High School	1255

1/29/2007	Gordon	The Residences at Deer Valley	8
1/30/2007	Trotter	Payson Junior High School	94
1/31/2007	Trotter	Highland Scout Group	60
2/6/2007	Gordon	REI- 33rd South	67
2/6/2007	Whatley	Sandy Scout Group	48
2/9/2007	Gordon	Steeps Camp	21
2/9/2007	Scroggin	Evanston Scout Group	96
2/13/2007	Gordon	Hunter Junior High School	187
2/14/2007	Whatley	Holladay Scout Group	86
2/19/2007	Garcia	Park City Olympic Park	12
2/20/2007	Gordon	Brighton Ski Resort	118
2/22/2007	Morris	Willow Valley Middle School(2 talks)	484
2/22/2007	Morris	Logan Middle School (2 talks)	1268
2/22/2007	Richards	Mount Harmon Junior High School	632
2/23/2007	Gordon	Steeps Camp	26
2/23/2007	Hutchinson	The Residences at Deer Valley	17
2/26/2007	Gordon	Kern River Gas Transmission/Engineering	27
2/26/2007	Gordon	The Residences at Deer Valley	6
2/26/2007	Trotter	North Sevier Middle School	202
3/8/2007	Whatley	Highland 29th Ward	48
3/17/2007	Gordon	Wilderness Medicine Clinic	89
3/19/2007	Gordon	Alta Rustler Lodge	28
3/22/2007	Gordon	Island View RTC	57
3/26/2007	Gordon	The Residences at Deer Valley	18
4/6/2007	Gordon	Backcountry.Com (2 talks)	37
		Total Talks 119	22451

UAC Media Contacts 2006-07

Date	Staff	Agency	Subject	National or Inter-national Television Interview	National or Inter-national Television Information	National or Inter-national Print Media	Local Television Interviews	National Radio Interviews	Local Radio Interviews	Local Print Interviews
2/15/2006	Weed	Herald-Journal	general safety/ current local conditions							x
10/1/2006	Weed	The Avalanche Review	2005-2006 season summary			x				
11/15/2006	Lees	KSL Radio	current season avalanche info						x	
11/16/2006	Lees	KSL Radio	current season avalanche info						x	
11/17/2006	Lees	Channel 5	current season avalanche info				x			
11/23/2006	Weed	Herald-Journal	general safety/current local conditions							x
11/28/2006	Hardesty	Channel 4	REI Avalanche Awareness talk				x			
11/28/2006	Tremper	New York Times	Article on beacons			x				
11/28/2006	Tremper	Channel 2	Avalanche Conditions				x			
11/28/2006	Tremper	What Do You Do	Documentary on avalanche jobs		x					
11/29/2006	Lees	Channel 4	"Roughing It" avalanche safety tips				x			
1/2/2007	Tremper	KPCW	Interview on program and funding						x	
1/4/2007	Tremper	Ogden Standard Examiner	Funding							x
1/4/2007	Tremper	Salt Lake Tribune	Funding							x
1/4/2007	Tremper	Associated Press	Funding			x				
1/5/2007	Lees	Channel 13	Avalanche Conditions				x			
1/5/2007	Staff	Channel 13	Avalanche work and Budget				x			
1/5/2007	Tremper	Channel 2	Funding				x			
1/6/2007	Staff	Channel 5	Avalanche work and Budget				x			
1/6/2007	Tremper	Channel 4	Funding				x			
1/7/2007	Tremper	Channel 5	Funding				x			
1/8/2007	Tremper	Channel 13	Funding				x			
1/20/2007	Tremper	Wall Street Journal	Info on avalanches			x				
1/23/2007	Tremper	Elite Skiing Newsletter	Avalanche Information			x				
2/1/2007	Weed	The Avalanche Review	personal experience with cracked slopes			x				
2/10/2007	Tremper	Channel 2	Avalanche Conditions				x			
2/10/2007	Tremper	Salt Lake Tribune	Avalanche Conditions							x
2/11/2007	Tremper	Clear Channel	Avalanche Conditions						x	
2/15/2007	Tremper	Channel 5	Avalanche Conditions				x			
2/15/2007	Tremper	KSL Radio	Avalanche Conditions						x	
2/17/2007	Tremper	Salt Lake Tribune	Avalanche Fatality							x
2/18/2007	Tremper	Herald-Journal	current statewide conditions							x
2/20/2007	Kobernik	Boston Herald	Hells Canyon Fatality			x				
2/21/2007	Kobernik	Channel 2	Gobblers fatality				x			
2/21/2007	Kobernik	Channel 4	Gobblers fatality				x			
2/21/2007	Kobernik	Channel 5	Gobblers fatality				x			
2/21/2007	Kobernik	Channel 13	Gobblers fatality				x			
2/21/2007	Kobernik	SL Tribune	Gobblers fatality							x
2/21/2007	Weed	KVNU (AM talk radio)	general safety/current local conditions						x	
2/22/2007	Kobernik	KSL Radio	Avalanche Danger						x	
2/22/2007	Kobernik	Channel 5	Avalanche Danger				x			
2/23/2007	Weed	The Valley Channel	general safety/current local conditions				x			
3/17/2007	Weed	Herald-Journal	general safety/current local conditions							x

Budget – Good News and Bad News

The Utah Avalanche Center is the epitome of a successful partnership organization in which most of the funding comes from other interested parties outside the Forest Service. In these times of diminishing Forest Service budgets, partnerships have become the only way that many programs can survive. The good news is that all parties that benefit from programs pay their fair share. The bad news is that any time spent fundraising is time not spent saving lives, and we seem to spend an increasing amount of our time on funding issues.

Utah Division of State Parks and Recreation is by far the largest funding partner, contributing $82,000 per year. This money supports avalanche forecasting and education in Logan the western Uinta Mountains and on the Manti Skyline—areas primarily used by snowmobilers.

The Friends of the Utah Avalanche Center is a private, nonprofit, 501c3 organization which raises funds from the private sector. The FUAC raises around $40,000 - $50,000 annually. They donate about half that amount directly to the Utah Avalanche Center through an agreement and they spend the other half directly on programs to benefit avalanche forecasting and education in Utah. These include the observer program, in which about 20 regular backcountry enthusiasts are paid a nominal amount to take time after their outing and send in an observation, computer and safety equipment for forecasters, web design and maintenance and on avalanche education and outreach programs.

Because of increasing costs in times of flat budgets, the UAC was faced with a $30,000 shortfall this season, which the FUAC generously made up with their rainy day funds. Therefore, this season they donated $45,000 directly to the Forest Service and they spent another $20,000 directly on observers, equipment and education.

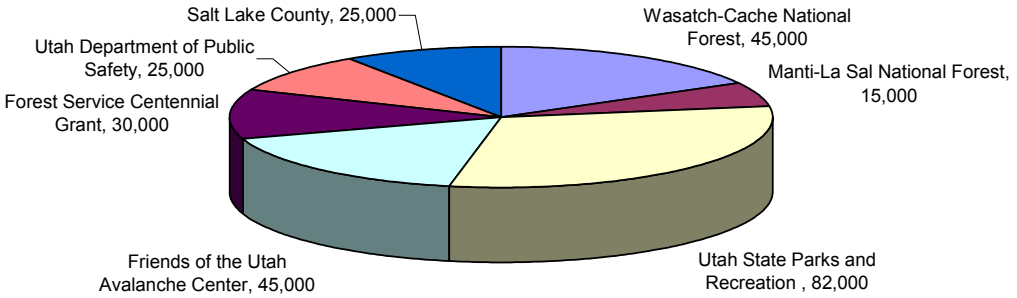
Last but not least, both Utah Public Safety and Salt Lake County contribute $25,000 annually.

This season, we also received a $30,000 Centennial Grant from the Forest Service, which was used for outreach programs to people who are not aware of the services of the Utah Avalanche Center. This money was spent on web design, the Are You Beeping? signs at ski area boundaries, video PSA's that play before movies in the major theaters and on television and broadcasting the overall danger ratings on local television, radio and in newspapers.

In addition, the National Weather Service provides significant in-kind support. Since 1980, our office has been co-located with the NWS Forecast Office near the Salt Lake Airport. They donate office space, computer network support, office supplies, weather forecasting services and computer support. Many thanks to Larry Dunn, the Meteorologist in Charge of the NWS for his steadfast support and also to Randy Weatherly who answers our many computer programming questions and generously helps on some programming applications.

In kind support also comes from the Forest Service District Offices, specifically Kamas Evanston and Logan. They donate snowmobiles and field time for avalanche-savvy personnel such as Dave Ream and Ted Scroggin, who are essential cogs in the avalanche forecasting machinery. In addition, the Wasatch Cache National Forest does not charge overhead for the Utah Avalanche Center so essentially, they donate the support staff as in-kind support.

Funding Sources for Utah
$267,000 total 2006-07



Cash Funding for northern Utah (Wasatch-Cache and Uinta National Forests)

Wasatch Cache National Forest	$45,000
Utah Division of State Parks and Recreation	$70,000
Friends of the Utah Avalanche Center	$45,000
Utah Public Safety	$25,000
Salt Lake County	$25,000
Forest Service Centennial Grant	$30,000
Total	$240,000

Cash Funding for southern and Central Utah (Manti La Sal National Forest)

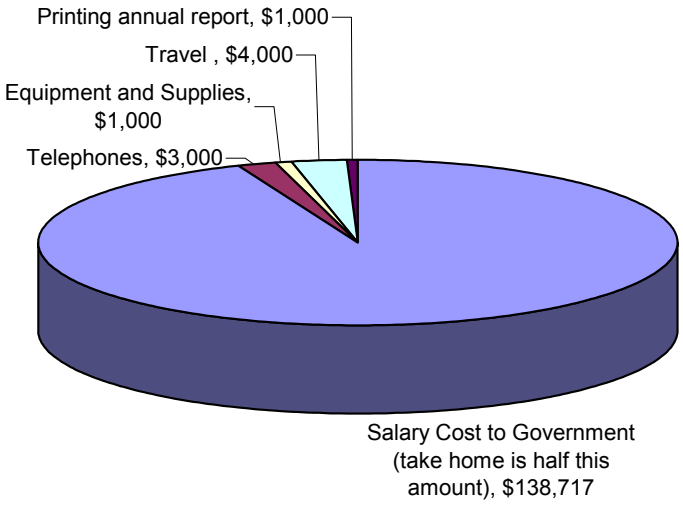
Manti – La Sal National Forest	$15,000
Utah Division of State Parks and Recreation	$12,000
Total	$28,000

Legislative Update

The good news is that this season, the Friends of the Utah Avalanche Center and the Utah Snowmobile Association successfully lobbied the Utah Legislature for $122,000 in one-time funds for next winter. These funds will come through Utah State Parks and Recreation. The bad news is that Utah State Parks, decided to cancel the $82,000 annual contribution to the Utah Avalanche Center for next season, which comes from the diminishing snowmobile registration fees. Instead, they would like us to apply for a grant from the federally-funded Recreation Trails Program. Unfortunately, since the funds are not guaranteed and they also arrive midway through our season, we can not spend them next winter, but we will spend them in the winter of 2008-09. In other words, we will be $80,000 short for next winter. Combined with an estimated $40,000 shortfall from increasing costs, we ended up pretty much right where we started.

Regardless, we appreciate the hard work and support by the many people who supported the Legislative funding. Many thanks to John Valentine, the President of the Utah Senate who is also an active member of the Utah County Search and Rescue Team, and thereby sees the tragic effects of avalanche accidents on a regular basis. Also, thanks to Ralph Becker, House Minority Leader, Senator John Stohl, Lobbyists Steve Erickson and Des Barker, who donated their time and the people who testified at the committee hearing including Brad Barber the retired Director of Planning and Budget for the State of Utah, Nathan Rafferty, President of Ski Utah, Ken Rossom with the Utah Snowmobile Association and April McDonald, the mother of a recent avalanche victim. Also thanks to the Board of the Friends of the Utah Avalanche Center, especially Jennifer Logan and other members of the Utah Snowmobile Association including Curt Kennedy, Dave Madsen and Doug Page.

Wasatch Expenditures 2006-07



Media Coverage

Teaching Out-Of-Bounds

By April Darrow Trans World Business 10-31-06

Most of the 130 U.S. ski areas that utilize **Forest Service** land offer backcountry access gates. Some have an open-boundary policy, allowing guests to cross into out-of-bounds terrain, while others' boundaries are closed or vary according to conditions. Anecdotal evidence indicates that more people are accessing the backcountry, many via access gates. In turn, resorts have been increasing measures to educate customers about backcountry safety.

In the last few seasons, avalanche beacon practice areas have been springing up at resorts throughout the West. The most widespread are Beacon Basin Transceiver Training Parks, created by transceiver, probe, and shovel maker Backcountry Access. Thirty resorts in eight states now offer the free parks, which provide a venue for guests to practice skills by bringing their own transceiver to search for pre-buried beacons attached by wires to a control panel. "There's no digging required, so this method is more fun and productive," says BCA VP Bruce Edgerly. The company has even taken it a step further by building beacon-controlled access gates for select ski areas. The gates operate using detector-controlled hinges that only open when a transceiver signal has been detected. Canada's Sunshine Village utilized the devices last season, and other resorts including the backcountry-dominated Silverton Mountain, Colorado are looking into them for 2006/07.

Aside from BCA's programs, an increasing number of resorts have hosted backcountry education events during the last few winters. Perhaps the most progressive resort program is Mt. Baker, Washington's Mountain Education Center, which educates 300 people a year through one-day introductory courses and three-day intensives. The basic courses cost 25 dollars per participant and focus on transceiver use and general backcountry info, while the 150-dollar intensives incorporate analyzing snowpack, reading terrain, digging pits, and even simulate a full-on burial.

Other programs target youth. The Alpine Safety Awareness Program (ASAP) a non-profit out of Bellingham, Washington, has educated 10,000 students—mostly middle school and high school kids—about backcountry safety and offers optional on-hill training at ski resorts. A fifteen-minute video touting avalanche prevention called Know Before You Go, created by Craig Gordon of the **Forest Service** Utah Avalanche Center in 2005, targets twelve to 25 year olds and has reached 12,000 people. More than twenty U.S. ski areas are currently using it to help train visitors.

Some resorts are pairing up with RECCO, the Swedish company that manufactures searchable reflectors. It reports that more than 120 U.S. ski areas and 100 outdoor brands are now using the avalanche-ready system. The brand is working to extend that outreach this season through retailers, where RECCO distributed more than 250,000 copies of its White Book, which outlines basic components of backcountry know-how. The book will be inserted into various snowboard publications this winter.

Even if brands like RECCO are reaching out to the public, resorts will still represent much of the frontline for backcountry safety and rescue training and techniques. While most focus will remain on education programs and public awareness, some states are choosing to up the rescue potential of their areas in case avalanche tragedy should strike. Utah's Wasatch Backcountry Rescue, a volunteer organization whose membership includes eight Utah resorts, is utilizing state-of-the-art long-range helicopter-mounted receivers to enhance its rescue techniques. In a state plagued by snow slides, the use of transceivers that cover a broader search area can help once the preventative training and education has failed.

Avalanche Danger Already Abound

Nov 02, 2006 by Julie Rose KCPW News

There's only a foot or two of snow on Utah's mountains right now, but diehards are already skiing the slopes of unopened resorts. That has prompted the Utah Avalanche Center to issue this warning:
"Resorts are not knocking down avalanches with explosives before the people arrive each day," says Bruce Tremper, director of the Utah Avalanche Center. "So it's just like the backcountry. And it's hard for skiiers to make that mental shift. They get on their favorite slope and suddenly are triggering an avalanche right after a storm."
The Utah Avalanche Center has already begun posting avalanche reports daily on its website - www.utahavalanchecenter.com. He says the fluctuating temperatures in the Fall turn early snow into sugar-like crystals that make avalanches likely:
"Kind of like a bunch of potato chips. Then when the next storm comes in it's like putting a brick on those potato chips and it slides very easily," says Tremper. "So fall is a very dangerous time of year for avalanches."
Tremper advises early snow enthusiasts to take avalanche beacons, a shovel and a partner to the slopes. Check the latest avalanche advisories at www.utahavalanchecenter.com.

Signs will beckon backcountry skiers to turn on beacons

By Brett Prettyman The Salt Lake Tribune
11/09/06

Are you beeping? It is not a question a polite stranger might ask if you failed to answer your mobile phone. It is an inquiry from the **Forest Service** Utah Avalanche Center (UAC) that might save your life, and it's a message coming to ski resorts along the Wasatch Front this winter.

The new campaign involves eight signs equipped with avalanche beacon detectors placed in key locations at the Town of Alta, Snowbird, Snowbasin, Brighton and The Canyons. The signs are equipped with built-in Ortovox avalanche beacons that emit a loud beep when other beacons are within range. Beacons are how people buried in avalanches are most easily located.

Officials hope that in addition to serving as a reminder to those who are properly equipped with beacons to turn them on or replace the batteries, the signs will send a clear message to all skiers and snowboarders about to leave the safety of the controlled environment within the resort.

Some Utah ski resorts allow customers to leave resort boundaries and access adjoining public land. That was the case in January 2005 when Idaho snowboarder Shane Maixner rode the Ninety Nine 90 Express lift at The Canyons and then crossed through a gate warning him of the dangers before dropping into Dutch Draw and being buried in a massive avalanche that took his life.

"What people need to realize is that crossing over the boundary to the other side of the rope is the difference between night and day when it comes to snowpack," said Craig Gordon, a forecaster with **the Forest Service** Utah Avalanche Center. "There is no avalanche control work and no ski patrol on the other side of that rope."

That means all backcountry users in Utah mountains in the winter - skiers, snowboarders, snowshoers and snowmobilers - should check with the center for the latest snow conditions, study the area upon arrival and carry a beacon, probe and shovel.

"People who are not familiar with the dangers of avalanches get lured into the backcountry areas that surround ski areas because they see people skiing powder while they are on groomed runs," Gordon said. "We want them to reconsider that decision when they see the signs."

The Are You Beeping? campaign was funded by the **Forest Service** with a donation from the family of Atilio Giorgio Cremaschi Yavar, a snowboard instructor from Chile who was living in Utah when he died in an avalanche in the backcountry near Brighton Ski Resort in April 2006.

The Town of Alta, Snowbird and Snowbasin will each get one of the signs, The Canyons will get two and Brighton will receive three. Partners in the campaign include the resorts, UAC, Ortovox and Wasatch Backcountry Rescue.

"This is another of the innovative steps the Utah Avalanche Center has taken to educate people about the dangers of avalanches and how to go safely into the backcountry," said Randy Doyle, area manager of Brighton Ski Resort. "We will be putting the signs at three of our most popular exit points."

Meanwhile, the popular Know Before You Go campaign, in its third year, has already been presented to 31,000 junior high and high school students in Utah. Gordon points out that there has not been a teenager lost in an avalanche since the **Know Before You Go** program started two years ago.

"We have definitely seen and increased knowledge of avalanche danger since the [Know Before You Go] program started," Doyle said. "Craig has had an impact by visiting all those schools." The center is now working with the State Board of Education to form avalanche education in the eighth-grade curriculum.

"We plan to increase our audience base for the **Know Before You Go** program through 2007-08 and hope to have avalanche education in the curriculum by the 2008-09 season," Gordon said. "If we can make it happen, it will be revolutionary. We would be the first state to implement avalanche awareness in school."

The center has also produced two new public service announcements that will be shown before films at select movie theaters, created a new logo, released a new toll-free forecast phone number **- 888-999-4019** - and is planning on making podcasts of the daily report available in the near future.

And don't forget it is already avalanche season.

"People generally think there is not enough snow to avalanche early in the season, but they happen," Gordon said.

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* BRETT PRETTYMAN can be contacted at brettp@sltrib.com or 801-257-8902. Send comments about this story to livingeditor@sltrib.com.

Avalanche program

The Utah Avalanche Center provides a daily snow-conditions report on its Web site, http://www.utahavalanchecenter.org, by phone 888-999-4019, and by e-mail. The center also has plans to introduce a podcast in the near future.

Watch the **Forest Service** Utah Avalanche Center's new public service announcement at http://www.sltrib.com/outdoors.

Early-season avalanche buries skier

Friends were quick to the rescue thanks to tracking device
NBC News and news services Nov 15, 2006

SALT LAKE CITY - An early-season avalanche on Tuesday swept away four experienced backcountry skiers, burying one who was quickly found only because he was wearing a tracking device. "I tried wiggling my face to try and get an air pocket" to breathe, Steven Lloyd recalled. He then started to slow his breathing and passed out.
His friends were able to find him since he and they were wearing tracking beacons. After 15 minutes of digging, they found him unconscious. On being pulled out, Lloyd quickly began breathing on his own.

The skiers were in the upper Silver Fork basin near Solitude ski resort, about 18 miles east of

Salt Lake City. They were skiing in more than a foot of fresh snow at an elevation of about 10,000 feet when an avalanche broke loose off a jagged ridge that separates Big and Little Cottonwood canyons.
Salt Lake County Sheriff's Office spokesman Lt. Paul Jaroscak said the skiers were experienced and had the necessary equipment to call for help.
"Two people were flown out by helicopter, and of those two, one of them was the one who was buried. ... The other two people skied out with rescuers who skied out to meet them," Jaroscak said.

None of the skiers experienced any injuries, he said. The **U.S. Forest Service** agency said the fresh snow and high winds combined Tuesday to create dangerous conditions.
"There was widespread avalanche activity," said Bruce Tremper, director of the Utah Avalanche Center. "The ski resorts, when they did avalanche control, got widespread slides. That's what our staff found in the backcountry."
Tremper said the new snow was sliding easily off a snowpack more than 2 feet deep.

More Snow the Key to Lower Avalanche Risk

November 15th, 2006 @ 2:39pm Dina Freedman Reporting KSL

Yesterday one Utah man was lucky to survive an avalanche in Silver Fork Canyon. KSL Meteorologist Dina Freedman tells why that avalanche potential is so high right now.
Since October the highest elevations along the Wasatch front have received around four to five feet of snow, but the bigger problem was the snow that fell in September. Our peaks in Northern Utah have been seeing lots of snow and that doesn't make it any easier for people who want to ski in the backcountry. Evelyn Lees, **Forest Service** Utah Avalanche Center: "We've put a very dense layer of snow on top of weak, potato chip like snow. And in the case of yesterday, the added weight of some skiers triggered the slide."

Because we had snow early in the season in September that just sat up there and didn't melt, it has now created an unstable layer for the new snow that just arrived this week.
Evelyn Lees, **Forest Service** Utah Avalanche Center: "What we're dealing with right now this year is what we call a persistent weak layer, a persistent weak layer is that shivery weak faceted snow and that does not strengthen within a day or two, any slope that did not slide yesterday still has the potential to slide with the weight of a skier today."
Even knowing that the avalanche danger is considerable and having the right safety gear with you, doesn't mean you're in the clear, the risk is still there.

Evelyn Lees, **Forest Service** Utah Avalanche Center: "The bonds between the crystals break, and as they start, and first it's a couple of bonds, then it spreads and numerous bonds break, and

then the slab. And then the weak snow layer can no longer support the slab of snow sitting on top of it and it starts to slide downhill if you're on a steep slope."
Yesterday not only did we have 10 to 15 inches of dense snow, but we had strong winds. Those winds can move the snow from one area to another and add more weight to it, making it even more prone to collapse.

The avalanche danger is not expected to change in the next 24 hours and remains at considerable. To lower that danger we just need more storms.
Evelyn Lees, **Forest Service** Utah Avalanche Center: "What we'd like to see is a steady stream of storms like a couple of storms a week, because then we build up a deep snow pack and we don't have time for the weak layers to develop. If it stops snowing now for a couple of weeks, we're going to develop even more weak layers."
Avalanche forecasts are issued every day and you can get them online or by using the phone. The new number for the **Utah Avalanche Center is 1-888-999-4019**.

Signs Increase Avalanche Awareness

November 28th, 2006 @ 5:56pm Jed Boal Reporting KSL

Video

View This Story

Heavy snow and wind set the stage for high avalanche danger today. But, after an early avalanche warning, the conditions reported from the mountains were not as bad as forecasters originally feared.
Bruce Tremper of the Utah Avalanche Center: "So we cancelled the avalanche warning for today, but we'll have to monitor it because we have more snow coming in for the rest of the day. There are probably not a lot of natural avalanches coming down from above that will catch you, but you could trigger the avalanche yourself. Considerable danger is still quite dangerous, but not quite as dangerous as we thought."

The snow is light density, and as long as winds don't pick up, conditions should not deteriorate. So the danger is considerable, rather than high.

Anyone venturing away from avalanche controlled areas should know what that means.
It's hard to zero in on a specific number of people who head out into the backcountry to ski or snowmobile, because you don't have to buy a pass. But, more people are using the resources at the Utah Avalanche Center.
Bruce Tremper/Utah Avalanche Center: "Our website has a huge number of new products, and a new look and feel that we're coming out with in the next month, so it's pretty exciting."
Also new this year, the **Forest Service** and ski resorts have put up beeping signs at backcountry exit points. The signs give skiers a gear check, and they beep and blink when they pick up signals from avalanche beacons, which every back-country skier should carry.
The Avalanche Center presents regular talks and clinics on avalanche awareness. There's one tonight at seven o'clock at R.E.I.
For more information and current conditions, check out the Utah Avalanche Center website.
http://www.avalanche.org/~uac/

New Avalanche Receiver

Manuel Genswein, the Swiss developer of the new Long Range Helicopter-based Receiver used to track and locate buried avalanche victims, explains the workings of the receiver during a demonstration at Wasatch Powderbird's heli-pad in Little Cottonwood Canyon, Utah, Thursday, Dec. 7, 2006. The new heli-based triple antenna system, which is a first in the United States, has a range of 150 meters and can be used to quickly search an avalanche site for victims. (Jim Urquhart/The Salt Lake)

New tech to save slide victims

Deseret Morning News, December 08, 2006 By Wendy Leonard

Unlike a human body, the targets buried Thursday on Mount Superior weren't in danger of suffocating under several feet of snow.

Members of the Wasatch Backcountry Rescue team demonstrate use of helicopter-mounted long-range receivers for locating avalanche victims. *Bob Plumb, Deseret Morning New*

Rescuers, however, worked just as fast to recover the plastic transmitters as they would to recover an avalanche victim — but this time, they had help from the air.
Long-range receivers mounted to helicopters are projected to make it safer for rescuers working on avalanche recoveries. The helicopters will join the efforts of search and rescue teams in the canyons, perhaps increasing the odds of saving avalanche victims.
Wasatch Backcountry has purchased two of the receivers for nearly $4,000 and turned them over to Wasatch Powderbird Guides, a Snowbird-based helicopter skiing outfit under contract with Salt Lake County to assist in search-and-rescue missions.
AirMed, a service of the University of Utah Medical Center that assists in searches in the Wasatch Mountains, also bought two of the devices for its helicopters.

Dean Cardinale, director of snow safety at Snowbird Resort, said a victim has limited time, under 10 minutes, before lack of oxygen causes brain damage, and will likely die of suffocation within 15 minutes. However, rare circumstances can allow for more time until death. Safety of rescuers is also a risk in such unstable conditions.

"There's always a chance another avalanche could cover the debris field," said Rusty Dassing, a senior helicopter guide. He said with each additional person added to the already-weakened slope, the threat of additional avalanches increases.
"This capability from the air is safer for rescuers," he said.
With the help of Wasatch Backcountry Rescue, a local search and rescue outfit, representatives demonstrated the new helicopter-mounted high-range receivers Thursday in Little Cottonwood Canyon.

Cardinale said the transmitter system is the first of its kind to be used in the United States, although the transmitters have been widely used for searches in European high country.

Manuel Genswein from Sweden shows the new helicopter-mounted long-range receiver at the start of a demonstration of the new technology in Little Cottonwood Canyon. The receiver picks up signals from beacons carried by recreationists to help locate avalanche victims.

Bob Plumb, Deseret Morning News

The device hangs by a strap from a helicopter and can pick up a signal from up to 196 yards — triple the range of regular avalanche beacons worn by rescuers. The device is useless unless victims are emitting a signal from their own beacon, worn around their bodies.

Dassing said anyone who heads into the hills during the winter for recreation should have a beacon and switch it on even during the drive up the canyon.

Beacons run about $200 each but are very important, as they emit a signal to receivers worn by ski patrollers and rescuers. And now, the receivers will also be carried by helicopters involved in the search after an avalanche.

Avalanche center finds funding a slippery slope

Understaffed agency is struggling to keep outdoor enthusiasts in the know

By Linda Fantin The Salt Lake Tribune Jan 04, 2007

Avalanches are the only natural hazard commonly triggered by the victim, making the **Forest Service** Utah Avalanche Center the quintessential consumer protection agency. Its updates on backcountry conditions steer thousands of adventurers away from danger each day. In mid-December, center director Bruce Tremper issued a particularly alarming forecast: The operation is $30,000 over budget, and he might have to trim staff from an already short-handed office. The warning and a plea for donations was e-mailed to about 2,000 people who receive regular avalanche advisories, including tour guides, outfitters and other business owners who rely on - and place demands on - the center's staff.

Businesses and other backcountry enthusiasts responded to the call, and, along with an infusion from Friends of the Utah Avalanche Center, the support should cover the existing shortfall, Tremper said.

But there are rumors the federal government might reduce its contributions, he added, and the crunch will continue to worsen as more people head into the backcountry. So Tremper and supporters are lobbying legislators to double funding for the avalanche center to about $500,000 rather than just plug the existing budget hole.

"In old days, we had ski swaps to raise money. But it's not a bake sale organization anymore," Tremper said. "We need to fund it."

The forecast center not only provides field reports on the backcountry, it acts as a clearinghouse for information phoned and faxed in by winter resorts, ski patrols and businesses such as Wasatch Powderbird Guides, whose permit requires it to provide morning updates about its tours to the center.

It's a symbiotic relationship that is critical to the winter tourism industry, notes Powderbird guide Mike Olson.

"A lot of our customers are the biggest backers of the forecast center, and we're doing our best to keep those guys alive. But we can't provide all the funding," said Olson. "The State of Utah must realize skiing is a huge money maker, and the forecasting center plays a big role in that."

The center gets $107,000, the bulk of its annual budget, from the state. The next-largest contributor is Friends of the Avalanche Center, which raises about $50,000 annually. The **U.S. Forest Service** kicks in $44,000 and Salt Lake County contributes $25,000.

Nearly all of it pays the salaries of the six forecasters who work 60 hours to 90 hours a week. Colorado, by contrast, has about 15.

Backcountry skiing, snowboarding, snowmobiling and snowshoeing boost Utah's reputation as a winter wonderland. But the traffic increase also means forecasters must cover more terrain.

"We just can't keep up," Tremper said. "When I started this job 20 years ago, we only had to worry about a handful of telemark skiers in knickers eating granola. Those days are long gone. The backcountry is being loved to death."

Since 1998, 224 people have died in U.S. avalanches, double that of the 1980s, according to the **Forest Service** National Avalanche Center. In Utah, where four people die each year in avalanches, the state used to rank just behind Colorado with the most avalanche fatalities. But snowmobiler deaths have pushed Montana and Alaska up the list in recent years, a reflection of the lighter, longer, more powerful machines on the market.

"They can take you to the top of a 12,000-foot peak pretty easily," notes Adam Pulley, owner of Bear River Lodge, about 50 miles northeast of Kamas. Pulley has 40 snowmobiles in his rental lot and sees the forecast center as a valuable public service.

"Right now they are spread very thin," Pulley said. "It would be nice to see more funding so they can do an adequate job."

Tremper has the support of Sen. John Valentine, R-Orem, but needs to find a House member to champion an appropriations request.

Valentine, an avid backcountry skier and a search-and-rescue worker with 26 years of experience, said the center has been "limping along" for too long.

"I would like to see them expand their educational mission [to reach] those kids I'm pulling out of the snowpack and the young adults who believe they are invincible," Valentine said.

Ruth Drapkin of Park City started skiing Utah's remote slopes in the 1970s, and she has been a fan of the forecast center since it was a dial-up service. She, too, praised the center's educational outreach.

"It's a science and they make it easy for a layman to understand what's going on," she said. "And understanding the snowpack is paramount to understanding the dangers that are out there."

lfantin@sltrib.com

Inside the mind of a potential avalanche victim

By Brett Prettyman

The Salt Lake Tribune 1/05/2006 02:30 PM

Before he started writing avalanche research papers with lofty titles, Ian McCammon was a mechanical engineer working on robotics and machines.

"Now he is trying to turn people into machines," jokes Bruce Tremper, director of the USDA Forest Service Utah Avalanche Center and a friend of McCammon.

But helping backcountry travelers act more like machines and less like human beings may be the only way to avoid the inherent and obvious dangers of avalanches. The human mind has a tendency to make too many shortcuts.

In papers with titles such as "Heuristic Traps in Recreation Avalanche Accidents: Evidence and Implications" (published in The Avalanche Review in December 2003 and February 2004), McCammon has delved into the psyche of backcountry winter travelers. After losing a close friend he knew to be well-trained in avalanche education, he wondered why seemingly knowledgeable people get caught in snowslides.

"There are patterns embedded in our humanity. To understand them could help us get a better

understanding of ourselves and what we do in the face of certain events," said McCammon, a Salt Lake City resident who travels the nation sharing his research with avalanche experts.

Research on more than 700 accidents between 1972 and 2003 led McCammon to identify several "heuristic" traps, or situational cues, that can lead to poor decision-making by rookies and experts, even in the face of unequivocal avalanche indicators.

McCammon is not the first to explore the human factor in avalanche tragedies, but he has approached the subject in a different way.

"It's a paradigm shift in the way we think about avalanche education. Every time Ian gives a talk I just go 'wow.' We have . . . [been] preaching the avalanche gospel for years, but the accidents just keep going up and up. . . . Ian's research shows there is more to safe travel in the backcountry than just being able to recognize avalanche danger; it is being able to recognize when you are ignoring that danger," Tremper said.

McCammon found the advertising world a fertile field for ideas about the effect of human factors on decision-making.

"They want people to make a decision to buy their product and they use the same mental traps we fall into in the face of avalanche danger to make those products more desirable even when the product is not exactly what the person might want," McCammon said. "This kind of advertising has been around for thousands of years."

Which makes it all the more difficult to recognize. Like consumers falling for products they don't need, potential avalanche victims are unaware they are making life-and-death decisions based on subconscious factors.

See AVALANCHE, E2

McCammon and Tremper, both seasoned backcountry winter travelers, admit they still fall prey to these errors in thinking even though they talk to people about ways to avoid them. The mental "traps" identified by McCammon in his research on avalanche victims include:

Familiarity: Cameron Carpenter felt safe, at least initially, the day his best friend died in an avalanche near Guardsman Pass in Big Cottonwood Canyon in 1986.

"It was one of our favorite places to go. We had been in that same spot a lot, even during that winter," said Carpenter, who lost his friend Brad Lindsey when they were both caught in the avalanche. "It wasn't until we were on the mountain for the second time that we realized we could be in trouble."

McCammon explains the familiarity heuristic this way: Rather than figuring out what behavior is appropriate each time we visit the backcountry, we tend to rely on past actions in that same place. Familiarity can help with decision-making, but it becomes dangerous when the avalanche hazard increases. McCammon found that 71 percent of the accidents he researched happened on slopes known to victims. When people travel in familiar places, they appear willing to expose themselves to almost four times as much avalanche hazard than when they travel in unfamiliar places. Familiarity also apparently negated the advantage of avalanche education.

Acceptance: The theory here is that people tend to engage in activities they think will earn them notice and/or respect. Call it the "bragging rights" or "testosterone" heuristic.

"Men, in the presence of women, will behave more competitively, aggressively or engage in riskier behaviors than when women are absent," McCammon writes.

Tremper says he understands the acceptance heuristic all too well.

"When I'm by myself I'm very cautious. Add a trusted partner and I'm willing to go places I probably wouldn't before. Add a group of six people and a couple of attractive females and I'll do just about anything," Tremper said.

McCammon reports that groups that include women appear to expose themselves to greater risk than those without, but not because women take more risks. Of the 1,355 individuals present in accidents McCammon studied, only 10 percent were female. And only 9.1 percent of the avalanche victims were women.

Commitment: When he first heard about the commitment heuristic, Carpenter said it probably did not play into his accident, but the more he talked about that fatal day, the more he realized how it had affected his and Lindsey's decisions.

"It was snowing hard. One of the other guys got cold and went back to the car. We were pretty committed to making another run," Carpenter said. "We made an effort to get up the canyon and weren't going to sit in the car."

McCammon found that people who were highly committed to enter the avalanche path that eventually caught them took more risks than those less committed to a certain goal or objective.

Expert halo: People appointed as "backcountry experts" by the group tend to expose the party to greater avalanche hazards than groups that make decisions based on consensus. McCammon found that leaders with the expert halo appear to make riskier decisions as the size of the group increases.

Individuals appointed as experts may suffer from a false sense of confidence in their avalanche awareness skills even if they are actually quite knowledgeable in the backcountry.

Tracks/scarcity: This may be among the most dangerous heuristics because the desire to find fresh powder increases along with the avalanche hazard. New and deep snow has a tendency to make many people ignore obvious dangers. The thrill of being the first to make tracks on fresh snow tempts many backcountry travelers into terrain they would otherwise avoid.

Social facilitation: McCammon found that groups who met other people before their accident exposed themselves to more hazards than those who had not encountered other groups that day. Parties of three and four people appeared more prone to this phenomenon than groups of other sizes. McCammon theorizes that people who are good at something believe they will do it better with an audience. But unskilled people believe they will perform even more poorly. The trap is that people with some avalanche avoidance skills take more risks.

The question for avalanche educators now is how to incorporate McCammon's research into effective prevention.

"The Europeans have had some great success with rule-based decision-making. There are certain rules they follow in certain situations," Tremper said. "That makes a lot of sense, but it still does not address the ability by people to justify certain risks, many times without even realizing they are doing it."

bpretty@sltrib.com Flawed decision-making has been the folly of even the most experienced backcountry traveler

Mind traps

Six decision-making traps in recreational avalanche accidents identified by Utah researcher Ian McCammon:

Familiarity - If the geography is familiar, we tend to do things we did before, despite changing risk factors.

Acceptance - A tendency to engage in activities that will get us liked or accepted.

Commitment - Focusing on an objective or goal to the exclusion of important hazard informa-

tion.

Expert Halo - Placing decision-making and responsibility on a person perceived to be the most knowledgeable in the group even if the person isn't a true expert.

Tracks/Scarcity - If fresh, untracked powder is scarce, it is perceived to have more value and be worth the potential risk.

Social Facilitation - People who believe they have good avalanche skills are more likely to take risks in the presence of other people; people who feel less skilled take fewer risks.

Source: "Heuristic Traps in Recreational Avalanche Accidents: Evidence and Implications" by Ian McCammon

Snowmobilers risk avalanche dangers

DenverPost.com 1/07/2006 01:51 AM

The public can empathize with the emotional shock felt by a snowmobile group that lost two members to an avalanche last weekend near Cameron Pass, but the group shouldn't have taken their machines inside a wilderness area.
The fact that the U.S. Forest Service reportedly hadn't erected obvious signs at the trailhead wasn't a solid excuse - one of the essential items in any outdoor survival kit is a map, and a good map should have shown the wilderness boundary. That said, the snowmobilers would have been in danger even if the slope they were on had been outside the Neota Wilderness.
Over New Year's, strong winds and heavy snow created considerable-to-high avalanche hazard even below timberline nearly everywhere in our mountains, the Colorado Avalanche Information Center reported at the time. Thus, slopes that usually don't have snow slides were risky places to be on that particular day. High marking (riding a snowmobile up a slope as far as it can go without stalling) just wasn't safe given the conditions.
For decades, Colorado carried the unwanted reputation of having more avalanche deaths than any other state in the country. (**Utah last year claimed that notoriety.)** But in recent years, the average number of annual Colorado avalanche deaths has fallen, despite a dramatic rise in the number of people taking part in winter outdoor recreation.
In the same period, the Colorado Avalanche Information Center, part of the state's Geological Survey, undertook concerted efforts to teach the public to avoid hazards. The legislature helped by allocating a small portion of the state's severance tax to the avalanche center, enabling experts to better analyze conditions, make the information publicly available and, most important, teach the public to recognize and avoid danger.
But the fatal slide near Cameron Pass puts Colorado nearer to a worrisome national trend: More snowmobilers are dying in snow slides. In fact, snowmobilers account for more U.S. avalanche deaths (44 percent) than backcountry skiers (24 percent), snowboarders (14 percent) and mountain climbers (5 percent) combined. No snowmobilers died in Colorado avalanches last year, but account for two of the four deaths so far this winter. Clearly, clubs, guide services and retailers need to better educate members and clients.
The Colorado Avalanche Information Center's classes are free and held at numerous locations statewide. The center's Web page is geosurvey.state.co.us/avalanche. The metro-area number for its daily forecasts is 303-275-5360.

Forecast of snow atop slick crust means mountains of danger to come

By Mike Gorrell The Salt Lake Tribune 02-05-2007

When it finally snows a lot - and surely it will - backcountry conditions are ripe for avalanche activity even more pronounced than Saturday's slides, one of which severely injured two snowshoers ascending Pfeifferhorn.

"We've been waiting and waiting for a weather event to stir things up and it finally arrived,"

Utah Avalanche Center forecaster Drew Hardesty observed Sunday. "With a very weak snowpack structure, all it took was a few inches of snow late in the week and strong winds to produce widespread avalanching."

The slide that took out snowshoers Joe Bullough and Brian Dutton was only 3 to 6 inches deep, but that was sufficient to sweep them 150 feet over a cliff band and dump them onto a snow field below.

Bullough remained in extremely critical condition Sunday at LDS Hospital in Salt Lake City while Dutton was serious but stable, said hospital spokesman Jess Gomez.

The two Salt Lake City men, both 42, unleashed the slide as they came within a couple of hundred feet of reaching the 11,326-foot summit of Pfeifferhorn, a jagged peak along the ridge separating Little Cottonwood and American Fork canyons.

In Hardesty's preliminary accident report, he said a "hard wind slab" broke loose on the ridge's steep southeast flank. This slab, weighted down with wind-blown snow, likely was on top of a layer that had become slippery during January's dry spell, when the snow surface repeatedly warmed up during the day and froze at night.

That "melt-freeze crust" can be found all around the Wasatch Mountains after a January in which hardly any snow fell but temperatures often fluctuated from below to above freezing. And that raises concerns about storms eventually piling a couple of feet of new snow on top of that crust, which will not be able to sustain the added weight, triggering widespread slides. "Nothing like a little wind to wreak havoc with things," Hardesty added, noting that sustained winds Friday night and Saturday of up to 50 mph, gusting to 70, created unstable wind drifts susceptible to sliding when another force, such as human movement, was mixed into the equation.

Case in point: The fourth person in a party skiing Saturday on the northeast-facing side of Scott Peak, near Park City, set in motion a hard slab 3 feet deep and 65 feet wide that buried one of the skiers up to his chest.

"Another skier on the north side of Timpanogos remotely triggered three avalanches," Hardesty said. "I received numerous reports of human-triggered slides in the backcountry [Saturday] on a variety of aspects and elevations."

Rated Sunday as "moderate" to "considerable," the threat of backcountry avalanches is likely to diminish today and Tuesday, but could pick up thereafter. The National Weather Service is predicting the central Wasatch Mountains will get a shot of snow Wednesday evening, with the likelihood of additional snow increasing into next weekend.

mikeg@sltrib.com

Related Avalanche stories

- **Feb 4:**
- Renowned avalanche researcher dies
- Avalanche strands pair, injuring one
- **Feb 3:**

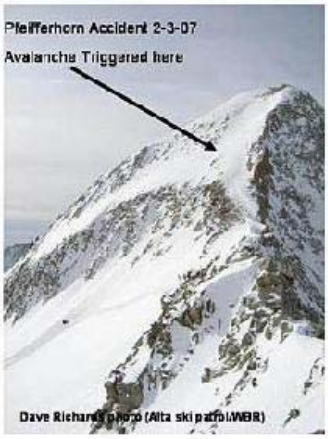
- Two skiers hit by avalanche high in Little Cottonwood Canyon; rescue delayed by high winds

The **USDA Forest Service** Utah Avalanche Center Web site at: http://www.avalanche .org/~uac/ contains a wealth of information about avalanches. Here are some tips culled from that site:

Backcountry travel tips

* Venture onto slopes one at a time, leaving someone in a safe spot to do the rescue. Split large groups and stay in visual and voice contact.
* Plan an escape route. What will you do if you trigger an avalanche?

* Use slope cuts. Keep up your speed and cut across the starting zone, so that if you do trigger an avalanche, momentum can carry you off the moving slab into safer terrain.
* Watch for cornices and give them a wide berth. Never walk to the edge of a drop-off without first checking it out.
* Look for alternatives: Follow ridges, thick trees and slopes with safer consequences. You can almost always go back the way you came.
* If there's no other choice, go underground. You can almost always weather a bad storm or bad avalanche conditions by digging a snow cave in a protected area. You may be uncomfortable, but you will be alive.



The Pfeifferhorn slide was triggered near the summit, injuring and stranding two backcountry snowshoers Saturday. (Courtesy of Utah Avalanche Center)

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Coping with an avalanche

* If you trigger an avalanche, try to get off the slab. If you are on skis or a snowboard, try heading straight downhill to build speed, then angle off to the side of the moving slab. If you're close enough to the crown, you can try running uphill to get off the slab, or running off to the side. If you're ascending when the avalanche breaks, there's not much you can do.

* If you're on a snowmobile you have the advantage of power. Grab some throttle and if you're headed uphill, continue uphill. If you're headed across the slope, continue to the side to safe snow. If you're headed downhill, your only hope is to try to outrun the avalanche. Remember that large avalanches travel 60 to 80 mph and are difficult to outrun.

* If you can't escape the slab, try grabbing a tree. But do it fast; avalanches quickly pick up speed.

* If you can't escape the slab or grab a tree, swim hard. A human body is about three times more dense than avalanche debris and tends to sink unless it's swimming hard.

* As the avalanche finally slows and just before it comes to rest, try to clear an air space in front of your mouth. This helps delay the buildup of carbon dioxide, which allows you to live longer under the snow.

* Push a hand upward. Visual clues allow your friends to find you faster. You may not know which way is up, but take your best guess.

* After the avalanche comes to a stop, the debris will instantly set up like concrete. Unless you are very near the surface or have a hand sticking up out of the snow, it's almost impossible to dig yourself out of an avalanche.

Weekend deadly for snow fans

After four die in avalanches, forecasters warn those playing in the backcountry

By Jeremiah Stettler The Salt Lake Tribune 02-19-2007

When two snowshoers unleashed an avalanche early this month near Pfeifferhorn that swept them over a cliff edge and into the hospital, avalanche watchers warned that more trouble was sure to come.

And it did . . . more brutal than before and claiming the lives of three people in Utah and a Utahn snowmobiling in Idaho. A cascade of avalanche-related deaths hit Utah on Saturday as snowmobilers and skiers traveled into the backcountry for a long Presidents Day weekend. Among them was a 16-year-old, whose snowmobile was caught in a 300-foot-wide slide that buried him and his machine.

On Sunday, a 17-year-old skier also died in an avalanche.

Craig Gordon, a forecaster for the **U.S. Forest Service's** Utah Avalanche Center, warned that more avalanches could follow as snow settles into the mountains this week.

"We're not out of the woods yet," he said.

The trouble lies beneath the fresh powder expected in the mountains today.

Dry January conditions have created a weak, sugary foundation that could collapse if the snow on top becomes too heavy.

When it does - whether by snowstorm, wind or a backcountry sportsman - the top slab cracks like glass and slides down the mountainside. That's what happened Saturday as Zachary Holmes, a Farr West teen, joined his cousins for a snowmobile outing about 14 miles southeast of Heber City in Wasatch County. The group triggered a slide as wide as a football field that traveled about 200 vertical feet and piled debris up to 10 feet deep.

The Tower Mountain region was ripe for an avalanche. Snowstorms had dropped 18 to 30 inches of powder in the mountains since the previous weekend and northwesterly winds heaped the snow even higher, Gordon said.

The avalanche buried Holmes - who was wearing a beacon and a helmet - beneath 3 feet of snow with the snowmobile on top of him.

His companions dug him out and administered CPR, but the teen later died at University Hospital in Salt Lake City. Another man died in Sevier County while climbing Signal Peak on a snowmobile. The 44-year-old Richfield man was caught in a slide that buried him in about 8 feet of snow. According to search and rescue teams, the avalanche had tumbled about 150 vertical feet in an 80-foot swath.

The Sevier County Sheriff's Office had not released the man's name late Sunday. A police dispatcher said authorities had not yet notified the family.

An avalanche struck an Ogden snowmobiler, whose party of four was riding near Palisades Peak in southeastern Idaho. Nicholas Steinmann, 26, was buried beneath 8 feet of snow in a slide that partially buried two of his colleagues.

His fellow snowmobilers probed the area with tree branches. With the help of a search and rescue team, they found Steinmann and administered CPR, but Steinmann died.

And another avalanche in Weber County, this one in the backcountry of the Snowbasin ski resort, claimed the life of a 17-year-old Massachusetts boy who was skiing with his father and brother Sunday. Witnesses told police the boy triggered the avalanche around 2 p.m. His body was pulled from under 6 feet of snow about two hours later, said the Weber County Sheriff's Office.

Gordon hopes the weekend's tragedies will serve as a wake-up call for backcountry enthusiasts who may feel a little too safe in the mountain snow.

"Is it tricky out there? You bet it is,"" he wrote in a Sunday avalanche advisory. ""There are plenty of steep slopes you can ride without incident, giving you a false sense of snow stability [and] luring you deeper into the avalanche dragon's den."

He urged snowshoers, skiers and snowmobilers to check avalanche advisories daily at www.avalanche.org/~uac and to watch for clues to instability - such as naturally caused avalanches. The National Weather Service expects more snow today. The mountains could receive 6 to 10 inches by midday with larger accumulations of 8 to 12 inches in Big and Little Cottonwood canyons.

While Gordon could not say for sure whether the snow would trigger a new batch of avalanches, he said people "need to be on their toes."

jstettler@sltrib.com

Avalanche safety tips

The **USDA Forest Service** Utah Avalanche Center Web site at www.avalanche.org/~uac/ offers these tips:

* **Venture onto slopes one at a time,** leaving someone in a safe spot. Split large groups and stay in visual and voice contact.
* **Plan an escape route**. What will you do if you trigger a slide?
* **Use slope cuts.** Keep up your speed and cut across the starting zone, so that if you do trigger an avalanche, momentum can carry you off the moving slab into safer terrain.
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* **Look for alternatives**: Follow ridges, thick trees and slopes with safer consequences. You can usually go back the way you came.
* **If there's no other choice**, go underground. You can almost always weather a bad storm or bad avalanche conditions by digging a snow cave in a protected area. You may be uncomfortable, but you will be alive.

Coping with an avalanche

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to dig yourself out of an avalanche.

Avalanche Center Receives Additional Funding

Shelley Osterloh Reporting **KSL News** *03-02-2007*

Bottom of Form

The recent snowstorm we had is making the avalanche danger even worse, but the future of the Utah Avalanche Center just got a whole lot better.

Two months ago, I told you the Utah Avalanche Center was in danger of having to lay off forecasters, even though they are needed more now than ever. But an e-mail campaign launched by the Friends of the Center and the Utah Snowmobilers Association persuaded the Utah legislature to up the Center's funding by $122,000.

This season four people were killed in Utah avalanches. One of them died in the mountains near Richfield, an area that does not have the benefit of avalanche forecasting. But thanks to increased funding, instead of cutting back staff and service, there's plans for adding more.

Bruce Tremper, director, Utah Avalanche Center: "Our ideas are to put another forecaster in the Logan area because they really need it there. The western Uintas have had just one person there all these years, and they really need two. Manti-Skyline needs a full time person and then just to expand the outreach program to the rest of the state."

The Utah Avalanche Center currently receives $82,000 through the Utah State Parks. That figure has been raised to $204,000, an increase of 122,000. Other funds have come from private donations, the **U.S. Forest Service**, Salt Lake County and Utah Public Safety. Bruce Tremper, the center's director, says while they are happy to have the additional funding, he and his team are worried about avalanche conditions this weekend.

Bruce Tremper: "We are really urging people to cool it this weekend, to stay off of steep slopes. This is not the time to be on steep slopes. Avalanches can break out very, very large, up to 10 feet deep. You can take out the entire slope. Trigger them from the bottom, it's especially dangerous this weekend."
Bruce Tremper says stay off of anything steeper than 30 degrees and stay out from under it, too. How steep is 30 degrees? Well if it's steeper than a regular flight of stairs, you shouldn't go there.

Almost a third of Utah avalanche deaths since 1996 involved boarders

By Jeremiah Stettler The Salt Lake Tribune 03-12-2007

A purple ski hat. A backpack. A snowboard.

Those were the first clues to lead search and rescue crews to the bodies of three Utah snowboarders, buried by a deadly avalanche in the rugged canyons near Mount Timpanogos in December 2003.

The backcountry disaster would rank among Utah's worst, killing three Utah County snowboarders as they descended Roberts Horn Chute, about 2 1/2 miles north of Sundance Ski Resort.

Utah's avalanches have shown an uncommon appetite for snowboarders over the past decade. Of the 43 avalanche-related deaths since 1996, close to one-third have involved snowboarders.

Outside the Beehive State, snowmobilers have suffered the heaviest losses. The death toll for snowmobilers has reached 110 people over the same period, accounting for 36 percent of all avalanche fatalities, according to the National Avalanche Center.

Skiers and snowboarders ranked second and third, respectively.

The prevalence of snowboarder deaths in Utah doesn't really surprise winter sport gurus such as Travis Johnson, who manages Milo Snow and Skate in Salt Lake City. With city life snuggled up against the Rockies, he said avalanche terrain is easily accessible to anyone with a snowboard.

Boarders often don't realize the danger lurking on those backcountry slopes, he said. The inevitable result: avalanches.

Snowboarders are particularly vulnerable because of their newness to avalanche territory, said avalanche forecaster Craig Gordon.

Snowboarding gear has advanced considerably over the past 10 years, opening the backcoun-