



**GALLATIN NATIONAL FOREST
AVALANCHE CENTER**

2001-2002 Annual Report



GALLATIN NATIONAL FOREST AVALANCHE CENTER

ANNUAL REPORT

2001-2002

by

Doug Chabot

Gallatin National Forest Avalanche Center
P.O. Box 130
Bozeman, MT 59771
(406) 587-6984
web page: <http://www.mtavalanche.com>
e-mail: gnfac@avalanche.org

Cover illustration by Ralph Wiegmann.

The Gallatin National Forest Avalanche Center (GNFAC) is a unique partnership of the Forest Service, Fish Wildlife and Parks, other federal and state agencies and businesses in the national and local outdoor community. All of these entities make it possible for the GNFAC to pursue its goal of putting out daily avalanche advisories in addition to teaching high quality education programs targeting all outdoor recreationists.

ACKNOWLEDGMENTS

Every year the community support to the Avalanche Center increases. This support comes in the way of money, product and time from many companies and individuals. These partnerships allow us to increase public awareness and education about avalanches every year. We again thank those businesses and agencies that have provided significant contributions (in excess of \$1000) this past season:

Friends of the Avalanche Center
Hans Saari Memorial Fund
Montana Fish, Wildlife and Parks Recreation Trails Grant
Northern Region Partnership Fund
Montana Fish, Wildlife and Parks Snowmobile Safety Program
Gallatin County Search and Rescue
Drew and Jennifer Seessel
Surfrider Foundation
Region 1
Polaris Industries
Team Bozeman
Merica Design
Northern Lights Trading Company
Natural Resources Conservation Service
National Avalanche Center

The **Friends of the Avalanche Center** deserves a hearty round of THANKS! These dedicated individuals help us in countless ways. Most notably they fundraise and write grants to financially support the GNFAC and also provide community outreach. The board includes Molly Merica (President), Chas Day, Greg Caracciolo, Joel Lee, Dale Sexton, Annie Fast, Jeannie Wall, Drew Seessel, Ron Lininger, Jason Schutz, Lance Riek, Jim Marshall, Marty Faulkner, and Cliff Gullett.

The Avalanche Center exists due to the long-term support and encouragement of the **Gallatin National Forest**. The GNF provides a home for the Avalanche Center and has taken leadership in our region for providing a top-notch program of avalanche education and awareness. Kimberly Schlenker, program manager for Recreation and Wilderness, continues to oversee the center, and her invaluable encouragement, assistance and guidance cannot be overemphasized. Her advocacy helped get the center off the ground and has helped it mature and grow throughout the years.

HOME PAGE OF THE GNFAC

http://www.mtavalanche.com/



GALLATIN NATIONAL FOREST AVALANCHE CENTER

Current Advisories

Real-Time Weather Conditions

Archived Advisories

Avalanche Education

Friends of the GNFAC

Aviation Report

Avalanche Observations

Gallatin Avalanche Center

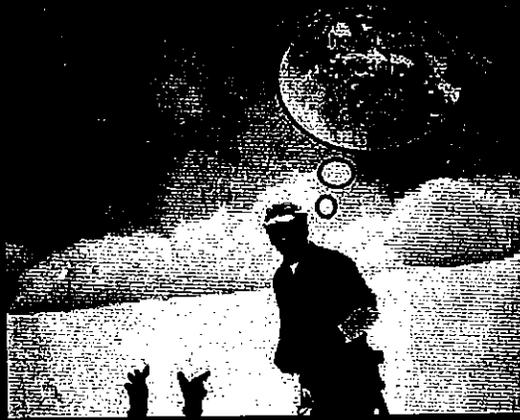
Snow Avalanche Articles

Links

Accident Reports

Team

Welcome to the Gallatin National Forest Avalanche Center (GNFAC) web site. Based in Bozeman, Montana, the GNFAC covers an area of approximately 10,000 km², including the Bridger, Gallatin, Madison, and Washburn Ranges, the Lionhead area near West Yellowstone, and the mountains around Cooke City. The goal of this site is to help provide the public with current snowpack and mountain weather information, as well as to assist with avalanche education. Check our [contact us](#) section to subscribe to our [mailing list](#) and receive the daily advisories via email.



Gallatin National Forest Avalanche Specialists:

Doug Chabot
Ron Johnson
Scott Schardt

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HISTORY

The idea for a full-time avalanche forecast center in Bozeman dates back to the early 1980s when Montana State University Professor Bob Brown and students Bruce Tremper and Dave Bryar put together a proposal for the state. They managed to elbow their way into a meeting with the governor, but their proposal was eventually turned down. Two years later Chuck Harris, a Forest Service employee in Livingston (20 miles east of Bozeman), got together with Bob Brown and gathered a network of folks from Bridger Bowl and Big Sky Ski Areas, Montana State University, Yellowstone National Park and the Natural Resources Conservation Service (NRCS). The group discussed the current avalanche conditions on a weekly conference call, and Chuck put a short blurb in the newspaper on Fridays. When Chuck left for northwest Montana a few years later, Don Michel, Bridger Bowl's Snow Ranger, took over. Karl Birkeland took the helm in 1989, and in 1990, through the Forest Service with Kimberly Schlenker's guidance and support, he started issuing weekly avalanche advisories. These quickly increased to 4 days a week the next year, giving birth to the Southwest Montana Avalanche Center.

Overworked, Karl hired Ron Johnson part time in 1991 and then full time the following year. With the additional manpower, advisories were increased to six days a week. Given the Forest Service's financial commitment, the name was officially changed to the "Gallatin National Forest Avalanche Center" (GNFAC) in 1993.

Karl decided in 1994 to pursue a doctorate from Arizona State University. During his fall absences, Alex Lowe and then Doug Chabot were hired intermittently to work with Ron. This continued until 1997 when Doug was hired part time allowing them to expand their advisories to 7 days a week.

The biggest change to the GNFAC occurred in 1999 when Karl was hired by the National Avalanche Center as an Avalanche Scientist and Technical Specialist. Doug moved to a full time position and Scott Schmidt was hired part time. In 2000, Doug was hired as the Director, and together with Ron and Scott they continue to move the Avalanche Center forward.

The GNFAC has grown since its inception in 1990. During its first year of operation the Center's avalanche advisories were accessed 3,400 times; quite impressive given that it was a one-man show with one phone line. This year the advisories were accessed over 174,000 times through our six phone lines, faxes, emails and web site. Additionally, we taught 62 education programs reaching 2,700 people.

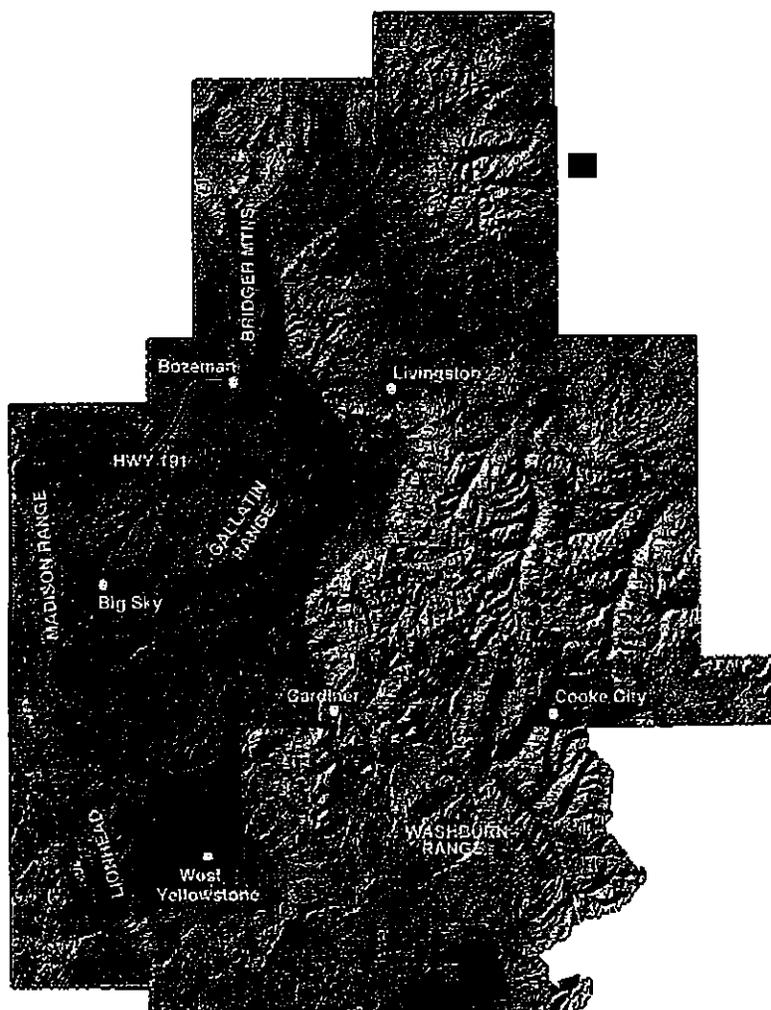
With winter recreation on the rise, we'll continue to meet the educational needs of our community. All of our partners contribute time, money and equipment that allow the GNFAC to continue with its mission of providing high quality education and advisories to the public.

ADVISORY AREA

The Gallatin National Forest Avalanche Center covers over 10,000 sq. kilometers of National Forest land. Our specific area includes the:

- ❑ Bridger Mountains
- ❑ Gallatin Mountains
- ❑ Madison Range
- ❑ Washburn Range
- ❑ Mountains around Cooke City
- ❑ Lionhead area near West Yellowstone.

Our advisories cover very specific areas, and at times are broken into sub-groups to accurately describe the current avalanche conditions. Many people also extrapolate from our advisories for adjacent mountain ranges. The shaded areas on the map represent the approximate area covered by our advisories.



20 WAYS WE MADE A DIFFERENCE IN 2001-2002

This season we're proud to list many new accomplishments. We reached more people than ever before through our advisories and taught a record number of education classes. Every year our goal is to build upon the previous season, and this winter was very successful.

1. Our advisories were accessed 1,291 times a day through our email service, web page, phone lines and faxes. This is a 16% increase over last year and a 370% increase from 5 years ago.
2. Our email subscription service was upgraded at the beginning of year. It's now easier to mail, attach photos and track our subscribers.
3. We taught 62 avalanche education programs reaching 2,700 people.
4. We increased our snowmobile education efforts through two, multi-day avalanche classes held in Bozeman and West Yellowstone. Additionally, over 450 snowmobilers attended our education programs.
5. There were three live recoveries of completely buried snowmobilers using avalanche transceivers. Two of these incidents involved rescuers who had been trained through our programs.
6. We created an "Avalanche Awareness for Snowmobilers" PowerPoint presentation and instructors manual. This was distributed to over 175 educators and snowmobile clubs throughout the country.
7. We purchased a digital camera and started putting photos in our advisories.
8. A new "Accident Reports" page was added to our web site allowing us to display photos and reports of various accidents that happened throughout the winter.
9. Both Ron and Doug taught at the prestigious National Avalanche School last fall. Over 200 avalanche professionals attended this weeklong course.
10. Doug lectured to the Western Chapter of the International Snowmobile Association in Jackson, WY. They requested 100 copies of our "Avalanche Awareness for Snowmobilers" CD that they distributed to snowmobile clubs throughout the west.
11. We recruited Chris Lundy to help us teach our avalanche awareness programs since it became increasingly difficult to meet the rising demand for our classes.
12. Recognizing that our advisories are read more often than heard, we attempted to become better writers. The Friends hired Ginger Birkeland to edit our advisories and improve our writing style.
13. We secured more funding for Scott Schmidt, which allowed him to work over 32 hours a week. His increased presence meant we were able to offer more education classes and get more field data.
14. In January, we hosted a Regional Conference for Forest Service personnel on educating snowmobilers about avalanches. This "Educating the Educators" workshop was attended by people across the state and resulted in two cover stories in the *Helena Independent Record*.
15. Every month we wrote articles relating to avalanches in the *Montana Snowmobile Association News* and *Carve*, a winter supplement to the *Bozeman Daily Chronicle*.
16. Our advisory was published every Wednesday in the Outdoor Section of the *Billings Gazette*.
17. Polaris, along with a local snowmobile shop Team Bozeman, loaned the Friends two sleds for our use this winter. This allowed us to investigate avalanches which otherwise would've been inaccessible, and let us make personal contact and educate hundreds of riders.

18. We converted all of our slide shows to PowerPoint, which streamlined our education programs.
19. We purchased an InFocus projector that was kept busy all winter. In the past we had to wrestle for the "community" projector, however, this purchase allowed us to have a dedicated system.
20. We were able to shotgun our message about avalanche safety with the help of the media. We had 35 media contacts that all resulted in favorable articles and television interviews.

ADVISORIES

Once again, we saw a rise in the number of people accessing our advisories. We're seeing our email subscription service and web site become more popular every year as computer technology gets better and easier to use. Our email list swelled to 832 a day prompting us to search for another email provider when our old system crashed under the workload. We replaced it early in the season and our emails remained glitch-free. The new system also allows us to target emails for specific user groups. Calls to our hotline picked up slightly since Cooke City became a local call; however, the phone lines only account for 7% of the total accesses. The number of faxes reached a plateau, although many businesses still find it a popular way to receive the advisory.

With the purchase of a digital camera we began taking photos and adding them to our advisories. Now, instead of saying, "...the avalanche was three feet deep and 1000 feet wide..." we included a photo to show it. People responded positively to this new feature and commented that the photos added clarity to the advisory.

Back in the "Dark Ages" of the mid 90s, more people listened to our advisories than read them. This has drastically changed as Internet access and email became affordable and reliable. Currently 93% of the folks getting our advisories read them, which prompted us to become better writers. Or at least try to. Recognizing our shortcomings, we had the Friends hire Ginger Birkeland to edit our advisories weekly. Like a schoolteacher, her corrections and comments taught us proper punctuation, grammar and style that helped improve the quality of our advisories. We hope she'll continue this service next year since we've still got a long way to go.

We began issuing daily advisories on December 1st and continued through April 14th for a grand total of 135 advisories. Over the season these were accessed 174,347 times, averaging 1,291 people a day, which is a 16% increase over last year and a 360% rise since 1997-1998 (*Figure 1*).

The breakdown of the numbers are:

- 112,327 emails from our web based subscription service.
- 36,205 hits to our advisories web page (www.mtavalanche/current/index.shtml).
- 11,505 phone calls to the Bozeman hotline, which services the Gallatin Valley, Livingston, West Yellowstone and Cooke City.
- 5,940 Forest Service internal emails.
- 6,750 faxes.
- 1,620 emails through the Cyberspace Snow and Avalanche Center (www.csac.org).

Additionally, our home page (www.mtavalanche.com) received another 40,700 hits.

To increase our presence in the community we've been handing out magnets and stickers with our phone numbers and web information at our educational seminars. Local businesses have also been handing these out to their customers. This year we distributed over 2000 magnets and 3,000 stickers.

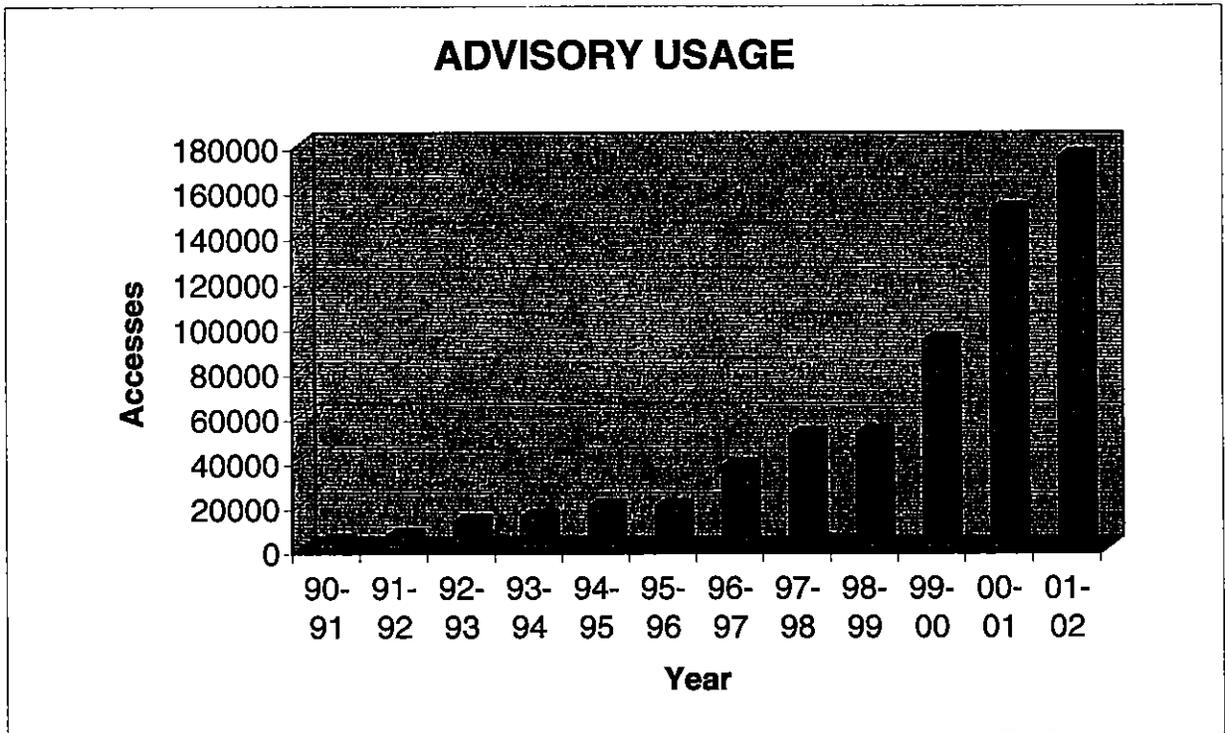


Figure 1: Advisory usage from 1990-91 to 2001-02

AVALANCHE EDUCATION

Avalanche education is a major focus of our operation. Although our advisories are educational, we take it one step further by teaching formal classes on avalanche awareness, rescue, snow dynamics etc., to a wide audience. Most of our lectures are one to two hours long, but we're increasingly doing more all day classes and field sessions. With the purchase of a slide scanner and the acquisition of an InFocus projector we're now able to create digital presentations. This means we're no longer searching reams of slide sheets looking for lost pictures! Everything is digitized, and with our new camera we're one step closer to creating quick presentations. All of our lectures are now on CD and we're in the process of organizing hundreds of our photos on disc for easy searching.

Besides offering education in southwest Montana, we've been fortunate to spread our knowledge to other regions. We've taught snowmobile education across the state with classes in Lewistown, Missoula, Helena, and Lewis and Clark National Forest. Additionally, through funding from the National Avalanche Center, we created a one-hour PowerPoint presentation on "Avalanche Awareness for Snowmobilers". This program was handed out to avalanche educators across the nation, including snowmobile safety instructors at clubs throughout the west. Over 175 of these CDs were given away with *thousands* of snowmobilers seeing our presentation. Snowmobilers are ripe for education and we want to reach as many as possible, especially since they're leading the country in avalanche fatalities.

During peak times in December and January we got swamped with education requests that created scheduling conflicts. We were reluctant to miss a teaching opportunity so we had Chris Lundy, a master's graduate at MSU and ski patroller at Bridger Bowl, teach three classes. He created some breathing room in our schedule, and we anticipate using him even more next year.

This past season we spent 202 hours teaching! This does not include preparation time or travel which can be quite substantial. All of these efforts paid off with the attendance of over 2,700 people at 62 different classes (*Table 1*).

Some noteworthy education seminars included:

- The five day National Avalanche School, which was attended by over 200 avalanche professionals.
- Advanced lectures on snow dynamics and rescue to the Bridger Bowl, Big Sky and Yellowstone Club ski patrols.
- An Avalanche Awareness lecture to all the 7th graders in Bozeman.
- Two weekend avalanche courses for snowmobilers held in Bozeman and West Yellowstone.
- Two, multi-day Basic Avalanche Awareness Seminars and one Advanced Seminar taught through MSU.
- A snow dynamics and snow compaction lecture to snowmobile groomers.
- Workshops for the Big Sky and Gallatin County Search and Rescue groups.
- A workshop on Avalanche Education for Region 1 Forest Service staff.
- Two days with various Special Forces on Department of Defense training.

Table: 1 2001-2002 AVALANCHE EDUCATION

DATE	INSTRUCTOR	GROUP	COURSE	#
5-Oct	Chabot	Avalanche Forecasters Meeting	Snowmobile Ed	40
10/29-11/1	Chabot/Johnson	National Avalanche School	Various Topics	200
1-Nov	Johnson	National Avalanche School	Rescue	200
6-Nov	Johnson	Chief Joseph 7th Grade	Ava. Awareness	200
7-Nov	Chabot	Barrel Mountaineering	20/20 Hindsight	70
11-Nov	Johnson	Local Ski Patrols	Fracture Mechanics	50
11-Nov	Johnson	Local Ski Patrols	Weather Forecasts	50
14-Nov	Johnson	Northern Lights Trading Co.	Ava. Awareness	25
17-Nov	Johnson	Big Sky Ski Patrol	Fracture Mechanics	40
19-Nov	Johnson	Lewistown Snowmobile Club	Ava. Awareness	25
20-Nov	Chabot	Sacajewea 7th Grade	Ava. Awareness	125
21-Nov	Chabot	Pine Creek School	Ava. Awareness	20
29-Nov	Chabot/Johnson/Schmidt	Team Bozeman	Basic Avalanche	24
30-Nov	Chabot/Johnson/Schmidt	Team Bozeman	Basic Avalanche	24
2-Dec	Lundy	Snowmobile Safety Instructors	Ava. Awareness	70
5-Dec	Johnson/Birkeland	MSU	Basic Avalanche	175
6-Dec	Johnson/Birkeland	MSU	Basic Avalanche	175
8-Dec	Johnson/Birkeland/Schmidt	MSU	Basic Avalanche	100
10-Dec	Schmidt	Bozeman Ranger District	Ava. Awareness	25
12-Dec	Schmidt	Snowshoe Club	Ava. Awareness	7
13-Dec	Chabot	Big Sky SAR	20/20 Hindsight	17
15-Dec	Chabot/Johnson	West Yell. Snowmobilers	Basic Avalanche	14
15-Dec	Johnson	Groomers	Ava. Awareness	30
16-Dec	Lundy	Groomers	Ava. Awareness	50
16-Dec	Chabot/Johnson	Snowmobiler Field Session	Basic Avalanche	14
17-Dec	Schmidt	Gallatin Co. SAR	Ava. Awareness	30
19-Dec	Chabot	West Yell. Snowmobilers	Ava. Awareness	40
6-Jan	Chabot/Schmidt	Snowmobiler Field Session	Basic Avalanche	14
8-Jan	Chabot/Johnson	Region 1 Educators Workshop	Teaching Skills	15
12-Jan	Schmidt	Big Sky SAR	Ava. Awareness	10
13-Jan	Schmidt	Big Timber Snowmobile Club	Ava. Awareness	40
10-Jan	Chabot	Timber Trails	Ava. Awareness	75
15-Jan	Johnson	Cooke City SAR	Ava. Awareness	50
17-Jan	Chabot	Prescott College	Snowpits	12
19-Jan	Johnson	Prescott College	Ava. Forecasting	10
25-Jan	Schmidt	Morning Star 2nd Grade	Ava. Dogs	85
28-Jan	Johnson	Yellowstone Institute	20/20 Hindsight	18
29-Jan	Johnson	Yellowstone Institute	Snowpack	16
30-Jan	Lundy	Yellowstone Institute	Various Topics	16
30-Jan	Johnson/Birkeland	MSU	Basic Avalanche	90
31-Jan	Johnson/Birkeland	MSU	Basic Avalanche	90
2-Feb	Johnson/Birkeland/Schmidt	MSU	Basic Avalanche	75
6-Feb	Johnson	MSU	Advanced Avalanche	40
7-Feb	Johnson	MSU	Advanced Avalanche	40

7-Feb Chabot	Gallatin Leadership Team	Ava. Center History	20
9-Feb Johnson/Schmidt	MSU	Advanced Avalanche	32
11-Feb Johnson	Wilderness Medical Society	Ava. Awareness	25
11-Feb Chabot	Gallatin Co. SAR	Rescue	15
12-Feb Schmidt	Morning Star 2nd Grade	Ava. Awareness	73
15-Feb Schmidt	Whittier School 3rd Grade	Ava. Dogs	40
19-Feb Johnson	Big Sky Youth Empowerment	Ava. Awareness	8
19-Feb Johnson	West Yell. Ranger District	Ava. Accidents	12
22-Feb Chabot	Int'l Snowmobile Assoc.	Ava. Awareness	30
2/22-2/24 Schmidt	Alaska Mountain Training Center	Basic Avalanche	30
5-Mar Johnson	Lewis and Clark NF	Basic Avalanche	25
20-Mar Johnson	Irving School 2nd Grade	Ava. Awareness	20
20-Mar Chabot	Region 1 Workshop	Ava. Awareness	30
20-Mar Chabot	Region 1 Workshop	Rescue	10
25-Mar Chabot	Dept of Defense-Special Forces	Backcountry Travel	8
26-Mar Chabot	Dept of Defense-Special Forces	Backcountry Travel	6

TOTAL= 62 Talks/Seminars/Field Sessions to 2703 People

ACCIDENTS AND INCIDENTS

This winter set records for avalanche fatalities in Montana. We led the nation with nine deaths, all of them snowmobilers. To be fair, there was a death in Idaho that was so close to the MT border near West Yellowstone that it should be counted too. That makes ten fatalities out of 32 nationwide. Unfortunately for us, three of these took place in our advisory area.

Given the steady rise in snowmobile avalanche fatalities we're reaching out to this group as much as we can. Most of these instances have glaring similarities we're trying to point out in our education programs. They can be broken down into three simple ideas:

1. In Montana, over half of the people killed in avalanches this year would be alive today if they exposed only one rider at a time on a slope. By just stopping that one behavior, we'd see avalanche fatalities plummet across the nation.
2. Another way to rapidly bring down these numbers would be if all snowmobilers carried rescue gear and knew how to use it. There's nothing worse than going to an accident scene and finding someone dead from a shallow burial where a transceiver may have saved their life. Certainly there are no guarantees, but a competent partner with rescue gear can definitely increase your odds of surviving. Three people are alive today because they had partners who kept their cool and performed rescues using transceivers, shovels and probes.
3. And last, we're trying to get snowmobilers to recognize that recent avalanche activity is a huge sign of instability, and to be extra careful traveling in avalanche terrain during these times.

Our education efforts are constantly being refined and we're always looking for new ways to teach. We'd love to educate everyone, because knowledge is a powerful tool for staying alive. We're excited about the live recoveries, especially because two of the incidents involved people who were trained through the Forest Service. Education works and we're dedicated to reaching more people every year.

Jim Earl created an "Accident Reports" page on our website. This allowed us to put pictures and reports of the various incidents soon after they occurred. Although reading about accidents can be grim, they can help drive home important points about traveling in avalanche terrain.

Table 2 represents all of the avalanche incidents and accidents reported to us. We only hear about a fraction of the avalanches actually triggered; yet with incidents involving injury and death we're usually notified quickly. As you look at the list, you may notice that many of these incidents are clustered around certain dates. This should come as no surprise since these were usually preceded by significant snowfalls. The listings in **bold** are those that resulted in fatalities.

Table 3 lists all the avalanche fatalities this year in the US. As of May 1st there were 32 deaths; MT with 9, AK-8, CO-8, UT-3, ID-2, CA-1, and WY-1. That's 32 too many.

Table 4 records the US avalanche fatalities for the last 16 years grouped by activity. This year was a bad one for snowmobilers with 18 deaths, nine of them in MT! This group has the unfortunate distinction of leading all others in fatalities during this period. Given the popularity of the sport, the athleticism and youth of the riders, and the powerful machines, we are targeting our education efforts to try and stop this rising trend.

Table 2: **AVALANCHE INCIDENTS AND ACCIDENTS**

DATE	LOCATION	DETAILS
13-Oct	Bridger Range	1 skier triggered, caught
2-Dec	Madison Range	1 skier triggered, caught
9-Dec	Madison Range	2 snowmobiler triggered
14-Dec	Madison Range	2 skier triggered
15-Dec	Madison Range	4 skier triggered
15-Dec	Gallatin Range	1 snowmobile triggered
15-Dec	Madison Range	1 skier triggered
16-Dec	Madison Range	1 skier triggered, caught
16-Dec	Lionhead area	1 skier triggered, caught
28-Dec	Gallatin Range	1 skier triggered
30-Dec	Bridger Range	1 skier triggered, caught
5-Jan	Bridger Range	1 skier triggered, caught
5-Jan	Bridger Range	1 skier triggered
6-Jan	Madison Range	1 snowmobiler triggered
6-Jan	Madison Range	1 snowmobiler triggered
20-Jan	Bridger Range	1 skier triggered
26-Jan	Gallatin Range	1 snowmobiler triggered
27-Jan	Madison Range	1 skier triggered
27-Jan	Cooke City	3 snowmobilers triggered, 3 caught, 1 buried, injured
31-Jan	Lionhead area	1 snowmobiler triggered, caught, buried, uninjured
16-Feb	Centennial Range	1 snowmobiler triggered, caught, buried, uninjured
16-Feb	Cooke City	5 snowmobiler triggered, 3 caught, 2 buried and killed
9-Mar	Gallatin Range	1 skier triggered
10-Mar	Cooke City	1 snowmobiler triggered, caught, partially buried
10-Mar	Cooke City	1 skier triggered
10-Mar	Cooke City	1 skier triggered
10-Mar	Madison Range	1 snowmobiler triggered
10-Mar	Bridger Range	1 skier triggered
17-Mar	Madison Range	1 skier triggered, caught
21-Mar	Gallatin Range	1 snowmobiler triggered
21-Mar	Lionhead area	1 snowmobiler triggered
22-Mar	Lionhead area	1 snowmobiler triggered, caught, partially buried
24-Mar	Lionhead area	1 snowmobiler triggered, caught, buried and killed
24-Mar	Cooke City	1 snowmobiler triggered
30-Mar	Cooke City	1 snowmobiler triggered
30-Mar	Cooke City	1 snowmobiler triggered
TOTAL= 41 Incidents resulting in 9 burials, 1 injury and 3 deaths		

Table 3: **2000-2001 AVALANCHE FATALITIES**

DATE	LOCATION	STATE	DETAILS
31-Mar	Eagle River	AK	2 snowshoers buried and killed
22-Mar	Targhee Pass	ID	1 snowmobiler buried and killed
21-Mar	Jackson Peak	WY	1 backcountry skier buried and killed
17-Mar	Pagoda Peak	CO	1 snowmobiler buried and killed
16-Mar	Brighton	UT	2 out-of-area snowboarders buried and killed
16-Mar	Whitefish Range	MT	1 snowmobiler buried and killed
15-Mar	Telluride	CO	1 out-of-area snowboarder buried an killed
14-Mar	Ashcroft	CO	1 backcountry skier buried and killed
14-Mar	Aspen Mountain	CO	1 out-of-area skier buried and killed
12-Mar	Big Hole Mountains	ID	1 snowmobiler buried and killed
8-Mar	Sugar Bowl	CA	1 out-of-area snowboarder buried an killed
24-Feb	Glenwood Springs	CO	1 snowmobiler buried and killed
16-Feb	Cooke City	MT	2 snowmobilers buried and killed
10-Feb	Whitefish Range	MT	1 snowmobiler buried and killed
6-Feb	Crystal Mountain	CO	1 backcountry skier buried and killed
1-Feb	Aspen Highlands	CO	1 skier buried and killed
31-Jan	Uinta Mountains	UT	1 backcountry skier buried and killed
26-Jan	Bonner	MT	4 snowmobilers buried and killed
12-Jan	Paxton	AK	2 snowmobilers buried and killed
31-Dec	Phillipsbug	MT	1 snowmobiler buried and killed
24-Dec	Cantwell	AK	1 snowmobiler buried and killed
23-Jan	Hope	AK	1 snowmobiler buried and killed
12-Dec	Cordova	AK	1 snowmobiler buried and killed
28-Nov	Rollins Pass	CO	1 backcountry skier killed (drowned)
11-Nov	Hatcher Pass	AK	1 snowshoer buried and killed

TOTAL= 32 Avalanche Fatalities (as of 5-01-02)

Table 4: US AVALANCHE FATALITIES BY ACTIVITY																	
ACTIVITY	86-87	87-88	88-89	89-90	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	16-winter totals
climbers	6	2	0	0	3	7	3	2	6	9	6	3	1	0	2	0	50
BC skiers*	2	6	2	2	2	7	9	2	7	6	0	0	3	8	5	6	67
in-area skiers/riders	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
OB skiers*	8	0	2	3	0	4	5	0	0	1	0	1	2	5	5	1	37
BC snowboarders	0	0	0	1	0	0	2	0	1	3	1	4	4	0	2	0	18
OB snowboarders	0	0	0	0	0	0	1	0	2	1	0	0	3	1	0	4	12
snowmobilers	2	0	0	1	2	2	2	9	7	5	6	14	13	5	15	18	101
misc. recreation	3	0	0	1	1	2	4	0	1	2	7	4	4	1	4	3	37
patrollers	0	0	1	0	0	0	1	0	1	1	0	0	0	0	0	0	4
motorists/highway workers	0	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	4
residents	0	0	1	0	0	0	0	0	2	1	0	0	0	1	0	0	5
others @ work	0	0	0	0	0	1	1	0	0	1	2	0	1	0	0	0	6
TOTAL	21	8	6	8	8	24	29	13	28	30	22	26	32	22	33	32	352
*BC= backcountry OB= out-of-bounds																	

This table was compiled by the Colorado Avalanche Information Center.

MEDIA

As avalanche fatalities mounted, so did our media exposure. Although unfortunate, the accidents and ensuing press coverage provided us with great opportunities to inform the public about avalanche danger. Our 35 media contacts (*Table 5*) resulted in favorable articles and television spots that piqued the public's interest in avalanche education, and increased the demand and attendance of our classes. Copies of the various newspaper and magazine articles begin on page 45.

This was our second year working with Rob Work at KMMS (95.1 FM) radio. Once again, every Thursday, Friday and Saturday Ron would have a 2-minute spot highlighting avalanche conditions. A local snowmobile shop, Team Bozeman, sponsored these radio announcements which were a huge hit.

Some highlights of the coverage we received included:

- ❑ Two editorials and three cover stories in the *Bozeman Daily Chronicle*. The editorials were especially flattering about the positive effects the GNFAAC has on the community.
- ❑ Two cover stories in the *Billings Gazette*. They also printed our avalanche advisory every Wednesday in their "Outdoor" section.
- ❑ Three cover stories in the *Helena Independent Record*.
- ❑ A front-page story in the *Livingston Enterprise*.
- ❑ A full cover feature and positive editorial in the *West Yellowstone News*.
- ❑ A two-page article in *Bozeman Outside*.
- ❑ The Montana Snowmobile Association ran a free ad in every issue for all the Montana avalanche center's hotlines and web sites.
- ❑ A full-page story on the GNFAAC in *Polaris Pro* magazine.

Table 5: **MEDIA CONTACTS**

DATE	STAFF	AGENCY	TOPIC
5-Nov	Chabot	Bozeman Daily Chronicle	Start of Season
7-Nov	Chabot	National Geographic	Cooke City Skiing
19-Oct	Chabot	KMMS	Powder Blast
28-Nov	Schmidt	KBZK	Start of Season
29-Nov	Schmidt	KBOB	Start of Season
7-Dec	Johnson	ID Falls Register	Ava. Conditions
17-Dec	Schmidt	National Geographic	Cooke City Skiing
31-Dec	Schmidt	KTVM	Ava. Conditions
3-Jan	Chabot	KBZK	Ava. Conditions
3-Jan	Chabot	Helena Independent Register	Ava. Conditions
8-Jan	Johnson	Helena Independent Register	Educators Workshop
19-Jan	Chabot	Bozeman Daily Chronicle	Snowstorm
22-Jan	Chabot	Billings Gazette	Cooke City Avalanche
23-Jan	Chabot	Billings Gazette	Cooke City Avalanche
28-Jan	Schmidt	Associated Press	Cooke City Avalanche
28-Jan	Schmidt	Livingston Enterprise	Cooke City Avalanche
28-Jan	Schmidt	MSU Exponent	Ava. Conditions
28-Jan	Schmidt	Great Falls Tribune	Ava. Conditions
28-Jan	Schmidt	Bozeman Daily Chronicle	Cooke City Avalanche
28-Jan	Schmidt	KBZK	Ava. Conditions
28-Jan	Schmidt	Bozeman Daily Chronicle	Danger Ratings
29-Jan	Chabot	KRTV	Ava. Conditions
18-Feb	Chabot	Livingston Enterprise	Cooke City Avalanche
21-Feb	Chabot	KBOZ	Fatalities
21-Feb	Chabot	Billings Gazette	Fatalities
27-Feb	Chabot	NY Times	Snowmobilers
12-Mar	Schmidt	National Geographic	Avalanche Dynamics
12-Mar	Chabot	New Yorker Magazine	Cooke City
13-Mar	Chabot	Newsweek	Fatalities
25-Mar	Schmidt	KTVM	Fatalities
25-Mar	Schmidt	Billings TV	Fatalities
8-Apr	Schmidt	KBOB	End of Season
12-Apr	Chabot	Powder Magazine	Season's Storms
TOTAL= 35 Contacts			

PROFESSIONAL DEVELOPMENT

Most of our energy is spent teaching locally, however, we occasionally are invited to lecture outside of Montana. It's impossible to accept every invitation, but we like to broaden our horizons by taking opportunities to teach in different areas. Being a small group of three, we try to avoid the dangerous pitfall of tunnel vision. Traveling around and interacting with other avalanche professionals is one way we keep ourselves flexible and open to new snow study techniques.

Highlights included:

- Ron and Doug taught at the National Avalanche School for five days last fall. This was held in Utah at The Canyons Resort and attended by over 200 ski patrollers, highway workers, and recreation professionals. The instructor pool was a virtual "who's who" in the avalanche world and allowed us to interact professionally with our peers from around the country.
- Scott went to Alaska for 4 days to help teach a Basic Avalanche Class for snowmobilers. This was sponsored by the Alaska Mountain Safety Center, a premier avalanche education center run by Doug Fesler and Jill Fredston. Scott created some new lectures on snow dynamics and slab release that were tailored specifically for riders.
- Ron was the guest lecturer at an avalanche class in Yellowstone National Park sponsored by the Yellowstone Institute and American Avalanche School.
- Doug went to Jackson, WY, to speak to the Western Chapter of the International Snowmobile Association. He talked about avalanche awareness, and more specifically, on how avalanche education for snowmobilers is evolving.
- Doug taught two sessions at the Regional 1 Training Academy in Missoula on Avalanche Awareness and Rescue. Forest Service personnel throughout Montana and Idaho participated.

ARTICLES

Besides writing the daily advisories, we occasionally pen articles for local and national media. Some of the articles we wrote were for specific user groups such as snowmobilers, but others were for the general public.

Some articles included:

- Doug wrote an article summarizing the avalanche season for the trade journal *The Avalanche Review*.
- Ron and Scott both wrote articles for snowmobilers every month in the *Montana Snowmobile Association Newsletter*.
- Doug authored six articles on avalanche safety in his "Snow Advisory" column in the monthly *Carve* magazine published by the *Bozeman Daily Chronicle*.

Copies of these articles are included at the end of the report in the "Newspaper and Magazine Articles" section on page 45.

FINANCES AND FUND RAISING

The GNFAAC continues to get strong support within the Forest Service. They fund one full time position, plus all of the expenses associated with operating an avalanche center (vehicles, office space and supplies, etc), which total over \$50,000. Our budgetary shortfall is covered by the generosity of many agencies, businesses and individuals.

Friends of the Avalanche Center

These dedicated volunteers are our safety net. This year they donated \$5,350 that covered our snowmobile expenses in addition to administrative and field supplies. Page 18 outlines their efforts in detail.

National Avalanche Center

Karl Birkeland and Doug Abromeit of the National Avalanche Center funded Doug for 40 hours last fall to create an "Avalanche Awareness for Snowmobilers" PowerPoint education program. These were distributed around the country to snowmobile clubs and other avalanche educators.

Northern Region Partnership Fund

This Forest Service committee awarded us \$15,000 this winter. This money helped alleviate our mid-season budgetary shortfall. It was a welcome addition to our coffers.

Montana Fish, Wildlife and Parks Recreation Trails Grant

Bob Walker and Steve Gilbert are all strong advocates of the state avalanche program and we were given \$13,209 for our operation. We successfully competed for money again this year, which will be used for next winter's operation.

Region 1 Earmark

Gary Morrison, director of recreation in Region 1, pushed through an earmark of \$20,000 to help us with our shortfall for the second year in a row. This represents a significant portion of our budget. We greatly appreciate his support, especially since this money kept our head above water.

Gallatin County Search and Rescue

Gallatin County Search and Rescue has been one of our most steadfast supporters with donations of \$4,000 every year. Our partnership with them is invaluable and the steady funds we receive go a long way towards the success of our operation.

Montana Fish, Wildlife and Parks Snowmobile Safety Fund

Ray Paige of FW&P is in charge of the state snowmobile safety program and was very generous by donating another \$3,000 again this year. FW&P have been supporters of the Avalanche Center since its inception, and we appreciate their continued support.

CONTRIBUTIONS OF LABOR AND EQUIPMENT

The GNFAC requires a community wide effort for its success. This effort is typified by the number of corresponding agencies and businesses, and in the number of people who volunteer their time or call in observations. Once again, the information network we use for collecting and sharing snowpack and weather information continued to operate efficiently.

We estimate the value of all the donated time is in excess of \$14,000. Certainly without this network of volunteers we would not be able to operate in our current capacity. Besides volunteer labor, we're fortunate that many companies have donated gear and supplies.

Some "official" agencies and businesses include the National Weather Service, The Natural Resources Conservation Service (NRCS), Big Sky Ski Area, Bridger Bowl Ski Area, the Yellowstone Club, Cooke City Bike Shack, Ace Powder Guides, the Forest Service offices in West Yellowstone, Bozeman and Gardiner, and the National Park Service offices in Canyon and the Northeast Gate.

A host of "unofficial" volunteers called in observations on a regular basis. Given that we're information starved many days, we appreciate all the calls and emails we get about current snow conditions. Over 60 people fall into this category.

On most days of the week one of us can be expected to be outside gathering data for the advisories. With our small staff it's difficult to get out amongst ourselves, so instead we rely on a group of volunteers to go out in the field with us. This year Ed Adams, Conrad Anker, Karl Birkeland, Bob Brown, Jeff Deems, Randy Elliot, Marty Faulkner, Scott Gill, Annie Grogan, Cliff Gullett, Matt Hill, Joel Lee, Chris Landry, Chris Lundy, Beth McConnell, Ladean McKittrick, Brian McNeil, Dan Miller, Molly Merica, Alan Oram, Lance and Christine Riek, Drew Seessel, RA Schmidt, Jeannie Wall, Ralph Wiegmann, Greg Winston, Mike Wood and Jamie Yount took time to safely accompany us in the field, even during marginal skiing conditions.

Matt Vandzura is a ranger out of Canyon in Yellowstone National Park. He feeds us crucial snowpack observations about the Washburn Range, which get incorporated into our advisories.

Jim Earl deserves a special mention for his volunteer work on our web site. He helped us overcome the hurdle of attaching pictures to our advisories, created an "Accident Reports" web page, put the Annual Report on our site, and was the general "web guru" for all our problems. His expertise was appreciated by everyone who surfed onto our website.

Christine Riek once again came through with troubleshooting computer problems. Last year she wrote a program that compiles the confusing weather data we look at every morning and reformats it into an easily read table. Unfortunately, the format in which we get the data from NRCS changed, so she had to massage the code in some mysterious way in order for it to work. Needless to say, her brilliance made our lives infinitely easier at 4:30 in the morning as we stumbled around the office half asleep.

Northern Lights Trading Company

This local store has been supporting the Avalanche Center since its inception. Every year they work with K2 and Black Diamond on our behalf to loan us boots and skis for the year. This year we were once again outfitted in K2 Skis and Terminator boots from Scarpa/BD.

FRIENDS OF THE AVALANCHE CENTER

The Board of Directors include:

Molly Merica, Chas Day, Greg Caracciolo, Joel Lee, Dale Sexton, Annie Fast, Jeannie Wall, Drew Seessel, Ron Lininger, Jason Schutz, Lance Riek, Jim Marshall, Marty Faulkner, and Cliff Gullett.

As our biggest supporters, the Friends of the Avalanche Center continue to be a cornerstone of our program. They began the year organizing the third annual Powder Blast fund raiser that netted over \$7,000. The entire Board rallied around this event, which was a huge success. We are indebted to these dynamic and hard working individuals for all their time and energy they put into helping the Avalanche Center.

This year the Friends gave us \$5,350 in direct support by paying for many expenses incurred outside of our normal operations. The snowmobiles that are donated by Polaris require general maintenance, oil, insurance, covers, as well as replacing bent trailing arms and tie rods from pretending to better riders than we actually were! If you own a sled you know how quickly these costs can add up.

The Friends also covered many administrative expenses, which included the fees to our email provider, Internet server, CDs, software, and subscriptions. They also paid for the design and printing of magnets and stickers for our education programs, and purchased two avalanche transceivers for our use. Additionally, they paid Ginger Birkeland for her professional editing services and compensated Chris Lundy for his teaching time.

Besides the wildly successful Powder Blast, a few other fund-raising events deserve special mention.

Surfrider Foundation and the Friends hosted a showing of the new Teton Gravity Research film "Mind-The Addiction". They split the proceeds, which netted the Friends over \$2,000.

Annie Fast, Chris Ankeney, Nel Bashoff, Jason Schutz and others put together a slide show of snowboarders, skiers and kayakers that yielded over \$1,500. This was the second year that they organized this event, and we anticipate it becoming a local favorite.

The Friends, being a non-profit 501 3 (c) organization, provide a means for other individuals and organizations to financially support avalanche education and information. These community partnerships are invaluable since the support we get reaches far into the fabric of southwest Montana. This aspect of the Friends is understated, yet an important part of their overall mission. This year they received support from:

Hans Saari Memorial Fund

Hans Saari was tragically killed in a skiing accident last year in France. His untimely death was felt throughout the Bozeman community, home to his family and many friends, as well as the larger international skiing and climbing community. His parents asked that donations be sent to the Friends in his memory, which totaled over \$6,000. Our goal is to use the proceeds from this fund for avalanche education so that it can be maintained in perpetuity. This year the Friends used \$150 to pay Chris Lundy to teach three courses that reached 136 people. Next year we hope to increase this amount by having the fund pay for even more education.

Drew and Jennifer Seessel

Drew and Jennifer, avid backcountry skiers and supporters of the Avalanche Center, gifted a substantial number of mutual fund shares to the Friends for the second year in a row. We all appreciate their generosity.

Polaris and Team Bozeman

Cliff Gullett, owner of Team Bozeman, once again worked with Polaris and the Friends to loan us two snowmobiles for the winter. Polaris, for the third year in a row, gave us two new sleds to ride. This year we rode the 2002 800-RMK, 151" track model. Talk about power! Given the number of snowmobilers in our advisory area, these machines have been instrumental in getting us to areas that were previously inaccessible. Equally important, these sleds allowed us to encounter and educate riders on a regular basis.

Montana Telemark Corporation

They hosted the Pinhead Classic, a telemark event held every year at Bridger Bowl. A record \$700 in proceeds was donated to the Friends. We appreciate the hard work that Warren Bauder and other volunteers do organizing this fantastic event.

Merica Design

Molly Merica, president of the Friends, was invaluable in her commitment to raise money for the Avalanche Center. She donated over \$2,000 in time designing posters, logos, placemats, and stickers, and provided leadership to the board of directors.

Cliff Gullett

Cliff of Team Bozeman, helped us get the sleds from Polaris, donated prizes to the Powder Blast and gave us valuable advice about snowmobiling. ("These 800s are like a loaded .357; if you're not careful you can kill yourself." Direct quote.) He also discounted parts, repairs and warranties worth over \$1,500.

Big Sky Ski Patrol

The Ski Patrol generously donated \$500 from the proceeds of their Dirt Bag Ball.

Barrel Mountaineering, Timber Trails, American Avalanche Institute, Big Sky Search and Rescue, Alaska Mountain Safety Center

We are often asked to teach a variety of avalanche courses that students pay to attend. Due to Forest Service regulations, we are unable to accept money for teaching those classes. This year many of these schools and businesses gave us donations in exchange for our time. Barrel Mountaineering raised \$325 from a lecture, Timber Trails of Livingston raised \$80, the American Avalanche Institute gave \$400, Big Sky Search and Rescue gave \$200 and the Alaska Mountain Safety Center paid \$680 to help defray costs associated with us teaching.

If you're interested in helping the Friends of the Avalanche Center, you can call Chas Day at 587-5040, or write the Friends at P.O. Box 6799, Bozeman, MT 59771.

BUDGET

INCOME

Northern Region Partnership	\$15,000	
Montana FW&P Rec. Trails Program	\$13,209	
Region 1 Earmark	\$20,000	
Gallatin County Search and Rescue	\$4,000	
Friends of the Avalanche Center	\$5,350	
Montana FW&P Snowmobile Safety	\$3,000	
TOTAL CASH CONTRIBUTIONS		\$ 60,559
Gallatin National Forest	\$52,661	
TOTAL GALLATIN NATIONAL FOREST CONTRIBUTION		\$52,661
		\$113,220
TOTAL INCOME		\$113,220

EXPENSES

Salaries	\$67,385	
GNF operating costs ¹	\$28,800	
Travel/Training	\$3,000	
Misc. Equipment ²	\$1,500	
Snowmobiles equip/maintenance ³	\$2,930	
Administrative costs ⁴	\$2,420	
		(\$106,035)
TOTAL EXPENSES		(\$106,035)
EXPECTED CARRYOVER		\$7,185

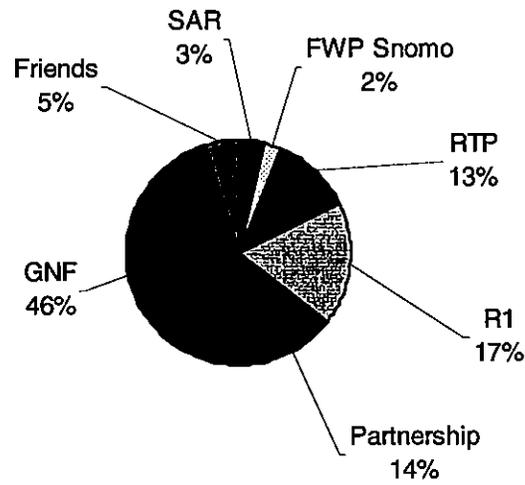
¹ The operating costs incurred by the Gallatin National Forest include office space, supplies, mailings, computers, support personnel, vehicles, gas, trailer and six phone lines among many other items.

² Misc. equipment expenses the Gallatin NF incurred included: Digital camera, equipment repair, film, uniforms, etc.

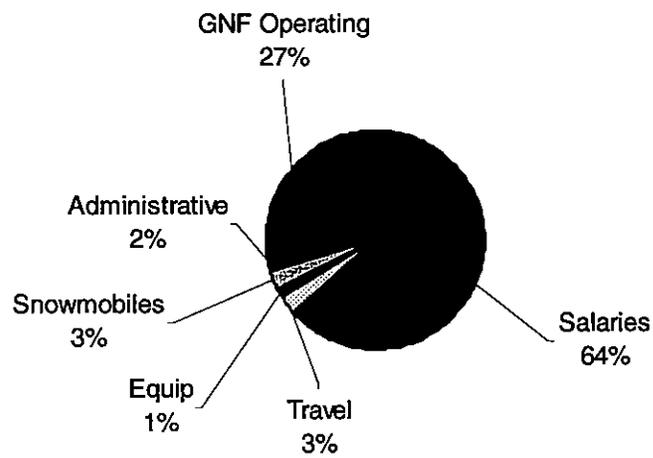
³ The Friends of the Avalanche Center paid for these expenses: Insurance, oil, delivery charges, covers, and trailer repairs.

⁴ The Friends of the Avalanche Center paid for these expenses: Beacons, software, teaching materials, dataloggers, and educational handouts.

INCOME



EXPENSES



DONATED LABOR AND EQUIPMENT

In addition to cash contributions, the GNFAC also relies heavily on \$34,200 in donated equipment and labor. The labor donations represent a dollar estimate of what it would cost to hire people to collect the information that these business and agencies provide. It's clear that without these donations the Avalanche Center would be unable to operate at its current level.

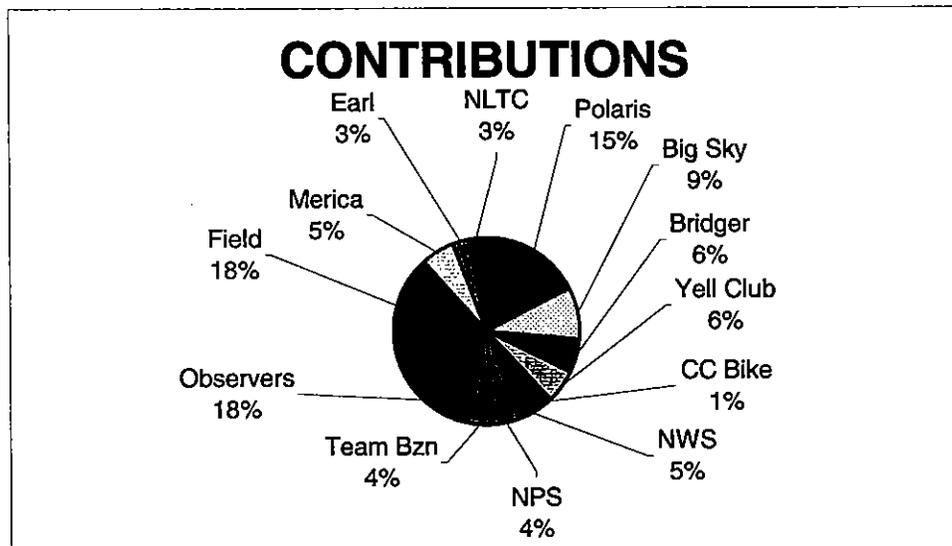
Equipment:

Polaris Industries (2 loaner snowmobiles)	\$6,000
Northern Lights Trading Company	\$1,000

Labor:

Jim Earl Web Design	\$1,000
Big Sky Ski Area	\$3,000
Bridger Bowl Ski Area	\$2,000
Yellowstone Club	\$2,000
Cooke City Bike Shack	\$500
National Weather Service	\$1,700
National Park Service	\$1,500
Team Bozeman	\$1,500
Volunteer observers and office help	\$6,000
Field volunteers (600+ hours)	\$6,000
Merica Design	\$2,000
Computer Programming	\$1,000

TOTAL	\$34,200
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SEASON SNOWFALL HISTORY

Just like clockwork, our first reported avalanche incident occurred with the season's inaugural snowfall. On October 13th, a skier hungry for the first tracks of the winter, was caught in a small slide in the Bridger Range. Thankfully he was uninjured, however, this event signaled the kickoff to another avalanche season. As always we were hopeful that this was the start of a legendary winter, but we ended up settling for mediocrity as November remained dry and warm.

December was a mixed bag with our southern areas getting over 4 inches of water while in the north the snowpack remained anemic. Unfortunately, around Christmas we received an unwelcome gift of surface hoar. This layer was promptly buried around West Yellowstone and caused us heartburn for the next two months. January had many storms with one dump measuring close to 30 inches in the Bridgers. A few days of warm temperatures in January formed ice crusts on south facing slopes that laid the groundwork for lingering instabilities—especially once a layer of facets capped this crust around Cooke City. This layer was responsible for two fatalities as well as many other human triggered slides. February and March were cold and snowy with some of our southern mountains getting over 10 inches of water in March! As you can imagine, we had sizeable avalanche cycles following these storms with people getting caught in slides. We sat on the edge of our seats in April anticipating large dumps, but when these didn't materialize we found ourselves quietly ending another season.

OCTOBER

Our first snowfall of the year dropped a few scrappy inches in the mountains allowing die-hard skiers the chance to make a few turns. One skier triggered a small slide, but other than some scrapes and bruises he escaped without consequence. In many spots thin snow cover and warm temperatures created a hard, dense layer of snow near the ground. This type of base was preferable to last year's depth hoar.

NOVEMBER

The beginning of the month saw no precipitation, but things began to look better mid-month as storms lined up and brought two to three inches of water to the mountains. Temperatures stayed relatively warm, and the snowpack began to build slow and steadily.

DECEMBER

On December 1st we put out our first advisory. The month saw many small storms in our north with heavier snowfalls down south. In the middle of the month, we witnessed many signs of instability and heard of folks triggering and getting caught in slides, but luckily not buried. A six day clear spell over Christmas created large, well developed surface hoar crystals. Wind and other factors gradually destroyed these, except in the mountains outside West Yellowstone. Here they were buried and preserved, which started a two-month period of headaches and worry.

JANUARY

Other than a few sporadic snow showers, the first half of the month was uneventful. This changed on the 17th when the Bridgers got hit with a favorable northwest flow that dumped over 30 inches. Other areas caught up with 3 inches of water falling the last week of the month. Consequently, the avalanche danger rose and we were seeing many natural and human triggered slides. A snowmobiler in Cooke City triggered an avalanche on the ice crust/facet combination that formed earlier in the month, and was completely buried. Using a transceiver, his partner dug him out and saved his life, although he suffered a broken leg. A few days later

near West Yellowstone, a rider had a close call when he was buried in a slide. Luckily, he and his partner were both wearing transceivers and were highmarking one at a time. His partner saw the slide occur from a safe distance and was able to quickly dig him out. Although he was four feet under the surface, he was uninjured.

FEBRUARY

We all hoped that the snowstorms the latter half of January would continue into February, but this wasn't the case. Cold temperatures, windy skies and smaller snowfalls characterized this month. There were many three to five inch snowstorms, enough to keep the backcountry fresh and interesting, but nothing to get too excited about. A few of these storms outside Cooke City kept the avalanche danger higher than elsewhere because of the instabilities associated with the ice crust/facet layer. This layer was sensitive enough to be triggered on the 16th by five snowmobilers highmarking. Three were caught, but two were completely buried and tragically killed. Without rescue gear their chances of survival decreased quickly.

MARCH

March was cold and snowy, especially in our southern mountains. Most areas got three to five inches of water, but Cooke City easily doubled that amount with 10 inches of water falling. We saw lots of human triggered slides this month and experienced another fatality. A snowmobiler was buried outside West Yellowstone. He was wearing a beacon, but was fatally buried 20 feet deep.

APRIL

April began with cold, single digit temperatures and no new snow. A rapid warming event happened the second week and we saw our first real wet slide activity. Smaller two to four inch snowstorms created natural avalanches confined to the new snow, but without big storms the backcountry was quieting down. We closed up shop with our 135th advisory on April 14th and took a deep sigh of relief when the season ended on a boring note.

FUTURE PLANS

In order to continue improving the Avalanche Center we put together a Strategic Plan outlining short and long-term goals. As stated at the beginning of the report under "20 Ways We Made A Difference", we had a very successful year and accomplished all of our short-term goals and many of our long-term ones. We're already starting to think about next year and have a list of goals we hope to accomplish. Obviously these are dependent on money and personnel, both of which we hope to have enough of. Our future goals include:

- ❑ Next winter we'll offer Scott Schmidt full time work. This year we were able to offer him 32 hours a week and it looks as though we'll have the funds to hire him 40 hours next season. Having Scott work additional hours this year (32 vs. 24) allowed us to gather more field data and teach additional classes. He also has expertise in computers, dataloggers and programming that Ron and Doug both lack.
- ❑ We will continue with the expansion of our snowmobile education program. Now that we've got a few classes under our belt, we hope to offer more education in the West Yellowstone area, for both the public and guides, as well as continue our programs in Bozeman.
- ❑ Chris Lundy will hopefully be able to continue teaching for us when our schedule gets too tight. We'd like to offer more classes using outside personnel so we can reach everyone who requests a program.
- ❑ With funding from Fish Wildlife and Parks, we'd like to print up more avalanche awareness placemats. Our first run of 50,00 has been handed out and many businesses have requested a second printing.
- ❑ Hopefully Ginger Birkeland will edit our advisories again next year since we need to keep improving our writing.
- ❑ Next season we want to have a web page where you can get a weekly synopsis of the avalanche and weather conditions.
- ❑ The International Snow Science Workshop is being held in BC this September and all three of us will attend. It's held every two years and consists of 5 days of lectures on research and other areas of interest to avalanche professionals. If our proposals are accepted, Doug will present a paper on snowmobile education and Ron will present one on shear qualities.
- ❑ As always, we're still searching for new and consistent funding sources.

Everyone that's helped us reach our past goals deserve many thanks! With your help, we'll continue to provide high quality avalanche education and information.

EXAMPLE OF AN AVALANCHE ADVISORY



Gallatin National Forest Avalanche Advisory Wednesday, March 13th, 2002

Internet: www.mtavalanche.com

E-mail: gnfac@avalanche.org

Recorded Information:

Bozeman, Livingston,

West Yellowstone, Cooke City:

406-587-6981

Office: 406-587-6984

Good morning, this is Doug Chabot with your Gallatin National Forest Avalanche Advisory issued on Wednesday, March 13th, at 7:30 am. **Gallatin County Search and Rescue**, supported by the local taxpayers, is the sponsor of today's advisory. This advisory does not apply to operating ski areas.

CURRENT CONDITIONS AND WEATHER DISCUSSION:

Yesterday the temperatures dropped, the winds calmed, and the snow fell. Our northern mountains got four to eight inches of new, dense snow, while our southern mountains picked up two to four inches. Cooke City, like a greedy child, grabbed another six inches. Ridgetop winds were ripping at 40 to 60 mph yesterday, but calmed as the cold front arrived and are now at 10-20 mph out of the west to northwest. Mountain temperatures have cooled to around 10 degrees, and should warm into the high teens today. We've still got some moisture in the air, although most of it is grazing the Wyoming border. I expect another one to three inches of new snow in our southern mountains today, while the north could just see a trace.

SNOWPACK AND AVALANCHE DISCUSSION:

The Bridger, northern Gallatin and northern Madison Ranges:

The snowfall definitely favored our northern areas with eight inches in the Bridgers and five to six inches around Big Sky. The storm started out quite warm and got colder as it progressed, which we like to see since it keeps the lighter snow on top. Unfortunately, in many areas the first few inches of snowfall was graupel. These pellets of snow should bond quickly, however, we received some reports of skiers that were able to easily sluff all the new snow because of its ball-bearing like nature. Even though wind speeds decreased, they are still blowing strong enough at the ridgetop levels to move the snow around. Areas that have a slab sitting on top of this may be sensitive to triggering today. The good news is that it shouldn't be widespread. Given the overall strength of the snowpack, I think it can handle this new load quite well.

For today, for the Bridgers, northern Gallatin and northern Madison Ranges, I consider the avalanche danger **MODERATE** on all wind-loaded slopes steeper than 35 degrees. Slopes without wind loading will have a **LOW** avalanche danger.

The southern Gallatin, southern Madison Ranges and the Lionhead area near West Yellowstone:

Our southern mountains, from the Yellowstone Club to West Yellowstone, received another two to four inches last night. These areas keep getting enough snow to keep us on our toes.

Colder temperatures mean the snow will be less dense which translates into easy wind loading. Slopes near the ridgetops will have the most sensitive slabs so you'll want to use extra caution if you decide to play on any of these today.

For the southern Gallatin, southern Madison and the Lionhead area near West Yellowstone, I consider the avalanche danger to be **CONSIDERABLE** on recently wind-loaded slopes steeper than 35 degrees. On all other slopes I consider the avalanche danger to be **MODERATE**. Remember, a "considerable" danger means that natural avalanches are possible and human triggered ones are probable.

The Washburn Ranges, and the mountains around Cooke City:

There are very few absolutes in the snow business, except for the fact that it always snows in Cooke City. At least that's the way its been feeling lately! They received another 6 inches, or half inch of water yesterday. The snowpack here has been continuously loaded since last Thursday, with a total of four inches of water. Some ski areas in Colorado haven't had that much snow all year! The forecasting dilemma is actually pretty simple. More snow equals more avalanches. Add wind and a weak layer on south-facing slopes and we've got a problem.

Wind-loaded slopes will be touchy today, even those not very steep. My partner and I saw numerous natural avalanches on Monday, and with constant snowfall, I see no reason to think that the avalanche danger got any better. South-facing slopes have the added concern of a buried weak layer now three to four feet down. We were able to trigger a slide on this layer, as were other people. **My recommendation is that you stay off of anything wind-loaded and avoid south-facing slopes.** There are plenty other slopes to play on without exposing yourself to additional danger.

For today, for the mountains around Cooke City and the Washburn Range, the avalanche danger is **HIGH** on wind-loaded slopes steeper than 35 degrees and **CONSIDERABLE** on all other wind-loaded slopes. Slopes without wind loading will be **MODERATE**. Remember a "high" danger means that natural and human triggered avalanches are likely.

Ron will issue tomorrow's advisory at 7:30 am. If you get out in the backcountry, we would appreciate any snow and avalanche information. You can leave a message at 587-6984 or e-mail us at gnfac@avalanche.org.

EMAILS AND SUPPORT LETTERS

It makes my heart soar like a hawk to see an email from the avalanche center and Thank you for the fine work you boyz do.. what a job.. :)

alot of Helena Boyz sled in your areas, and have found your updates both informational and entertaining..
Keep up the good work..
Daryl Cheek

Hi Doug,
I should have started out that request with "thank you very much for the great and specific information you give in your mailings"!! You guys are awesome! -Kevin

Hi there!
We really appreciate the availability of the report and all the great work you do. We'd love to treat you guys to lunch next time you're in town - just let us know when!
Leona
West Yellowstone Chamber of Commerce

Dear Doug,
The Avalanche awareness night in Tahoe was a huge success. With over 250 people in attendance. Thank you so much for giving me the power point presentation to use, It made my presentation much more professional. I look forward to meeting you in person at an ISSW in the future.
Thanks Doug.

Thanks for the alert - we may try to get down there with a little army next Tuesday (soonest the logistics work ...). Meanwhile, I may give "our" spot on lower Bacon Rind a go, looking for the same SH.

Your pics with the advisories are very helpful! And dramatic!
See you soon ...
Chris

Thanks again for your help and Happy Holidays.
Cheers, Lei Tone

Just a quick note to thank you again for coming to McLeod last evening. Your avalanche presentation was the best I've seen yet! Good Job!! Even though our little guy tuckered out, he was talking about it this morning while looking at the new snow on the Crazy's. It's amazing how much the kids pick up.

Take care and thanks,
Kevin, Connie & Kalvin Kunda

Hi guys!

First of all, I want to thank you for continuing such great work. Your reports are consistently the best tool I have found to help in my evaluation of the conditions I ski on.

Secondly, the Pinhead Classic is coming up next weekend, held again at Bridger Bowl. I've attached our public service announcements to this email. I would greatly appreciate any plugs you can give us.

Thanks again for everything you do.

Warren Bauder

Montana Telemark Corporation

WAS FUELING UP AT 4 CORNERS SOUTH OF BOZEMAN SAT. MARCH 16 APPROX. 5 PM AND SAW LIGHT GREEN US FOREST SERVICE PICK UP WITH 2 RMK'S ON TRAILER HEADING NORTH TOWARDS BOZEMAN. WONDERED IF THAT WAS MY FAVORITE AVALANCHE DUDES. THANKS FOR THE SUPER SERVICE YOU PROVIDE. I REALLY APPRECIATE YOUR BULLETIN.

MARK LINDY

See you next snowmobiling season!! Powder Up!!

Kathy

I signed on to receive your advisories back in January prior to our trip to the Yellowstone area. I found your information interesting and helpful, especially weather-wise, in planning our trip. I continued to receive your reports due to my interest in the information you presented. I look forward to getting back out to your area next year, as our trip was a great experience! Keep up the good work in your reporting next season! Thank you!

Ray Oines

Brookings, SD

Thanx for all the good info this season!! We look forward to next year hoping the EL Nino is not a major factor!!

I am a patrolman at Big Sky. During the season I only get out in the backcountry one or two days a week. But by working on the mountain I know what's going with the snow. Tomorrow the season ends. Now everytime i ski will be in the backcountry. I plan on skiing into August. I realize due to financial concerns you have to stop with your adviseries. But I will miss them, especialy, now that I need them more than ever. It was a good season, I will miss you guys, looking forward to reading you again next year.

Bart

Hey fellas. Although I don't get into the backcountry very often, I'm a regular advisory reader. I'd just like to say, JOB WELL DONE!! You guys have really taught me how to follow the snowpack throughout the season.

Your expertise and enthusiasm really shows in your advisories. Thanks for the service. Enjoy the offseason.

Mike

THANKS ALOT FOR ALL THE REPORT!

Lynn Ingeman

Ron,

Many years ago an acquaintance in the area took me and my wife into Sheep Basin on skis in late February. An avalanche path right at the entrance especially impressed us. An aspect of nature I have found interesting ever since. Thanks for all your effort and insight on the risks and potential dangers from snow and gravity. I always enjoy reading each edition of your consistently well investigated and articulated advisories. Moisture and the quantity deposited as snow is a major aspect of life in your part of the country and I follow your advisories partly to gain a sense of what the coming season and economy may be in for. Good luck with your Forest Service work in the coming seasons. Sincerely, Doug Colclasure ---Oak Ridge, Tennessee

Ron, Doug, & Scott -

Nice job this season, guys. I know that your program is changing the way people take to the backcountry. And you can bet you saved some lives. The boomer's kids have all of the outward bound energy that their parents had but thanks to the GNFAAC they are pausing to gather intelligence and be more savvy and informed mountaineers. Your report is the first thing I read each day as I monitor the snowpack in the context of water supply conditions. I just wish you guys were on a couple more weeks so I had a better feel for runoff and rot of the pack as we witness the water supply "liquidate." Your classes in town are great and I want to take a refresher sometime. I'll get out LaChapelle and start boning up.

Jess Aber,
MT DNRC

Montana Governor's Drought Advisory Committee



Milton Fusselman

12/17/01 11:39 AM

To: Kimberly Schlenker/R1/USDAFS@FSNOTES
cc: Doug Chabot/R1/USDAFS@FSNOTES, Ron
Johnson/R1/USDAFS@FSNOTES
Subject: Avalanche training

The Gallatin Avalanche Center put on a program at West Yellowstone this weekend. It was attended by about a dozen people, including 2 NPS rangers, several snowmobile guides, and several members of the general public. It was a good course with a lot of valuable information. I spoke with about half a dozen attendees afterward, and they all thought that it was important that they had gone. Even though some of them had been riding for years, and had been around in avalanche country, they learned a lot. It is a program worth continuing. We had hoped to have greater attendance, but a conflict with the NPS program for guides prevented it. However, a shortened version of the avalanche training will be offered again this Wednesday in West Yellowstone.

Milton Fusselman
Hebgen Lake Ranger District
Hwy 191 North, PO Box 520
West Yellowstone, MT 59758
(406) 823-6968; FAX (406) 823-6990
mfusselman@fs.fed.us

William Avey

01/14/02 11:43 AM

To: Kimberly Schlenker/R1/USDAFS@FSNOTES, Doug
Chabot/R1/USDAFS@FSNOTES
cc: Becki J Heath/R1/USDAFS@FSNOTES, Rich
Inman/R1/USDAFS@FSNOTES
Subject: Scott Schmidt and the Avalanche Center

Last night Scott came over and he and I went to the Sweet Grass County Recreation Association (local snowmobilers) potluck. Scott gave an outstanding presentation to them on avalanche awareness, he did a fantastic job of speaking to the snowmobilers on their terms, with his delivery and presentation tailored to them - I just wanted to send over a note to let you all know how much I appreciate the job he did as well as how much goodwill this outreach of the avalanche center bought us.



"Kim Raap"
<KRAAP@state.wy.us
>

02/25/02 04:45 PM

To: <dchabot@fs.fed.us>
cc:
Subject: Avalanche Training CD

Doug,

On behalf of the IASA Western Chapter, many thanks for attending our meeting in Jackson last Friday. The work you have done is outstanding and you are certainly to be congratulated. Everyone was very impressed with the presentation and the work you have done to bring snowmobiles into the avalanche education effort.

After polling folks, we could use a total of 100 CDs with manuals to cover the 8 states who were present. There is a strong commitment from our folks to get this great new information out into the snowmobile safety education networks in our respective states.

Please send the materials to me and I'll distribute it from here. My address is: Kim Raap, Wyoming State Trails Program, Herschler Bldg. 1E, 122 W 25th St., Cheyenne, WY 82002.

Thanks again for your assistance.



Chris Landry
<clandry@imt.net>

01/13/02 04:18 PM
Please respond to
clandry

To: hshovic@fs.fed.us
cc: kschlenker@fs.fed.us, Doug Chabot <dchabot@fs.fed.us>, Karl
Birkeland <kbirkeland@fs.fed.us>
cc: kschlenker@fs.fed.us, Doug Chabot <dchabot@fs.fed.us>, Karl
Birkeland <kbirkeland@fs.fed.us>
Subject: GNFAC location

Dear Mr. Shovic,

It has come to my attention that the USFS is contemplating relocating the Gallatin National Forest Avalanche Center, and Dr. Karl Birkeland of the USFS National Avalanche Center, out of their downtown location in the Federal Building to office space on the west edge of Bozeman.

As a graduate student at Montana State University, I've had a close working relationship with both the GNFAC, visiting the office in the downtown Federal Building frequently. and with Dr. Birkeland, my primary advisor. This central location has been convenient to me, and the Gallatin District Ranger's office would clearly be less convenient.

I know, too, from experience, that the GNFAC has frequent visits from its citizen constituents interested in passing along field observations and/or obtaining information directly from the GNFAC staff.

This latter interaction, it seems to me, is especially important to retain. Prior to attending graduate school here, I was a professional avalanche forecaster in Colorado with close ties to the Colorado Avalanche Information Center. If the CAIC has any defficiency in its day-to-day avalanche forecasting operation it was, in my opinion, the lack of face-to-face interaction with its "customers". This harms their ability to forecast, since backcountry users find it hard to pass along complex information face-to-face, and harms their credibility, since users had no personal relationship with the avalanche center staff. It seems to me, after being here in Bozeman for three winters, that the current downtown location benefits both GNFAC users and its staff greatly in those matters and that relocating the Center to the west end of town would do substantial harm to the Center's excellent performance and strong user relationships. If their current office space at the Post Office building is simply essential to the Forest for other purposes then I would strongly urge you to consider finding an alternative and convenient downtown location for the GNFAC and Birkeland.

I'm sure that you have given this matter careful attention and I appreciate your consideration of my thoughts.

Chris Landry



GroundhogX@aol.co
m
01/14/02 12:12 PM

To: dchabot@fs.fed.us
cc:
cc:
Subject: avalanche relocation letter

Dear Henry,

It has come to my attention that the Gallatin National Forest is trying to create new space in the Federal building downtown that may result in the Avalanche Center being relocated. As President of the Friends of the Avalanche Center I am writing you to express my concern about this relocation issue.

The Friends are a group of 12 volunteers who work diligently at fundraising to increase avalanche awareness and education in southwest Montana. The Gallatin National Forest Avalanche Center (GNFAC) is the primary recipient of our fundraising efforts. In the past 7 years we have donated over \$37,000 in funding and equipment supporting the GNFAC. We believe their education efforts and daily advisories are paramount in preventing avalanche accidents and fatalities in southwest Montana.

Speaking on behalf the entire Friends board we oppose moving the avalanche center for 2 reasons:

1. Delivering daily advisories every morning via phone, fax, web site and e-mail (over 1,200 accesses daily) is very crucial to the winter recreationalists of SW Montana. Since much of advisory distribution requires computer technology, relocating the GNFAC outside the Federal building may hinder the disbursement process due to the lack of immediately available computer support. There have been several occasions when the advisory would not have occurred on time or at all without the in-house support of the computer department. It is unacceptable to the Friends to jeopardize this public service and as the GNFAC's largest supporters we want to guarantee that this service continues without pause.

2. The GNFAC staff, Doug Chabot, Ron Johnson and Scott Schmidt need to be conveniently accessible to us. The Friends, as well as partners in the community find it valuable to have the GNFAC located in downtown Bozeman. The Federal building provides easy access for the Friends/Partners to stop in to discuss budget issues, fundraising goals, and project updates and also allows us to continue our close relationship with the Avalanche Center. Moving the GNFAC to a distant location will make it difficult for us to communicate with Doug, Ron and Scott and may hinder our effectiveness as their primary supporters outside the Forest Service.

Thank you for your consideration of our situation.

Best Regards,

Molly A. Merica,
President of the Friends of the Avalanche Center



"Aber, Jesse"
<jaber@state.mt.us>

02/08/02 11:47 AM

To: "gnfac@avalanche.org" <gnfac@avalanche.org>
cc:
cc:
Subject: FW: This Service

Doug, Ron, Scott -

Your service and site are state-of-the-art and as a former back-country skier and middle-aged still try some extreme when I get the chance skier, I want to commend you guys and gals, if there are some involved too, for the great work you are doing.

I forwarded your subscription address to Roy Kaiser, NRCS Snow Survey chief in Bozeman who was aware of the site but is so busy, did not get to it. He thanked me and agreed that all intelligence is important when we are talking about snow dynamics and avalanches. I'm sure he gets inquiries from back-country enthusiasts now and then and now he can forward them to you. He probably has been doing that already.

Roy is a member of the Montana Governor's Drought Advisory Committee which I have staffed since its inception by statute in 1991. Our eyes are riveted to the SnoTel while we hope for the water supply to shape up. I know what is happening in the mountains, in large part, from your report and of course, my ski outings. I have skied Bridger for 30 years, but had to give up buying passes there years ago due to moving for grad school and work. Bozeman skiers are spoiled to have BB. If I hear them complain I give them grief. Although Showdown is an under-rated area and not too far away, relatively no one from Bozeman has EVER skied there.

I took Snow Dynamics as an MSU freshman in 1971 from C.C. Bradley and John Montagne and was ever so thankful of my new awareness of the nature of snow as we skied into Daisy Pass outside of Cooke City in the early 70s often to stay in the old cabin up there below Crown Butte. Back then, there were occasionally some local 'beelers but mostly test teams from the midwest that came in spring. And we had Yellowstone to ourselves!!! Skiers only.

Nowadays, the largest potential beneficiary group for your service is the 'beeling community. For years they were the least informed and often arrogant back country users. Although I hitched a few rides with them when rude friends left me at the trail head with the heaviest loads and I was in a hurry to cut some tracks near the cabin or get set up and my pack off! It was fun passing the ski buddies on the trail, to their dismay.

Now, thanks to folks like you and the classes offered, all back country users are getting with it. One year not too long ago, the number of back country avalanche fatalities of 'beelers exceeded that of skiers and snowshoers and that trend will continue. I want to take a refresher course soon and will try to time a trip to see my folks, who live in Bridger Canyon, with a course offering.

I especially like to hear your admonitions about exposure to release zones and dep zones. Many times I had a ridge hippie behind me at BB say what on earth are you waiting for as I let the skier ahead traverse and cross a chute solo. My response was usually terse (unless it was a cute babe) "To limit our exposure!" Powder makes people crazy and they forget.

Thanks for the work you do and we support you 100 percent!!

Jess Aber, Staff
Gov.'s Drought Committee



CJH51442@aol.com

03/13/02 10:46 PM

To: dchabot@fs.fed.us

cc:

Subject: Thanks

Doug,

It only recently dawned on me that I had dropped the ball on letting you know how much we in BSSAR appreciated Scott Schmidt's class and field instructions. I apologize for being so tardy on sending our thanks, but wanted you to know that Scott did a great job. In fact, there's widespread local support for an encore presentation next January. Even though our turnout was smaller than we hoped, because of the many positive comments of those attending Scott's program, I'm sure we'll have a larger group next time.

If you can plug us into the schedule book, we'd like to request a slide show presentation at our regular Thursday night membership meeting on January 9, and another Saturday classroom/field training session on January 11. Thanks for all your efforts.

Jere Hanan
Big Sky



"Richard Hughson
Ross"

<Richard.Ross@cgu.e
du>

To: kbirkeland@fs.fed.us

cc:

Subject: Re: Avalanche Awareness

02/12/02 01:33 PM

Thank you so much for all for assistance in helping backcountry fans enjoy the great outdoors and the terrific Montana Cold Smoke. Sadly, people forget that traveling and exploring the Montana backcountry powder isn't a right, it is a privelege earned through education and realizing that mother nature doesn't care one wit whether we live to tell our powder tales or not. We travel in her boundaries at her largess and to do so requires that we pay attention to her and respect her by carrying the necessary gear and more importantly, learning how to use that equipment and realizing that tomorrow may just be a better day to play.

Though I do not live in Montana anymore but now reside in sunny, southern California. What I learned from your classes and reports has allowed me to enjoy the Mt. Baldy (OB @ Mt. Baldy Ski Lifts Inc., where I am a certified ski instructor) backcountry--a 10,000 foot peak just an hours skin away from chair 4 and 3000 vert. feet of Sierra/San Gabriel cement later, of course, with a big grin. Keep up the good work and thank you once again for your hard work and good deeds.

Sincerely,

Richard H. Ross, former Bridger Ridge afficiando and Yellowstone Park
"Heavenly Glades" BC skier.

Tom Contreras

04/09/02 05:35 PM

To: Becki J Heath/R1/USDAFS@FSNOTES, Terry
Knupp/R1/USDAFS@FSNOTES, John Knorr/R4/USDAFS@FSNOTES
cc: Doug Chabot/R1/USDAFS@FSNOTES, Jim B
Miller/WO/USDAFS@FSNOTES

Subject: Snomobiler Avalanche Awareness and Education Program

Becki - Hi. I am the Winter Sports Specialist for the Intermountain Region. Last October I attended the Annual Avalanche Centers meeting at Snowbasin Ski Area. Doug Chabot made a presentation to the group of an avalanche education module he developed on CD and a training manual specifically for snowmobilers. I was very impressed with his program that I felt it was important that this effort be shared with the Western Chapter of the International Snowmobile Association Members, Associates and State Presidents. The Forest Service has had a difficult time over the last few years trying to present an effective and acceptable avalanche education program that snowmobilers would embrace.

I was able to arrange for Doug to make his presentation to the group in February in Jackson Hole, Wyoming. Doug did an outstanding job! The group commented to me on Doug's enthusiasm, delivery, understanding of the subject matter and his ability to present it in a simple, fun, yet informative manner. Becki, the combination of Doug and his program is a Winner that is long been needed for avalanche education in the backcountry for snowmobilers. In the five years I have been working with International Snowmobile Association I have not seen such an overwhelming acceptance of avalanche awareness and education program from this group like I observed from Doug and his program.

There will be an International Snowmobile Congress in Vancouver, B.C. in June. Approximately 2,000 members from the United States and Canada attend. I along with the members from the Western Chapter would like to have Doug present his program to the membership. I will be working with Congress leadership to do so.

On another note, Region 4 will be hosting the National Winter Sports Workshop for the Forest Service in Jackson Hole next February. We are planning to host this workshop concurrently with the Regional Recreation Directors and the Regional Ropeway Engineers. There has been interest shown by the Directors for part of the agenda to address Snowmobiling Management. I think this would be another excellent opportunity for Doug to present his program.

I look forward to working with Doug and the International snowmobiling community in providing an important educational opportunity for this segment of our recreating public that will help them to make good decisions based on education when snowmobiling in the backcountry on their National Forest.

Dear Doug,

Thank you
It was so fun.
Leah Roberts

Thanks Doug!

Your presentation
manner with ~~the~~ kids
is awesome! Have you ever considered
teaching in Felicia

Jenny

Thanks, Cheri

Thank, Amber.

Holden

Thanks for your

"Involve-mint"!

"Commit-mint"!

"Excite-mint"!

This is for your
"enjoy-mint"!

Justyne

JANICE
GENA

Monte

Thank you for
sharing your
wisdom & knowledge
with us!
Mrs Shannon

Audrey
thank you

Thank
you I
really liked
it

Lillian

Sara Peretz

Thank you
I liked the
game.
Micah D

Thank
you!
Mrs Smith

Thank for
the presentation
it was cool!
Sarah
Clervson



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Becki Heath
Gallatin National Forest Supervisor

I am writing to express our gratitude for the presentation given by Ron Johnson on 11/17/01. Ron spoke on the topic of avalanche fracture mechanics to the Big Sky ski patrol during our annual training refresher. His presentation was very informative and it was a welcome change for the patrol to have an outside expert give his interpretation of such a complex subject. I feel fortunate to have access to such a valuable resource as the Gallatin National Forest Avalanche Center and appreciate the time taken to help educate our staff.

Randy Spence
Big Sky Snow Safety Director

Ron
Thanks for your
service to the
community!

Becki
Heath

Ronbo - nice job!
Thanks!
bs



United States Department of the Interior

NATIONAL PARK SERVICE
PO Box 168
Yellowstone National Park
Wyoming 82190

IN REPLY REFER TO:

Becky Heath
Gallatin National Forest Supervisor
P. O. Box 130
Bozeman, MT 59771

February 1, 2002

Dear Ms. Heath,

On behalf of the Yellowstone Park Lamar Rangers (Brian Chan, Mike Ross, Bundy Phillips) I would like to extend my sincere thanks to the Gallatin National Forest Avalanche Forecast Center, particularly Ron Johnson for teaching part of the annual Cooke City Avalanche Rescue Training conducted on January 15, 16 & 17, 2002. Numerous positive comments were paid to Ron for his excellent teaching skills. Ron taught snow pack stability analysis and avalanche rescue beacons to the class. The class consisted of over 40 participants from Gallatin and Shoshone National Forests; Yellowstone National Park; Fremont County SAR, Idaho; Park County SAR, MT, Cooke City SAR; Yellowstone Ecological Research Center and others. It is quite obvious that Ron contributes well more than what it would take to teach an average class. His knowledge and experience of snow avalanche, mountain travel and general outdoor skills is top notch. Several of the class participants told me and others that Ron "...really knows his stuff". We hope to continue coordinating these training sessions in future years and look forward to calling upon the GNFAAC for their assistance.

Thank you very much for allowing these individuals to contribute their knowledge and skills to make this training better and better every year.

Sincerely,

Bundy Phillips
Lamar Sub District Ranger
Yellowstone National Park

cc: Yellowstone Chief Ranger's Office
Yellowstone Training Documentation Office
Yellowstone Superintendent's Office

March 27, 02

March 27, 02

Dear Ron,

Thanks for coming to our class.

We learned that you need four

ingredients to have an avalanche:

slope, slabs, weak layer and trigger. We also

learned that an avalanche can go

one hundred miles an hour.

Our favorite parts of the presentation

were the movie and the science project

Love, The Second Graders at Irving School.



SHOWDOWN SKI AREA

ROK

THANKS SO MUCH FOR
YOUR PRESENTATION AT SHOWDOWN
YOU PUT ON A PRETTY GOOD
SHOW.

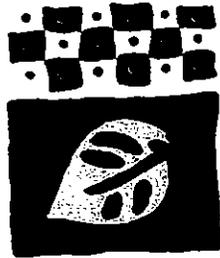
CHRIS Q Stan King Don Winderbush
Great class, really enjoyed it! Colleen Finch
Tom Job

THANK
YOU

Dear Ron,

3/30/02

Thanks once again
for all of your time and
enthusiasm. You and Seth
were a big hit! We have
a note for Seth as well -
if you have an address
for him, could you email it →

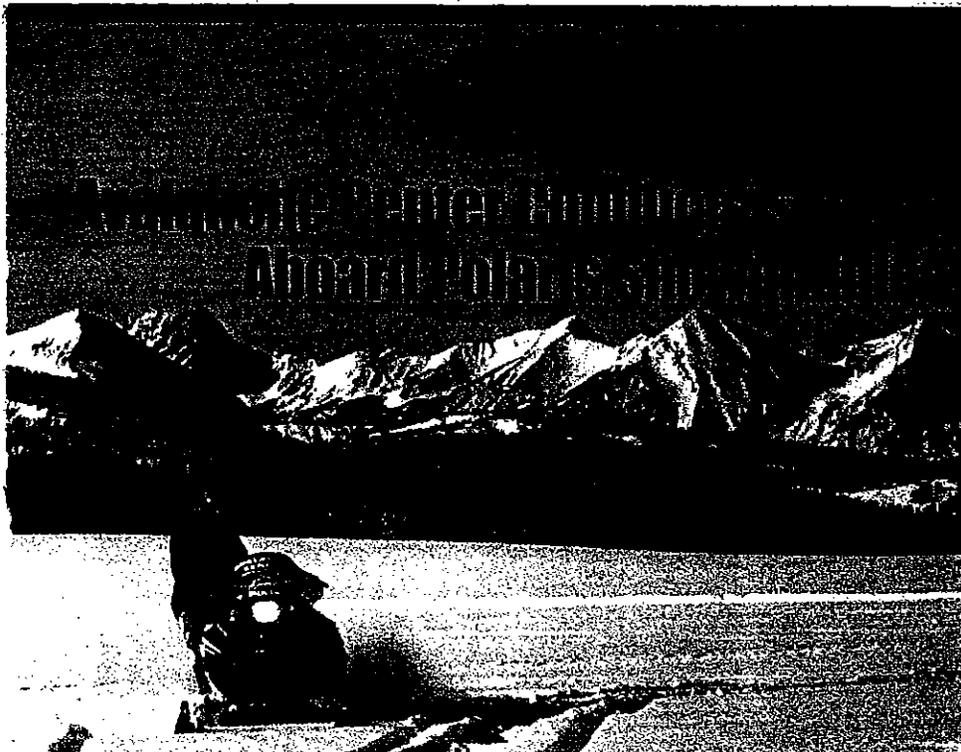


Doug,

Thanks for speaking last week to our series! You were awesome as usual! Each time you come in, your presentation is better than the last. We missed "Arnold" this year though! We look forward to seeing you again next year (+ I'm sure some kids will make your class at MS4 this week too!)

Thanks for all your efforts,
Jennifer Royall, Sacajawea Middle School

NEWSPAPER AND MAGAZINE ARTICLES



POLARIS MAG - SUMMER 2001

The snowy winter of 2000-2001 was a challenging one for the staff of the Gallatin National Forest Avalanche Center and other avalanche professionals. According to Doug Chabot, director of the Avalanche Center based in Bozeman, Montana, there were 30 avalanche fatalities in the United States over the winter, and 14 of those victims were snowmobilers. In Montana alone, there were seven fatalities, including four snowmobilers.

Yet the toll might have been worse if not for the work of the Avalanche Center team, which monitors snow conditions and issues avalanche warnings throughout the winter. The staff also teaches avalanche awareness classes year-round, and is constantly studying avalanches to learn more about these potentially deadly snow slides.

Chabot said the Avalanche Center team wants to reach more snowmobilers with its avalanche awareness messages.

"For the future, we would like to extend our snowmobiler education out-

reach," he said. "Snowmobilers lead the nation in avalanche fatalities with 71 deaths in the last eight years, and we would like to curb these rising numbers."

He said the Avalanche Center's work is aided greatly by contributions from Polaris, which last year donated two Indy 700 RMKs to the team and sponsored avalanche advisory reports issued on the internet and via e-mail and telephone. The staff logged more than 1,200 on each sled, most of it in remote mountain backcountry.

"These sleds allowed easier access into the backcountry for our snow stability evaluations and also made it easier to investigate snowmobiler-triggered avalanche incidents," Chabot said. "We investigated three snowmobile-triggered slides that previously would've been impossible for us to get to because of their off-trail, remote locations."

To get more information about avalanche safety and awareness, check out the center's Web site: www.mtavalanche.com.

Powder Blast

3rd Annual Avalanche Center Party

The Friends of the Avalanche Center and Hans Saari Memorial Fund are happy to present the 3rd Annual Avalanche Center Party on Friday, October 19 at the Emerson Cultural Center from 6 p.m. to 11 p.m.

Tickets are \$20, your contribution will include: beer donated by Blackfoot River Brewing Company and Spanish Peaks Brewing Company, a chili feed including salad, bread and dessert, live music by the Salty Dogs, the best bluegrass band you have ever heard, and a silent auction for outdoor products and more. Bid on Patagonia, LifeLink, Ortovox, Helly Hansen, Vasque and much more.

Proceeds from Powder Blast 2001 will directly benefit the Gallatin National Forest Avalanche Center (GNFAC). The GNFAC puts out daily avalanche advisories in addition to teaching high quality education programs targeting all outdoor recreationists.

The GNFAC covers 10,000 sq kilometers of National Forest land including the Bridger Mountains, Gallatin Mountains, Madison Range, Washburn Range, mountains surrounding Cooke City, and Lionhead

area, near West Yellowstone.

Last year, 2000-2001, was the GNFAC's 11th year of operation. During that year a shallow, weak snowpack covered most of the western U.S. and contributed to 30 avalanche fatalities across the country. Montana did not escape unscathed with 7 deaths (tying Wyoming for the grim distinction of first place), 5 of which occurred in southwest Montana by April 20. Two climbers were killed on Emigrant Peak, one snowmobiler was killed in Jackson, Montana, one skier was killed in the Bridger Range, and one snowmobiler was killed in the south Madison Range. There were 47 reported avalanche incidents in Southwest Montana last year, resulting in 12 burials, 2 injuries and 5 deaths.

Educational programs continue to be a focal point of GNFAC's work. Last year, snowmobile education programs were expanded as well as the creation of five PowerPoint avalanche presentations. Last year the GNFAC taught 47 classes to over 20,000 people. Classes ranged from 45-minute avalanche awareness shows to multi-day seminars, with participants varying from third graders and

professional ski patrollers to snowmobile engineers.

On average, the GNFAC's advisories were accessed 1,116 times a day. This was a 62% increase over the previous year and a 400% increase from five years ago.

Through grassroots marketing such as PowerPoint presentations, placemats, magnets, and their website (www.mtavalanche.com), the GNFAC is working to make our backcountry a safer place. Backcountry ignorance, or overconfidence for that matter, is a large factor in fatalities. Failure to recognize avalanche terrain, unstable conditions, and not carrying rescue gear (such as transceivers) can sum up most backcountry fatalities. Lack of basic skills and habits seem to repeatedly crop up in accident investigations. "Certainly through our advisories and our education programs we're spreading the message and seeing more people out in the backcountry better prepared." GNFAC.

Ticket outlets for the Powder Blast, the 3rd Annual Avalanche Center Party, are available at Barrel Mountaineering (582-1335), Northern Lights (586-2225), and Team Bozeman (587-4671).

OCT 2001 - CARVE

SNOW ADVISORY

Avalanche Center is there to help you enjoy winter

The onset of winter is always an exciting time around Bozeman. Skis get waxed, sleds get tuned and frantic hand-wringing excitement surrounds the first real snowfall of the season.

Regardless of whether you're a skier, snowmobiler, boarder or snowshoer, we all take advantage of Montana's snow-covered terrain in search of the best face shots, steepest highmarks and the gnarliest powder. However, last winter demonstrated with seven avalanche fatalities in Montana, recreating in winter can be risky business since we all choose similar terrain to play in or travel through — avalanche terrain. Avalanche terrain is simply defined as open slopes of 30-45 degrees, a steepness that usually provides the best skiing and highmarking. Unfortunately, these slopes can become hazardous and prone to avalanche once we have a few simple ingredients: a steep slope, slab of snow, buried weak layer and a human trigger.

"Can the snow slide?" is a complicated question, however, the Gallatin National Forest Avalanche Center (GNFAC) can help you find the answer by giving you current snow stability information in their daily avalanche advisories.

In its 12th year of operation, the GNFAC's mission is to educate the public about avalanche hazard through both daily avalanche advisories and educational seminars. Avalanche specialists Doug Chabot, Rolf Johnson and Scott Schmidt

provide detailed information about the snowpack and weather for the Bridger, Gallatin, Madison and Washburn Range and the mountains around Cooke City; in general most mountain areas within an easy drive to the north and south of Bozeman.

Doug, Rolf and Scott are in the field most days of the week digging snowpits, performing stability tests and gathering information. This, coupled with observations from volunteers and data from remote weather stations, is compiled into an avalanche danger rating reported every morning in the daily advisory. In addition to snow pack information, the advisory also recaps previous storm events and gives detailed 24-hour mountain weather forecasts. Along with this information you can make educated decisions about snow stability and route selection. Advisories are available by 7:30 a.m. and can be accessed by phone, web site, fax or e-mail subscription. Last winter they had over 150,000 accesses to their advisories.

Besides daily avalanche advisories, the GNFAC is committed to avalanche education. Last winter they reached 2,000 people through 47 talks and seminars. In addition to the successful avalanche courses offered through Montana State University they'll also teach a multi-day avalanche seminar for snowmobilers in Bozeman and West Yellowstone.

For a third year in a row Team Bozeman and Polaris have loaned the Avalanche Center two, brand new, 700 RMK's to help with their fieldwork! Coupled with backcountry skiing,

these performance snowmobiles allow the GNFAC to gather detailed snowpack information by reaching previously inaccessible terrain.

If you get out into the backcountry, you've probably noticed that the Gallatin National Forest's winter recreation is steadily growing. With over 300,000 snowmobile user days and an estimated 40,000 skier/snowboarder days last year, it's unfortunate but inevitable that we'll continue to see avalanche incidents and deaths in our area. Last year the GNFAC reported 57 avalanche incidents involving 18 snowmobilers, 35 skiers/snowboarders and four climbers. Regrettably, these resulted in 12 burials, two injuries and five deaths contributing to 33 avalanche deaths nationally.

You can find out more about the GNFAC on their web site www.mtavalanche.com. Daily advisories are posted there and you can sign up for a free e-mail subscription sent first thing in the morning. They also post an education schedule, a copy of the latest annual report, information about the non-profit group the Friends of the Avalanche Center, scientific articles and useful links. If you're ever wondering how much it snowed, or how cold or windy it is you should bookmark the "Real Time Weather Conditions" page which displays this information from Bridger Bowl and Big Sky Ski areas on an hourly basis.

The advisories start once the snow starts to accumulate, usually in November, and continues until mid-April. The advisory hotline is 587-6981. Put that on your speed dial, or subscribe to their e-mail service because free information is hard to beat and it could save your life.

DOUG CHABOT

Columnist Doug Chabot brings you info to keep you safe

SNOW ADVISORY

Not too early in the season for avalanches



DOUG CHABOT

Every October we patiently await the first snowfall of the season. Many people drool all summer in anticipation of strapping on skis and carving the winter's first turns.

This year didn't disappoint us. In mid-October droves of hungry skiers took to the slopes with the inaugural snowfall and consequently, just like clockwork, triggered the winter's first avalanche.

A common quote we hear is "I didn't know there was enough snow to avalanche." Well guess again. Generally, if there is enough snow for you to be sliding on, then there's enough snow to avalanche.

It can still be brown in the valleys, but as long as the mountains have a veneer of white skiers and snowboarders will search for the deepest snow, which in the early season is usually found near ridgetops and in gullies from wind deposition. Wind is incredibly effective in moving snow on the ground from one place to another. Although it improves the skiing by

careening down the slope. It's relatively easy to search for depth hoar in a thin snowpack by poking your pole or hand in the snow to see if faceted, sugary, loose snow is at the ground. Depth hoar by itself poses no danger, but if it's underlying a larger slab of snow you may want to choose a different route. Nature's warning signs of unstable snow include recent avalanche activity and "whumphing" or collapsing of the snowpack.

Understanding snow stability can be time consuming and confusing. Our mission at the Gallatin National Forest Avalanche Center is to help you make good, safe decisions in the backcountry by providing daily avalanche advisories. These contain detailed field observations, mountain weather forecasts and an avalanche danger rating that can assist everyone entering avalanche terrain. Our advisories are recorded every morning on our phone line and can be heard at 587-6981. If you prefer cyberspace, you can read them at www.mtavalanche.com where you can also sign up for a free e-mail

subscription to the advisory.

Another significant aspect of our job is providing avalanche education. This winter we're offering a Basic Avalanche Awareness Class, open to all user groups, on the evenings of Dec. 5-6 with a field session on the Dec. 8, and again on Jan. 30-31, and Feb. 2. We're also teaching an Advanced Avalanche Course Feb 6-7 with a field day on Feb. 9. Call ASMSU Outdoor Recreation at 994-3621 for more information about both classes.

Additionally we are offering avalanche classes tailored specifically for snowmobilers. The first one has evening sessions on Nov. 29-30 with an all day field session on Dec. 2. This will be held in Bozeman through Team Bozeman. You can call them at 587-4671 to register. In West Yellowstone, we'll run the same class over the weekend of Dec. 15-16. You can register for this one by calling the Avalanche Center at 587-6984.

Doug Chabot is the director of the Gallatin National Forest Avalanche Center.

There's enough snow to slide on, there's enough snow to avalanche

AVALANCHE! Are you prepared?

By JOAN HAINES for the Chronicle

All the warnings in the world about avalanche dangers won't help if skiers, snowmobilers and snowboarders don't take the time to educate themselves on how to use protective equipment and read snow conditions.

Last winter was one of the deadliest snow seasons on record.

Gallatin National Forest Avalanche Center

specialists are trying to make snow recreation safer by issuing heads-up information on avalanche conditions.

During the 2000-2001 winter season, Montana and Wyoming each had seven fatalities, giving each a first place for fatalities in the United States. Five of Montana's seven fatalities were in southwest Montana.

"A lot of people caught in avalanches — they know the information," said Ron Johnson, of the Bozeman-based Avalanche Center. "It's the human factor. People might say, 'I know the snowpack is unstable but ... or I really want to ski this slope.'"

The Avalanche Center puts out daily advisories, updated at 7:30 a.m., revealing how much snow fell overnight and wind and weather conditions. The advisories cover the Gallatin, Madison, Bridger and Washburn ranges, the mountains surrounding Cooke City and the Lionhead area near West Yellowstone. Conditions are rated from a low to high probability of avalanche danger.

The avalanche specialists will begin issuing advisories as soon as the snow piles up, first on an intermittent basis if the snow isn't deep enough for daily information.

There doesn't have to be much snow on the ground for avalanches to be deadly, said Doug Chabot, Avalanche Center director.

"Hunters can trigger (them) by walking," Chabot said. "It doesn't take much. Just a little instability and a steep enough slope."

The Avalanche Center and Team Bozeman, a Bozeman snowmobile store, are sponsoring an avalanche awareness course Nov. 29 and 30, plus a field day Dec. 2 at Team Bozeman headquarters, 403 N. Seventh Ave. A \$30 donation is requested.

"Those taking the classes will learn how to use probes and beepers," said Cliff Gullett, Team Bozeman owner. "We want them to learn to 'read' snow."

"Reading" snow means digging a snowpit and being able to spot the difference between stable and unstable layers.

To access a recording of advisories by phone, call 587-6981. To speak to Chabot, Johnson or avalanche specialist Scott Schmidt, call 587-6984. You can also get an e-mail subscription to the advisories or access the center's home page at mtavalanche.com.



Chronicle File Photo

A backcountry skier digs a snow pit to test snowpack stability.

"CARVE", NOVEMBER 2001

Avalanche advisory available

DILLON — With snow beginning to build up in Southwest Montana mountains, it's time to be aware of avalanche dangers when traveling in the backcountry, the Forest Service said.

"It's important for people to have the proper equipment and to have their 'avalanche eyes' open when traveling in avalanche terrain," Ron Roginske, recreation specialist for the Beaverhead-Deerlodge National Forest said.

For current avalanche advisories for much of western Montana and to learn more about avalanches, Roginske recommends the website, <http://www.mtavalanche.com>.

Gallatin National Forest Avalanche Center opens for the season

The Gallatin National Forest Avalanche Center is opening for the 2001-2002 season. The center provides avalanche education to the public and issues advisories for the Bridger, Gallatin, Madison and Washburn ranges, the Lionhead area near West Yellowstone and the mountains in the Cooke City area.

Avalanche information is currently being issued intermittently and will begin daily advisories in early December. Recorded information for the Bozeman, Livingston, West Yellowstone and Cooke City areas is available at 587-6981 and on the Web at www.mtavalanche.com

Montana State University program offers avalanche education seminar

A basic avalanche seminar will be offered Dec. 5 and 6 from 7 to 9:30 p.m. in the Strand Union Building at Montana State University. A field session will be conducted on Saturday, Dec. 8, from 10 a.m. to 4 p.m.

Course content includes hazard recognition, route selection, fundamental snowpack analysis and basic search and rescue procedures. Cost is \$5 per classroom session and \$15 for the field session. Participants may attend any or all sessions, however, new information is presented at each class.

Advanced registration is required only for the field session and may be completed at either classroom session. For information, call 994-3621.

Avalanche awareness class tailored for snowmobilers set for Nov. 29, 30

The Gallatin National Forest Avalanche Center with Team Bozeman will offer an avalanche class for snowmobilers. Two evening lectures on Thursday and Friday are scheduled as is an all-day field session on Sunday, Dec. 2. Topics covered include weather, terrain, avalanche formation, rescue, stability tests and rider safety.

Participants need to register in advance by calling Team Bozeman at 587-4671 and have access to a snowmobile for the field session. A suggested donation of \$30 will benefit the Friends of the Avalanche Center.

From Chronicle news sources

SNOW ADVISORY

This Christmas, give a gift that may save a life

Picture this: You're skiing across a slope when suddenly you realize that the entire slope is moving with you — avalanche!

Unsuccessfully struggling to stay on top you become buried. And the clock is ticking. Odds are that if you're dug out in the next 15 minutes you've got a 90 percent chance of survival. At half an hour it's less than 50 percent and decreases rapidly from there.

This is a grim situation. What can you do? Nothing. It's all up to your partner now. Just hope that you chose them wisely and they have some basic rescue skills and a high "freak out" threshold. But even the coolest, calmest, smartest, most professional partner will be unable to dig out your rapidly suffocating body if you're not carrying avalanche rescue gear.

With Christmas just around the corner and winter still in its infancy, now is a good time to give your partner some backcountry avalanche gear. Not only do you get points for buying them something new and cool, but you're the one that could directly reap the benefits! Hopefully this stuff never gets used, but let's face it, people make mistakes.

We get lost, fall down, get stuck and sometimes find ourselves in situations we never thought possible. No one ever plans on getting caught in an avalanche, just like no one ever plans on getting into car wrecks. But wearing a seatbelt or carrying rescue gear can stack the odds of survival in our favor. At a minimum you should carry an avalanche transceiver, shovel and probe. And remember, everyone venturing into avalanche terrain should have these and know how to use them. Surviving a burial without them is slim.

Confused about what to buy? Here's some information to mull over before you open your wallet to make a holiday purchase.

TRANSCIVERS

Transceivers, also referred to as beepers or beacons, cost around \$200 to \$300. At first glance the sticker shock may turn you

away, but these little units are the cornerstones of being found in the snow.

How they work is simple.

Everyone in the group wears one in "transmit" mode that pulses an electronic "beep" at a steady rate. Then, if someone becomes buried, you can switch to "receive" in order to hear the "beep" emitting from the buried beacon. The closer you get, the stronger the signal gets. This sounds easy, but it requires some practice to master, especially in the horrific event that more than one person is buried.

There are many brands of transceivers, although they can be sorted into three types: analog, digital and a hybrid of both. The bottom line is that they all work well, and are compatible with one another.

In search mode analogs utilize sound from a mini speaker as the primary searching tool, so the closer you get, the louder the "beep" becomes. Additionally, some analogs have a light display that blinks as you get closer.

In contrast, digital beacons have a microprocessor in them that measures the signal strength and displays the search distance in meters. These also have sound, so as you get closer to the buried beacon the numbers descend and the volume increases.

Hybrid transceivers allow you to switch back and forth between digital and analog, which some people find helpful yet others find confusing.

Each beacon, regardless of brand, requires practice to use effectively, especially in the heat of battle. The model you choose will depend on its ease of use depending on your prior experience and style of learning. We are always asked, "What's the best beacon?" and our response is, "The one you know how to use."

SHOVELS

There are many good shovels to choose from ranging from \$30 to \$80. The shovel blade, usually metal or lexan, needs to withstand the abuse of hard shoveling and prying.

Metal scoops tend to be larger which allow you to move more snow and dig

through hard debris better, but lexan blades are lighter and stronger. Extendable handles can be a good option since they make digging easier on your back. And predrilled holes on the scoop let you improvise a harness to carry the shovel on your body, which is handy if you're snowmobiling or skiing without a pack.

Fancier models have probe poles or snow saws conveniently stashed in the handle.

Bigger is definitely better. However, if it's too big you'll be more apt to leave it at home instead of taking it with you, so find that balance.

PROBES

A collapsible probe pole will set you back \$45 to \$75 depending on the materials used.

Carbon fiber probes are strong and light, but pricey when compared to aluminum ones. Some ski poles screw together creating a makeshift probe, which is a nice option if you are exceptionally weight conscious, however they're not as efficient as a stand-alone probe.

Probes are effective at pinpointing a buried victim, which cuts down on your digging time and increases their chances of survival. I highly recommend carrying one — or better yet, I highly recommend my partner carrying one!

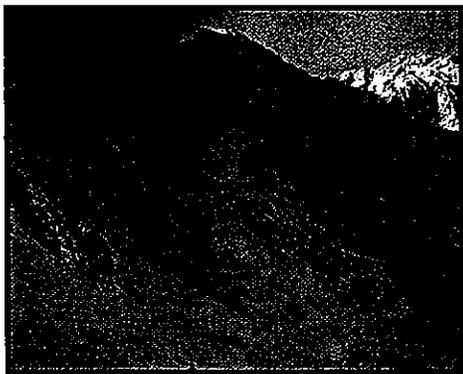
Be generous this holiday and give yourself or someone close to you a beacon, shovel or probe. Deaths caused by lack of rescue gear are totally avoidable. If you travel in avalanche terrain you owe it to yourself, or more importantly to your family and friends, to lower your risk by getting educated and carrying the appropriate gear. Stack the deck in your favor in case you erred in your snow stability evaluation. In fact, be extra generous since the gear you buy for your partner may be the same gear that saves your life!

If you'd like to read our daily avalanche advisories or see our education schedule, check out our website at www.mtavalanche.com.

Doug Chabot is the director of the Gallatin National Forest Avalanche Center.



Doug Chabot



As you hike slowly up through the deep snow, the cold air stinging your face, you hear a CRRRAAACK so loud and deep it echoes down the canyon and shakes the new snow off the trees. You turn to move, but, before you can, you're tumbling. Down and down the slope in a tidal wave of ice and snow chunks. You're thrown about like a shoe in the dryer. If you don't smash into rocks and trees you may be crushed by the ice chunks falling with you. When you stop, if you're still alive, you'll likely suffocate with the tons of concrete-like snow compacted all around you. But if your friends are prepared and trained, you could be found and dug out in less than two minutes. And knowing what forces and circumstances



Digging a pit and performing a snowpack analysis is a good way to assess avalanche danger.

AVALANCHE!

by R. Kent Orms

combine to create these deadly winter occurrences can help you make decisions to avoid danger areas altogether.

Countless factors go into making an avalanche, but the most deadly—slab avalanches—have two basic characteristics: an accumulation of snow and a weak layer somewhere in that snow.

ANATOMY OF A SNOWPACK

It begins with the gathering of clouds. High cirrus clouds, say. Innocent looking enough, these high-altitude, wispy clouds often run with the jet stream and bring in the bitter cold and snow. In these clouds, sometimes as high as 50,000 feet, ice particles make up most of the matter. They begin to attach themselves to each other, dust, and water vapor, gaining size and

weight until, finally, they give way to gravity. If conditions are right and temperatures are around 10 F, they make it to the ground as big, fat, beautiful snowflakes—the kind that make every Bozemanite start cooking up work excuses and looking for the shovel and transceiver. But also the kind that can build up to make a snowpack into a ticking time-bomb for an unsuspecting skier. The kind that could add weight to a weak lower layer and when set off, shear into huge chunks of hardened snow and ice—a slab avalanche.

Dependent on more factors than could be discussed in one article, the dynamics of a snowpack take shape early in the season with the first snowfall. From there, amount of wind-loaded snow, temperature, slope of the hill, aspect (which direction the hillside faces), leeward or windward orientation,

humidity, and how the lower layers were formed, all contribute to the character of a snowpack. But what makes a snowpack into a deadly slab avalanche? First, it begins with the creation of a weak layer, something that gives way to the weight of the layers above. How this weak layer forms can be quite complex, but there are three general ways.

FORMATION OF DEPTH HOAR

When the flakes are falling, they are usually fine-grained, but as the flakes land, they almost immediately undergo transformation. Imagine you're a snowflake near the ground, say up in the Gallatin Range. The ground, retaining heat, warms you up and just like being in a fluffy down jacket, you start to pump water vapor into the air spaces between

Gallatin National Forest Avalanche Center

Founded in 1990 to "provide the public with current snowpack and mountain weather information and avalanche education," the GNFAAC is a tremendous resource for any backcountry visitor. Based in Bozeman, Montana, the GNFAAC covers an enormous area, including the Bridger, Gallatin, Madison, and Washburn Ranges, the Lionhead area near West Yellowstone, and the mountains around Cooke City. The GNFAAC is staffed by Doug Chabot, Ron Johnson, and Scott Schmidt. Together they compile daily advisories that you can receive by e-mail, their website, or just by calling them.

One of the chief functions is the Avalanche Center's variety of tailor-made avalanche seminars and workshops that are given in

the early winter. Many long-time backcountry skiers consider the workshops a mandatory annual event before the season begins. There are two avalanche workshops: Basic and Advanced.

There are two Basic avalanche courses this year. The course includes lectures on two evenings and a Saturday in the field. Course content includes: hazard recognition, route selection, fundamental snowpack analysis, and basic search and rescue procedures. Cost is \$5.00 for each evening session and \$15.00 for the field session or the whole thing for \$25.00.

1st Session: December 5th and 6th, 2001, 7:00-9:30pm, at MSU in the SUB, Ballroom B. December 8th, 2001, all day field session at Bridger Bowl. 2nd Session: January 30th

and 31st, 2002, 7:00-9:30pm, at MSU in the SUB, Ballroom B. February 2nd, all-day field session at Bridger Bowl.

There is just one Advanced class and it consists of two evening sessions and one Saturday field session. Course content includes: a brief review of basic topics, snow metamorphism, avalanche slab fracture mechanics, and avalanche rescue. The field session includes snowpack analysis, route finding, and advanced avalanche rescue techniques. Cost is \$45.00 (cheaper for MSU students).

February 6th and 7th, 2002, 7:00-9:30pm, at MSU in the Strand Union Building, Ballroom B. February 9th, 2002, all day field session at Bridger Bowl. Call 994-3621 for more information on either course.

your fluffy crystals. This vapor moves upward, to colder snowflakes in the snowpack, and recrystallizes. Neither the density nor the thickness of the snowpack changes, but a weak, unstable, and invisible layer forms nonetheless. This weak bottom layer is called depth hoar. The rate of recrystallization depends on the temperature gradient. Depth hoar forms faster in shallow snow and cold weather.

NEAR-SURFACE FACETING

Just under the top of a snowpack, a similar phenomenon can occur. Near-surface faceting describes the formation of a weak layer near the surface of the snowpack and was first theorized by Bozeman resident and National Avalanche Center snow-scientist Karl Birkeland. In near-surface faceting, weak crystals similar to depth hoar are produced when water vapor forms and recrystallizes under a high temperature gradient. But here, a quick temperature change must take place deep within the snow. And, according to Birkeland's reports, a significant layer of faceted (weak) snow forms within a day and a half. These faceted crystals have poor bonding properties, making the layer prone to breaking away and sliding with the accumulation of more snow. Simply stated, a dramatic change in temperature can be quite dangerous, especially if more snow follows in the next week or two.

FORMATION OF SURFACE HOAR

A third type of weakness occurs at the snow surface. When you waddle out to the car on a winter morning and end up having to scrape a frosty windshield, you experience how water vapor in the atmosphere

likes to crystallize on the coldest thing around. Similarly, a layer of snow gets cold after spending all night losing infrared radiation to the sky. By morning, a layer of large ice crystals may be deposited on the snow, forming surface hoar that future snowfalls can't bond strongly to. With enough new snow, the situation can resemble that of a concrete slab perched atop a layer of ball-bearings.

So, you've got a weak layer and then an accumulation of snow, what else do you need to make an avalanche? Well, you need a trigger, something to set it off—and hopefully that's not you.

WHAT CAN YOU DO?

Backcountry travelers have tons of resources available

for educating and helping to protect themselves from becoming victims of an avalanche. The first step is learning to recognize the signs of an avalanche.

Look for avalanche tracks. Look around to see where previous avalanches have cut

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path through the trees. This is a huge clue that there may be an avalanche in that spot again. It may look great for skiing, but there is a reason that no trees have grown there. Also, look for trees that only have branches growing on the downhill side.

Stay off slopes between 30 and 45 degrees. On significantly steeper slopes, the snow generally sloughs off before it can build into an avalanche. On shallower slopes, the snow has little reason to move—although avalanches often extend beyond the slope onto flatter run-out zones.

Identify recent avalanches in the area. Seems obvious, but there is more to this than just avoiding where the avalanche occurred. Look for clues, like the characteristics of the hill. What direction is it facing? How steep? Is it wind-loaded? Try to avoid slopes that match those characteristics. Sometimes all the snow in a particular area is unstable.

Listen for a "whooping" sound from the snow. This indicates a small or large



failure. You will hear this often if you travel in the backcountry much. Take notice—it's a sign of an unstable snowpack.

Practice. Have a friend bury a backpack with your transceiver in it and then try to find it as fast as possible. Switch and let her try. It is best to do this again at the beginning of every trip. Also, go over safety procedures for skiing down the slope—e.g., one at a time.

Take advantage of local resources. The Gallatin National Forest Avalanche Center is probably the single greatest resource for anyone who travels in the outdoors in the winter around here. Backcountry travelers can call or log in to the Avalanche Center to report conditions they experienced, and staffers there spend a good portion of the week in the backcountry testing conditions themselves. The GNFAAC's annual classes offer a chance

to get cheap (\$25), professional, hands-on instruction and should absolutely be an annual requirement by anyone using the backcountry.

There is a balance somewhere between risk and safety, between courage and foolishness, and I think most of us cross back and forth over it. To some, just successfully negotiating traffic on the way to work is reason enough to plant a well-deserved coffee cup on the desk like a flag bearing witness to your travails. For others, hanging on a thin ribbon of ice by a nylon leash far above frozen ground is completely within the realm of comfort. So, we each must learn the signs of danger, stay alert to conditions, and then make decisions according to our own comfort and risk level as well as that of our partners. ☺

Kent Orms was once caught in a small but scary avalanche, and since then he's significantly improved his avalanche safety skills. Kent has been Outside Bozeman's contributing editor for the last two years.

Give or buy the Gift of Life

By RON JOHNSON
Avalanche Specialist
Gallatin National Forest
Avalanche Center

It is crunch time! Either you are scrambling to buy someone special a meaningful Christmas gift or you need to tell someone what you bought with the gift certificate or cash that was given to you. Do I have some ideas for you! How about avalanche related gifts?

Avalanche Education **Related Gifts**

Knowledge of avalanches is the first line of defense for avoiding getting caught in an avalanche. Perhaps you can offer to pay for a friend's tuition or give a donation to the sponsor of the course. Many courses are offered in Mon-

tana. You can get information by contacting your local Avalanche Center.

Books and videos are also good ways to learn about avalanches. A few of the good ones are:

Book: *Sledding in Avalanche Terrain: Reducing the Risk*. By Bruce Jamieson and Darcy Svederus. Check out the Canadian Avalanche Association's web site at <http://www.avalanche.ca> for ordering information.

Video: *Riding Safely in Avalanche Country*. Forest Service National Avalanche Center and Idaho Department of Parks and Recreation. To order, call the Friends of the Sun Valley Avalanche Center, (208) 726-4333.

Hazard Assessment Tools

A key question to ask when snowmobiling in the mountains of Montana is: Is the terrain capable of producing an avalanche? Slope angles are a key factor in determining the likelihood of an avalanche occurring. Most avalanches occur on slopes that are between 30 and 45 degrees in steepness. Therefore it is important to measure slope angles. Your local outdoor shop carries slope inclinometers. Another handy option is to buy a compass that also has an inclinometer. That way you can measure slope angles and have a navigational aid.

Avalanche Rescue Gear

If you or your partner are unfortunate to get caught in

an avalanche the best chance of survival is with a speedy rescue. That rescue will be up to you or the other members of your party. The three important pieces of equipment that will need are:

Rescue Beacons

There are many brands of rescue beacons (also called avalanche transceivers). I'm not aware of any that don't work well. The key is to buy a new one and read the instructions and practice, practice, practice.

Probe poles

Rescue beacons are key to getting you close to where someone is buried. Probe poles help you pin-point the exact location. Probe poles should be sturdy and com-

act enough that they will be carried on every snowmobile excursion by every member of the group.

Shovels

Rescue beacons and probe poles help you locate a buried person but shovels allow you to uncover and actually save a person. As with probe poles, shovels should be sturdy enough to withstand abuse while being light and compact enough that they will be carried.

All of this gear should be available at your local outdoor shop or snowmobile



Photo: Dave Johnson
Avalanche rescue gear should be sturdy and compact enough that they will be carried.

WHAT TO GET... TO GET OUT OF AN AVALANCHE

Nate Ziegler
Outside Magazine

The white stuff is starting to pile up and so is the impending avalanche danger. While there are areas in which winter sports enthusiasts can participate in their activities without much fear of an avalanche, many would be surprised how much danger they are actually exposed to. Along with alpine skiers and snowboarders, other groups, such as snowmobilers, snowshoers and cross-country skiers, all face very real, yet often unnoted, avalanche threats. Small avalanches traveling as little as 10 vertical feet have trapped many a skier or snowshoer in a gully and killed them.

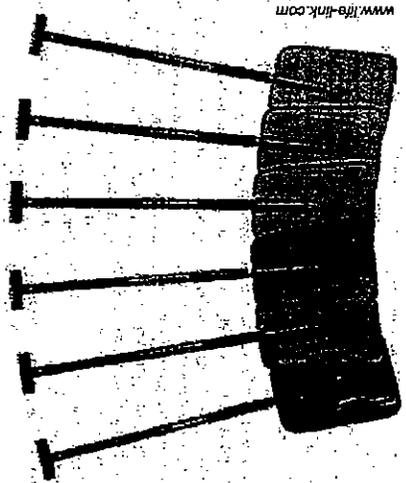
But don't be afraid, this isn't an excuse to grab the Doritos and dive into the couch this winter. Get out, do your thing, but most importantly get educated. More than any digital directional transceiver, Lexan shovels or fancy "breath through the snow

and live for three hours," vest knowledge is the most valuable thing you can equip yourself with before you head into the backcountry. Nevertheless, stuff happens, and all the knowledge in the world is not going to find your buddy under 8 feet of snow, unless you both have beepers. So both equipment and knowledge are necessary to survive in the backcountry... and little luck never hurt anybody.

Most people are aware of the backcountry survival gear in the market. Avalanche transceivers come to mind first. Often called beepers or beeps, these things are a Godsend. You turn it on and when you leave the house and, if all goes well, it will say there's a buddy. If the unthinkable should happen and you buddy gets caught and buried in a slide, you then turn transceiver to receive and hopefully follow the intensity of the beeps to find your buddy. Granted, both people must know how to use the transceivers and both must have the same

frequency. The current international standard for transceivers is 457 kHz. Back in the day, two frequencies were widely used: 457 kHz, and 2275 kHz. Ortovox, a leader in the transceiver industry, solved this in the 80s by creating a dual frequency transceiver. But 457 still had marked advantages over 2275, not the least of which was signal strength. And in 1989, production of all 2275 transceivers stopped. So know your frequency!

Recently, the market has been lit with a new advance in transceiver technology: digital transceivers. As opposed to analog transceivers, which use audible signals only, digital units use an LCD display to direct a searcher to a victim. The display shows a direction arrow and a number indicating, in numbers, the direction and distance to the victim. They work with any 457 transceiver and are just as if more reliable than an analog. The Burton/Berryvox Red 457



www.burton-link.com

Digital is by far the high watermark for transceivers. But cost is a factor. Digital transceivers are dead even in the price race at \$300. This includes the Burton/Berryvox model, the Ortovox M2 and S.O.S. Digital. (Survival on

Continued on pg 10...

ones. On the Student Union Building for sale board there were 3 ads, all the same. The first was for an Avalanche. The second was for a Peps Optifinders (probably making the jump to digital) and all under \$80. But be cautious buying used; your life (or someone else's) is at stake. Make sure it is the right frequency and that works. And I leave you with this: a beeper is not an invisible shield against avalanches nor is it a guarantee of survival. It is simply a safety precaution, not an excuse to be a moron and ski on super steeply avalanche slopes.

The next piece of equipment is almost equally important, yet immensely simpler: the shovel. Think about it: say you can find someone in 3 minutes after a slide. If they are under 10 feet of snow that knowledge does little for you (or them, depending how you look at it) with out a way to clear the snow. Enter the snow shovel.

This isn't the same tool you used to dig holes for fence posts this summer. A snow shovel is a compact, light unit, usually with a telescoping handle and a square blade. They fit unobtrusively in a pack and serve multiple other uses (digging out cars, building kickers, blunt tool of destruction, etc.).

The only real variable is blade material. Life-Line (a local company) makes a Lexan head for their shovels that is darn close to indestructible. It's covered by a no questions asked lifetime warranty never to bust. I've done everything short of putting a back saw or hot lead (bullet) to mine to see if it would break and it's still intact. These strength tests include beating it on trees, being hit by baseball bats, getting huge rocks dropped on it and being run over by cars and trucks multiple times. Anyone that tells you that Lexan blades break easily has obviously never properly abused one. Metal blades are heavier, stay bent when used for prying one thing, and generally cost more. I would recommend avoiding them. Look to spend \$40-\$50 on a shovel that should last eternally.

Next on the equipment list is the probe pole. Akin to a tent pole, a probe breaks into smaller sections to be carried easily. It also locks together when straightened, which prevents it from coming apart when being pulled in and out of the snow. This is the only piece of equipment that I might classify as a non-essential. In the hands of almost any competent individual, a probe can take precious minutes off a victim's burial time. They may seem a little pricey at \$50-\$70, but still cost a lot less than a funeral.

In the completely optional department comes the Avaling. The Avaling is a vest like device that has a mouthpiece protruding in the area of the face. The idea is, once you get caught in a slide, to get the mouthpiece in your mouth and bite down before you get buried. Once buried, it will allow you to breathe in oxygen-rich air from in front of you, and exhale dangerous CO2 behind you. This device has been tested in a live burial for 1 hour and scientific projections show that a survival time of 3 hours is possible in ideal circumstances. It facilitates this by keeping the airway clear of blockage, preventing asphyxiation through a shield of CO2, and preventing an ice shield from building around the victim's head by moving heated exhaled air to the rear.

Although, there are a lot of variables involved. For example, the mouthpiece must actually be in the victim's mouth and the snow pack must be light enough that the victim's lungs can expand. These are all factors considering that you don't die, of trauma (20% of avalanche victims die from trauma inflicted in the slide). Much like a beeper, an Avaling is not a warrant to be reckless; it's merely a precaution.

In my opinion, education is the best avalanche survival tool. If you can identify potential high-risk areas and avoid them, you're better off than the other person who practiced with their beeper for 200 hours this summer. When it comes to avalanche safety, we are all fortunate to be living in Bozeman. The GNFAC (Gallatin National Forest Avalanche Center) is located here and is an excellent resource for avalanche awareness, training, and forecasting. Several times per year the center offers classes through MSU, consisting of 2 classroom sessions and one field session. The classes teach route finding, snow peak analysis, snow stability tests, snow science, and most importantly, rescue practices and techniques.

Last year I took both the basic and advanced classes and because of it, I feel a lot safer on the snow. I could try to give you a lesson about how to perform a search and rescue, or ramble on about surface hoar and temperature gradient metamorphosis, but it would probably do more harm than good. But if any of those terms I just mentioned, or the idea of being safe in the backcountry, appeal to you, I recommend that you contact ASMSU at 904-2933 or enroll in a class today.

Our Opinion

Avalanche Center an invaluable asset

Few of us know or are willing to acknowledge when the federal government develops a grassroots program that is a genuine response to our community's needs.

But on occasion, our government works for us in such a way that nothing but clear and positive results are the outcome.

Such is the case with the Gallatin National Forest Avalanche Center, based in Bozeman.

Quite often, the center's three avalanche gurus — Karl Birkeland, Doug Chabot and Ron Johnson — risk life and limb (while having more than a little fun) to report snow conditions around Southwestern Montana.

They have two advisory hotlines, one for West Yellowstone, Bozeman, Livingston and Gardiner — 587-6981 — and another for Cooke City — 838-2341.

By calling the hotline, you will receive information regarding backcountry and ski area observations. Snowmobilers, backcountry skiers, snowshoers and others use the information

every day in order to prepare themselves for Montana's vastly unpredictable snow and weather conditions. For four of the last five years, our state has led the nation in avalanche deaths, including seven last year.

With more and more people seeking good snow and backcountry conditions, the Avalanche Center should be an integral part of people who will be entering avalanche terrain.

The center also spends a good deal of their time educating the public by presenting workshops and lectures that focus on using proper judgment and honing one's skills in the backcountry.

Last weekend, Chabot and Johnson led a two-day course in avalanche awareness for snowmobilers. The first day was a five-hour lecture and slide show that brought out snowmobile guides and riders who were able to learn what to watch for while out riding. The following day was a five-hour field session that covered issues of weather,

terrain, avalanche formation, rescue, stability tests and rider safety.

It was the first class of its kind ever held in West Yellowstone. Another class is held in Bozeman, with last year being their first experience with the two-day course. The center has received accolades, as they are the first in the country to hold such an event, and every effort to thank and support them is not only worthwhile, but also necessary in order to ensure their continued efforts.

What the Gallatin National Forest Avalanche Center has done since its inception in 1990 is immeasurable, but one thing is for certain: their dedication certainly casts a shining light on the U.S. Forest Service. To help support the center, write to: Friends of the Avalanche Center, P.O. Box 6799, Bozeman, Montana 59771, or call 587-6984. They also have a web site at www.mtavalanche.com and can be reached by e-mail at gnfac@avalanche.org.

Avalanche Safety



Milt Fusselman, a Gallatin National Forest employee who checks on regional outfitters to see they are following procedure, attempts to locate an avalanche transceiver beacon last Sunday. In the first photo, Milt is scanning the area for a signal. In the second photo, he zeroes in on the other beacon. In the last picture, he pulls the buried beacon from the snow after successfully locating it.

Gallatin Forest Avalanche Center brings first snowmobile avalanche safety training to West

Story and photos by BOB FURU

A quick snow check when you are out in the backcountry on a snowmobile might be all you need to keep you and your companions alive.

That's the lesson several snowmobile guides and riders got last week when they participated in an avalanche safety course sponsored by the Gallatin National Forest Avalanche Center.

Riding under poor lighting conditions up to the Horse Butte Lookout station and beyond, Doug Chabot and Ron Johnson — two of the three men who run the Avalanche Center — led the group first to a safe hillside with a 28 degree slope. With

the group split into two, Chabot and Johnson led each team through a basic identification and safety course on survival and safety in avalanche country.

After some initial fears, a missed turn and a battle with my facemask that

sported a precarious layer of ice buildup inside my helmet, I wound up in Chabot's group. I had been reading his faxes and e-mails regarding the center's daily findings and suggestions for years, and had always assumed I would merely be disseminating that information via my desktop computer. Let the experts do this kind of stuff, I thought.

But there I was, a lowly newspaper reporter among some very accomplished guides who work for Jeff Watt, a pleasant man on solid ground but a fiendishly sick powder hound when aboard a

More avalanche safety photos/page 8

snowmobile. Watt owns and operates Ace Snowmobile Guides, a guide service located at Hi Country Snowmobiles on Hayden and Highway 20. The rentals and business end is the responsibility of Blaine Heaps, Hi Country's owner who works as a fly-fishing guide during fishing months.

After parking our sleds along the trail, Chabot led us down the unmarked hillside which contained a few feet of soft, quicksand-like snow supported by a solid snow base underneath. Each person then took their shovel — a must for backcountry 'bilers, along with probes and a transceiver — and carved a block of snow along the hillside.

Next, by placing the business end of the shovel over the snow cube, Chabot demonstrated how you can give the shovel a few soft taps to see if any breaks in the snow are created. If not, he'd tap a little harder. Pretty soon, you could begin

More on page 8

A shovel, probes and a beacon are necessary tools for backcountry s

to see the structure of the normal snowpack one quite often without a world, let alone any knowledge of avalanche safety. Experts say that most avalanche accidents occur as a result of riders lacking equipment, training and attitude — which was the whole purpose of this two-day course.

The first day was a five-hour indoor instruction course on safety and awareness. Participants met in the Barrel Bar at the Stage Coach, while the Avalanche Center team advised them of what to look for and how to respond. The second day was "hands-on" training: an all-day field course.

Chabot covered a few tests that can be done to find breaks in the snow, where slabs of heavy

buildup can cause an avalanche. The stability tests are not an uneasy task and can take only a few minutes. After the first hillside, we traveled to a steeper, 32 degree slope. Avalanche conditions become prevalent at 30 degrees and higher.

A triggered avalanche is surprisingly strong and swift. A small slab 60 feet wide, 90 long and just one foot deep weighs 36 tons. Small slides travel at 40 miles per hour, while larger ones can move at a speed of up to 120 miles per hour.

With the obvious dangers of wind loaded slopes, steep terrain, and a rider's hearing and sight disability — wearing a helmet is essential, but it can impair one from hearing the "whoomping" or hollow sounds that may be clues of instability, as well as

cause "tunnel vision" in which you are unaware of clues and dangers around you — there are things backcountry riders must use and practice with.

Our next drill involved using a device known by many names: avalanche beacon, transceiver, "peeps," and "S.O.S." to name a few. Pairing up with another rider, one person would set their beacon on its "transmit" setting and walk out among the deep snow, burying the pocket-sized lifesavers under the snow's surface.

The teammate would then turn their beacon to its signal setting, and set out blindly in search of the hidden treasure.

The beacons are equipped with body straps and it is important that you wear the device around your body — underneath your jacket — and have it trans-

mitting a signal as soon as your travels begin.

Watt says he now make guides use only digital transceivers, which are a costly! The S.O.S.-type transceiver about half the cost — one g member bought his at a pav for \$100 — but there are ob differences between the tw. S.O.S. is an analog transceiv meaning the user must rely more difficult transmission than the digital model. With digital transceivers, the use provided with three signals a distance meter and a dire meter. As you get closer to target, the sound signal cha arrows point the direction a digital readout tells you hov you are in feet to your targ.

The analog system doe provide distance; rather, it

■ Snowmobile safety



Clockwise from left: Jeff Watt and Doug Chabot examine the texture of different layers of snow; Watt holds a digital avalanche beacon while attempting to locate his partner.; Chabot demonstrates a quick shovel tapping test; Chabot shows his group slabs of snow broken by his gentle tapping; Watt surveys the steep terrain; Watt looks into a magnifying glass to examine the difference between top layer snow and bottom layer snow.



When snowmobiling/ from page one

mits a beeping signal and also shows a light signal which gets stronger as you get closer.

Research shows that most snowmobile avalanche victims are found within forty feet of their snowmobiles, usually upslope but sometimes under their machine or downslope. That gives a rescue team a good indication of where to begin their search. Riders should carry probes on their packs so they can begin probing the snow for a victim. Watt says that when he gets a reading between 8-10 feet, then he can begin probing. But with the digital transceivers, it takes only seconds to find your mark, provided you've had the practice. The analog ones can take a bit longer, but again, with experience, should get you quickly to your mark.

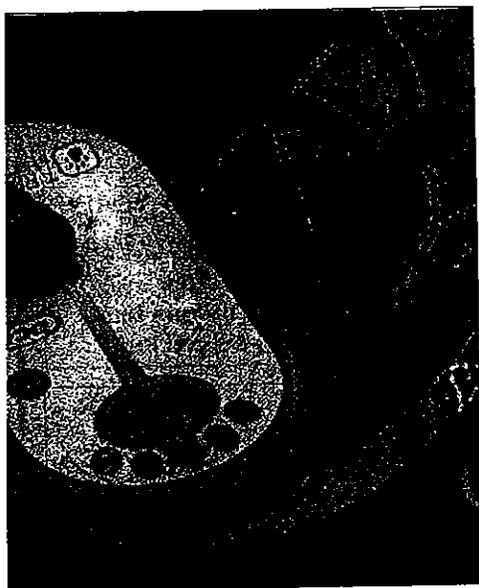
Johnson, Chabot and Watt all agree that practice and prepared-

ness are fundamental for back-country snowmobiling. Watt requires his guides to spend a great deal of time on "guide rides" so they can practice safety and rescue techniques.

Watt has never had to rescue someone during an avalanche, but he knows it can happen at any time. It is almost certain that person who snowmobiles their whole life will trigger an avalanche.

This was the first year the Avalanche Center put on the two-day course. The first was held last year in Bozeman and was notably the very first snowmobile avalanche safety course held in the country.

To call the Avalanche Advisory Hotline, call 587-6981. Their web site is www.mtavalanche.com and you can also email gnfac@avalanche.org.



MOORE ON BOARD

Get out there — The backcountry is a place to make memories



Jay Moore

Often I wish. I wish that more often I could get out into the backcountry to enjoy God's great creation. Getting out to experience the silence and the beauty and the majesty of the surrounding ranges is great. Ripping down a big chute or cruising an open face is the very pulse of snowboarding. It is like surfing a giant white wave. The crisp floating icy air and the feeling of being so small in a vast sea of white must be experienced to believe. Many times I have had the opportunity to go cat boarding and even heli-boarding. I have been to North Cascade Heli with the Mervin crew, Whistler Heli with Airwalk, Irwin Lodge with K2, and others. I have taken creative hikes that have yielded great lines in a few resorts in Europe. All of these were great experiences yet most memorable would have to be two days when a friend and I rode with Craig Kelly and Dave Downing in the northern Bridgers. These are the days that beckon you back to those giant snow covered peaks. If you answer the call, be ready, and be wise.

When traveling into the backcountry you must be aware of the many risks around you. You must be prepared. Know your surroundings and have a partner with you that is also well versed in mountain travel in the winter. Be aware of the stability of the layers of snow everywhere you will be. If you take an educated approach you may avoid a tragic outcome to an otherwise great day. I would suggest a backcountry avalanche safety course. In the last issue of Carve, there was info on a level 1-avalanche course to be taught January 28-30. For more info call (307) 344-2294. Also in the last issue of Carve was a great article by Doug Chabot, director of the Gallatin National Forest Avalanche Center, which addressed the use and need for three essential backcountry tools — transceivers, shovels and probes. Know how to use these tools before you go into the backcountry. These are the basic must have items. Now we need to choose the vehicle.

Split snowboards have come a long way baby. There are two dominant brands, Voile, and Burton. Each has minor differences and each offer an efficient way to travel in the backcountry.

With Voile you can purchase a split kit to convert your board of choice or opt for any of the three lengths of their carbon fiber filled decks. The Voile system is the easier of the two to use. The bindings mount to plates that slide over and bring together the halves. A large keeper pin holds them in place. Changing from approach to riding mode is fast and easy due to the simplicity and looser tolerances of the Voile. Just don't drop the pin when changing over. I would advise you carry an extra at all times.

The Burton split comes together using a circular clamp, which surrounds and squeezes

together the two halves. There is not much tolerance for ice build up and because of this it is much harder to operate. This can be a serious drawback when you are on top of a peak trying to assemble the board in a driving cold wind. The benefit of the Burton split is that it rides the same as a conventional un-split board. To me this is a great benefit.

This is the dream we have all been waiting for. Imagine a split that rides like a regular board. Until now you there was sacrifice of performance if you had a split. Gone are those days. If you're into the best performance once you're in riding mode then the Burton is for you.

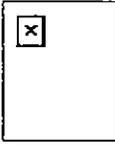
Both Voile and Burton have their own skins. The differences are actually quite noticeable. The Voile skins affix with a clip over the tip, and glue to the base ending just short of the tail. The Burton skins clip over the tail and come forward up and over the tip, and have a d-ring, which slides over the wrap to hold it in place. Reports have come in that this newer way works well and that Burton may indeed have re-invented the wheel in this respect.

A good set of collapsible poles is a must for

getting around. Consider icing-friendly designs and size of the basket on the pole when choosing poles. Do they collapse down small enough to get into your pack? Does your pack hold it on the outside securely? You don't want to loose gear on the way down whether it is your shovel blade, handle, or poles. You may also want to carry a small set of snowshoes for the steep ascents. Something like the Vets shoe, which is a smaller minimalistic one-piece polycarbonate shoe, or a smaller traditional shoe with a removable tail may be a good addition to the arsenal.

Don't forget about hydration. Get yourself a Camelback and don't forget the winterizing tube cover or you just may carry around a bunch of ice all day. Little items like windproof lighters, binding tools, extra ladderstraps, space blankets, first aid kit and even a safety whistle can be lifesavers.

I hope this gear review gets you inspired to get out there. Above all, remember when you get out to go with others who are also experienced, and that you watch each others backs while out. Winter is here, so get out there.



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Montana

Knowing avalanche conditions critical

By MARTIN J. KIDSTON, IR Staff Writer - 01/04/02

Check before you go.

Changing snow conditions and Monday's death of a 21 year-old man in a slide west of Deer Lodge have Montana's avalanche experts reminding winter recreationists to proceed into the backcountry with caution.

Doug Chabot, an avalanche specialist with the Southwest Montana Avalanche Center in Bozeman, said snow conditions are monitored several times a week, and updates are posted daily.

In southwest Montana, the northern Gallatin Mountains currently have the weakest and most unstable snow conditions in the area, Chabot said.

Snow pack in the range has shown signs of widespread collapsing and cracking, warranting the Avalanche Center to label the area's avalanche danger as "considerable" on all slopes greater than 35 degrees and "moderate" on lesser slopes.

Chabot said that on Wednesday winds up to 40 mph in the Bridger and Madison ranges were strong enough to remove surface snow from some slopes, depositing it on the lee side of ridges to create wind slabs up to one foot deep.

Chabot said that reports from the Bridger and Madison ranges also found wind slabs to be fragile enough that cracks propagated through the crusted snow to trigger several small slides.

The conditions in the two ranges have prompted a "moderate" avalanche danger on slopes over 35 degrees and "low" on all lesser slopes.

"We dig holes and try to figure out if the snow is stable or unstable," Chabot said. "We ask ourselves if things are getting stronger or weaker and we take that information and put it into an

- Helena MarketPlace
- Movies/Films
- Web Cams
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- Horoscope Pages
- Send E-Greetings
- TV Listings

and we take that information and put it into an advisory every morning."

The point of the effort, Chabot said, is to provide the public with enough information to stay out of trouble.

Avalanche hazards throughout Montana's west-central region, including the Bitterroot and Lolo National Forests, and the Rattlesnake Mountains north of Missoula, are "considerable" on all wind-loaded slopes greater than 35 degrees. Natural avalanches are possible, the warning states, and human-triggered avalanches are probable. Avalanche dangers posted by the Glacier Country Avalanche Center in Kalispell were "moderate" on Thursday, especially on steep, open slopes, which received deposits of wind-transported snow.

West of the Continental Divide, natural avalanches are unlikely. But human triggered slides, the report said, were possible.

Chabot cautioned that conditions change daily and those looking to enter avalanche prone areas should check snow conditions before proceeding. Chabot said that signs of recent slides are the leading indicator of unstable snow conditions, seconded by snow layers that collapse or crack under the weight of hikers, skiers or snowmobilers.

If the obvious indicators aren't visible, Chabot said, the person would be wise to examine snow conditions before proceeding into dangerous territory.

"To really find out, you'll have to dig around in the snow a little bit," Chabot said. "You're looking for layers that are weaker, those underneath dense or stronger layers."

Avalanche terrain is defined by slopes steeper than 30 degrees. As an example, Chabot said, a black diamond ski run generally slopes at roughly 35 degrees. The steeper the slope, the more stress the snow pack is under.

Snow, wind, and nature itself can trigger a slide, while the added presence of humans can create enough stress to cause an avalanche.

"If you're going to play in avalanche terrain you should get educated — take a class, read a book, watch videos," Chabot said. "Once you're out there, everyone in the group should have an avalanche transceiver and a shovel. If you make a mistake and get caught, it will at least allow someone to come and help."

Chabot suggested putting one person at a time on a given slope and take turns crossing slide prone areas.

For daily avalanche conditions worldwide, including Montana, log on to the Avalanche Center's Web page or call one of the numbers

Avalanche ALERT

Avoiding, surviving are matters of preparation, smarts



George Lane IR staff photographer

CAMPBELL OF LINCOLN, a snowmobile safety instructor and an avalanche survivor, stands next to the snowmobile he was riding when the avalanche occurred.

overed in seconds. Buried for minutes. Felt like forever.

COMING IN MONDAY'S IR

By MARTIN J. KIDSTON
 IR Staff Writer

Buried under two feet of snow, Jeff Campbell was thinking about his pregnant wife and three kids, hoping his friends could hone in on his avalanche transceiver and dig him up before it was too late.

It was a race against time and Campbell knew it.

The memory of that day in February of last year on the North Fork of the Blackfoot River is still fresh in Campbell's memory. How the snow broke loose. How the slab swept him down the mountain. How the debris piled up on top of him.

Campbell, a safety instructor for the Ponderosa Snow Warriors snowmobile club in Lincoln, was unlike the average rider. He was educated in avalanche safety. He wore an avalanche beacon. He knew the snow that day was weak. The slope, he saw, was more than 30 degrees. It was prime avalanche terrain and slide conditions were ripe.

But what Campbell knew and what he did were two different things. The difference between the two, he said, nearly killed him.

"We made our way into a clearcut and we rode around the bottom. One of the guys went up

and made a pass across. He did it three times and it looked all right to me."

Earlier in the day, Campbell had seen the snow slough off the side of the road. A heavy snowfall had set in the prior week. But Campbell positioned his sled anyway and pointed it across the open slope. Watching his friend dash across the opening had silenced the little voice in the back of his mind — the one saying this was a mistake.

"I got half-way across and I noticed all the snow was moving around in front of me," Campbell said. "I saw big slabs of

More BURIED, page 9A



AVALANCHE DANGER
 How to read the snow and live.



Photo courtesy of Jeff Campbell

THIS PHOTO SHOWS THE HILLSIDE where the avalanche occurred. Campbell was snowmobiling in the upper left side of the photo.

Buried: Campbell saw warning signs but didn't heed them

continued from 1A

snow moving. I was right in the middle. It happened so quick."

The two-foot deep slab had broken free 75 feet above Campbell. It measured 150 yards across, meaning that Campbell, who was caught on his machine in the middle of the now-moving slab, was still 75 yards and a long haul to safety.

When the slab began to move, time, he said, stood still.

Doug Chabot, an avalanche expert with the Gallatin National Forest, said that average avalanches can achieve speeds between 60 and 80 mph within five seconds. They crash down with the force of a freight train

'I was thinking about what an idiot I was. I had a baby on the way. I had three kids and a wife.'

**JEFF CAMPBELL,
SNOWMOBILE SAFETY
INSTRUCTOR**

and settle with the consistency of concrete. Of the two types of slides — slough avalanches, which are small and narrow, and slab avalanches, which

move as a cohesive mass — Campbell was riding the worst of the two. When the slab goes free, Chabot said, it fractures like a plate of breaking glass. "I had a hold of my sled with my left hand," Campbell said. "I decided that I wanted to hang on to my sled and I tried to keep a swimming motion with my right hand."

Campbell's quick action would save his life. The slide took him 250 vertical feet down the mountain and dumped him onto an old roadbed. The snow piled up. He was buried in seconds. "I felt the snow come over the top of me," Campbell said. "I kept my right arm moving and when I came to a stop I tried pushing the snow away from my face. I tried to calm down and get my wits about me."

Claustrophobia, Campbell said, quickly set in. Now buried under two feet of snow, he managed to sweep the debris away from his face before it settled. By luck, the snow over his face was loose enough that it fell through to

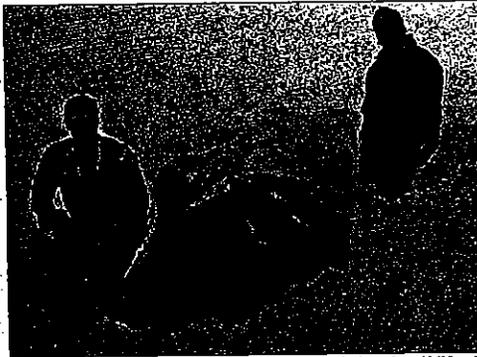


Photo courtesy of Jeff Campbell

JEFF CAMPBELL, right, and his friend Dan Burns of Deer Lodge dig Campbell's snowmobile out from the avalanche.

create a breathing hole the size of his fist. He began to scream for help, not knowing if his partners were caught in the massive slide as well.

"I had some air," Campbell said. "But I tried to push out with my legs. Trying to move — it was just like concrete. I couldn't hear a thing."

Five minutes passed. Then 10. His avalanche beacon had been set to transmit. With his life hanging on the instrument and the unknown fate of his friends, he thought about his family. And hypothermia.

"I was thinking about what an idiot I was," Campbell said. "I had a baby on the way. I had three kids and a wife."

Fifteen minutes passed — the statistical point where the odds of surviving begin to drop away with every minute the victim remains buried. But that day, luck was on Campbell's side.

"It took them 20 minutes to find me. That 20 minutes felt like forever," Campbell said. "I thought they were buried too."

Now nearly a year later, Campbell related his story to a roomful of Forest Service personnel attending an avalanche awareness course for snowmobilers in Bozeman on Monday.

Like avalanche experts Chabot and Ron Johnson, who teach avalanche safety for the Gallatin National Forest, Campbell hopes to spread his lesson to Lincoln-area snowmobilers. Be smart and listen to your intuition.

"It's of the utmost importance," Campbell said. "There are so many days when you can go out riding that it's not worth the risk on a marginal day."

As a safety instructor, Campbell said the it-won't-happen-to-me mentality can be dangerous. Paying attention to the warning signs is paramount. The snow talks. Riders, he said, need to listen.

Reporter Martin Kidston can be reached at 447-4086, or by email at mkidston@helenair.com.

LotteryNumbers

Powerball: 13-19-22-41-47, Powerball 5
Wild Card: 4-10-14-19-20 King of Clubs
Montana Cash: 2-15-16-31-37
Rolldown: 11-24-28-39-48

Correction

Meagher was never appointed governor

In Friday's Independent Record, Thomas Meagher was referred to as Montana's first territorial governor. He served as acting governor in his appointed position as Montana secretary when the state's first two governors left their positions, but he was never appointed governor. The Montana Historical Society recommends "Territorial Politics and Government in Montana, 1864-1889" by Clark Spence for a discussion of the state's politics at the time.

Danger: Teaching snowmobilers how to detect danger is goal

continued from 1A

crests and high-mark steep slopes.

High-marking is a technique using a series of up and down cutbacks to cross slopes that are too steep to ride a snowmobile directly across.

"They're catching air that rivals what the skiers are doing," Chabot said. "We're finding that many riders are young and athletic and are coming from a skiing or snowboarding background."

The proliferation of the snowmobile industry has also played a factor, Chabot said, with more riders going off-trail and putting themselves and their groups at risk.

In 2001, the snowmobile industry saw the sale of more than 208,500 snowmobiles worldwide, with more than 140,000 of them selling in the U.S. The industry has grown to take in \$7 billion a year.

According to the U.S. Forest Service, 1.6 million snowmobiles are currently registered in the U.S., 16 percent of them in the western states. Of those western riders, Chabot said, 50 percent ride off trail, compared to only 20 percent nationally.

"Our goal as educators is to help snowmobilers make decisions about snowpack and terrain so they can make informed decisions," Chabot said. "With today's technology, they can easily get onto a 40-degree slope — into avalanche terrain."

As riders themselves who use their machines to study the snowpack in southwest Montana and issue avalanche warnings, Chabot and Johnson are teaching the teachers how to educate snowmobilers.

"Avalanches involving people just don't happen randomly," Johnson said. "In most avalanche incidents, the victim or someone in their party triggers the slide."

Life and death

In the early 1990s, a snowmobiler was riding with a large group, high-marking a steep north-facing chute near Cooke City when he became stuck. As he tried to free his machine, he triggered an avalanche 200 feet above him.

The slide in this particular case was substantial, Johnson said. It measured 500 feet wide and 800 vertical feet. Its crown line, or the point where the slab broke free, was three feet deep and slid at an angle of 36 degrees. It was prime avalanche terrain and snowpack was weak.

"Although this occurred in February, conditions in November contributed to the weak, faceted snow near the slope's base," Johnson said. "About one foot of new snow fell the previous week and strong winds loaded the upper bowl and chute."

According to the accident report, the victim had his back to the avalanche and was unaware of it until it hit him. The slide swept him 600 vertical feet down the slope where he was buried under six feet of debris.

"They located the victim's position with an avalanche

transceiver and used a probe to pinpoint his location," Johnson said. "He was dug up and found to be unconscious and not breathing."

The victim in this case was resuscitated after being buried for 20 minutes. His story is a lucky one. Many don't have a happy ending.

On Dec. 31, 2001, near Philipsburg, 21-year-old Cory Ring was killed by an avalanche, becoming Montana's latest casualty.

According to the accident report, Ring and three others were riding snowmobiles in the Thompson Lake area. When Ring separated from the group, the group went looking for him and found Ring's helmet and partially covered snowmobile in the debris of an avalanche.

No one in the party had avalanche transceivers, shovels or probes, according to the report.

Aided by other snowmobilers, the party found Ring's body one hour later. He was buried under more than four feet of snow and located 100 yards from his snowmobile.

The investigation by the Pintler Ranger District suggested that Ring had not made it very far up the slope when the avalanche tore free.

"(They) reached this conclusion based on the fact that the snow was not conducive to high-marking and the tracks in the general area did not make it very high up the slope," the report reads. "The sheriff felt that the marks on (Ring's) face may indicate that his helmet may have been knocked off by the avalanche."

Surviving the slide

"It isn't the foot of snow that kills you," Johnson said. "It's the six feet of debris that ends up at the (bottom)."

Those lucky enough to survive an avalanche — avoiding the rocks, trees, cliffs and other hazards presented on the way down — run the risk of suffocating under the mass of snow within minutes. The longer one is buried, the lower his chance of survival.

"The good news is that if you're caught in a slide, are untraumatized and have your head buried four feet or less under the snow surface, you have a 90 percent chance of surviving if you're dug out within 15 minutes," Johnson said.

The chance of survival drops dramatically for every minute that passes, Johnson said. After 25 minutes, the odds of surviving drop to roughly 58 percent. At 35 minutes, it falls to 35 percent. The victim's only chance of survival, Johnson said, rests upon the rescue ability of his companions.

"Let's face it, if you're caught and buried in an avalanche then you blew it," Johnson said. "This is when you hope you chose your partners well."

According to the Avalanche Center, 64 percent of those buried in an avalanche survive because of their partners' ability to conduct a rescue. In cases where partners left the scene to get help, the rescue team turned

into a body recovery team nearly 80 percent of the time.

"Companion rescue is your best bet," Johnson said. "Although 64 percent isn't very high, it's better than 20 percent survival that an organized rescue offers."

Johnson said that out of 682 rescues performed, only 292 avalanche victims lived.

The learning curve

Jeff Campbell, a snowmobile safety instructor in Lincoln for the Ponderosa Snow Warriors, was caught and buried last February in an avalanche near the North Fork of the Blackfoot River.

Rescued by his friends, he's one of the lucky 64 percent to survive a slide. Being prepared, he said, contributed to his rescue. It's also contributed to the survival of other snowmobilers who were buried by an avalanche and lived to tell about it.

"Snowmobilers have come a long way as far as getting the gear," Campbell said. "Avalanche beacons, probes and shovels. But the knowledge of the snow and what to look for is lacking."

With the number of avalanche deaths among snowmobilers climbing, Campbell said, educating riders is the crux of the issue. Skiers and climbers have been trained in reading snowpack conditions for years. Snowmobilers haven't.

Johnson agrees. "If your goal is to high-mark, then gather as much information as possible on your initial pass," Johnson said. "Ride low and fast to minimize your exposure to the center of the slope. This way, if it slides, you're headed in a good direction."

Johnson said riders should also consider riding the slope from the top down instead of the bottom up. Center punching the slope on the first pass, Johnson said, raises the rider's chances of getting caught in a slide before he can cross the safety zone beyond the avalanche's flanks.

"Think about the stresses that a rider and a snowmobile put on a slope," Johnson said. "If it's close to the breaking point, then you're increasing the probability that it will avalanche."

According to the Avalanche Center, 63 percent of snowmobile-induced avalanches occur while the rider is high-marking the slope. Johnson added that riders would only expose one person at a time to a slope, avalanche fatalities would drop. That means leaving a friend to dig out his own snow if he gets stuck.

"It's common in avalanche incidents with snowmobilers to hear that one person was stuck and his buddy rode up to help him, but ended up triggering the slide instead," Johnson said. "What sometimes happens is that the helper escapes, since he's on a moving machine, but ends up killing his friend since he's stuck on the slope."

Reporter Martin Kidston can be reached at 447-4086, or by email at mkidston@helenair.com.



INDEPENDENT RECORD

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Avalanche ALERT



DOUG CHABOT DESCRIBES HOW TO STUDY the snowpack and terrain last week.



RON JOHNSON, LEFT, EXPLAINS how to use an avalanche beacon. Right, Doug Chabot analyzes weak layers in the snowpack in the Bridger Mountains last week.

Recognizing the terrain

- Slope Angles: Anything over 30 percent is vulnerable to a slide given enough stress.
- Slope Size: What will be the consequences if the slab begins to move?
- Slope Shape: Terrain traps can be deadly by funneling victims into constricted spaces.
- Vegetation: Damage to trees is an easy indicator of avalanche terrain.
- Runout: Where will the slide end up once it starts to move?
- Aspect: Is the slope on the windward side or leeward side of the ridge?
- Elevation: Temperature and weather set the stage for slides by creating weak layers.

Know the signs. Read the signs. Heed the signs.

The first of this two-part story ran in Sunday's newspaper.

Story and Photos
By MARTIN J. KIDSTON
IR Staff Writer

Surviving an avalanche may be a matter of luck — avoiding one is not. It's a message avalanche experts Doug Chabot and Ron Johnson are telling the public in hopes of saving lives.

Working for the Gallatin National Forest and the southwest Montana Avalanche Center, the two have tackled an important task — since 1995, more than 42 avalanches have been reported in Montana, killing 22 people.

Studying the Snow

According to Johnson, an avalanche occurs when the load, or stress, placed upon the snowpack exceeds its strength. It's a simple equation that, when miscalculated, can be deadly. Additional load can come in a variety of ways, such as standing on the snow, new snowfall or windblown snow deposited onto the leeward slopes.

"If the balance is precarious, then adding just a little more load can produce an avalanche," he cautioned.

Over the course of the winter, the snowpack becomes layered. Johnson

said every snowstorm adds new layers to the pack. Each layer consists of different snow crystals, densities and strengths. Once on the ground, the snow can change consistency.

Cutting into the snowpack and conducting shear tests, or simply looking at the layering, can reveal possible hazards, such as weak layers formed by surface hoar or faceting.

"Surface hoar is frozen dew that forms on the snow surface during cold, clear nights," Johnson said. "While not a concern at this stage, it poses a significant and persistent problem once it's buried."

Surface hoar, while strong under compression, is weak under shear. Johnson said that once it collapses, it can propagate fractures over large areas.

Faceted snow, or non-binding grains of sugar-like snow, can also be dangerous, especially when buried. The consistency of faceted snow makes it weak and, once buried, capable of collapse under stress.

While digging a snow pit in a safe location can reveal details about the stability of the pack, it's not the only sign winter recreationists can look for to avoid danger.

"It's one piece of the big puzzle," Johnson said. "On some days, it's an incredibly small piece when there's

other signs visible."

Snow talks, and people need to listen. Reading the signs, Johnson said, can be the difference between life and death. But yielding to the signs is just as important as recognizing them. Yet, Johnson said, even the most obvious signs are often ignored.

Terrain the Only Constant

Chabot said there are two types of avalanches — slough and slab.

The slough slide, or point-release slide, is typically smaller and, because of its size, is less likely to catch a person on the way down.

The slab slide, however, is a different story. Here, Chabot said, a cohesive mass of snow, sometimes measuring a mile wide, breaks free as a single unit, laying ruin to anything that lies below. Weak layers of faceted snow or surface hoar are often to blame.

"Slab avalanches are the most destructive and the most difficult to predict," Chabot said. "All it needs is for the cohesiveness of the slab to be stronger than the cohesiveness of the weaker layer. Once they go, they can propagate for long distances."

Dissecting a slab avalanche may be easier than predicting one. Chabot said that, like a river, they follow a track down, coming to rest on the flat terrain below, dubbed a runout.

"It's a good idea to identify the potential runout of a slide, since this would not be the best place to park a snowmobile," Chabot said.

While weather, snowpack and the human factor all play roles in releasing slides, Chabot said, terrain remains the only constant in the four-part equation.

"With good route-finding, it's possible to travel safely in the backcountry, even during times of high snowpack instability," Chabot said. "If you can recognize avalanche terrain, then you can avoid it."

Standing up to his hips in a snow pit at 8,000 feet in the Bridger Mountains, Chabot said that studying the slope's angle is important. Generally, he said, a slab avalanche occurs on slopes between 25 and 60 degrees. But most slab avalanches occur when the starting zone is between 30 and 45 degrees.

"Anything above 60 degrees and the snow sloughs — below 25 degrees and the stresses on the snowpack aren't enough to cause the snow to slide," Chabot said. "When we talk about slope steepness, we're referring to the steepest part of the slope. This is the likely spot where the avalanche will be released."

Chabot said that while it may be hard to estimate the angle of a slope,

More AVALANCHE, page 8A

Avalanche

Continued from 1A

An inclinometer, which measures slope angles, can be handy where accuracy is paramount.

Weather Factor

Most natural avalanches break free during or immediately following storms.

Johnson said the existing snowpack cannot adjust to the increased weight in a short period of time. Adding precipitation, either naturally or through the action of wind, only increases the stress on snowpack, without adding length.

Wind redistributes snow by piling windward slopes and depositing the snow onto leeward terrain, creating cornices and pillows of snow," Johnson said.

Johnson said that on clear, sunny days, if the wind is blowing and moving snow

around, the slopes are being actively loaded.

"Anytime you're standing on rocks in the middle of winter, ask yourself where all the snow has gone," Johnson said. "It was probably redeposited on the leeward side of the ridge."

Snowfall and wind aside, the most obvious and often ignored sign of an unstable snowpack is recent avalanche activity.

"Heed the warnings," Johnson said. "It's Mother Nature's biggest sign that things are unstable."

Yet, even this warning is often ignored.

Johnson told of a group of four Minnesota riders who rented sleds from a Cooke City retailer. Upon entering the terrain, Johnson said, they traveled over the debris from a recent avalanche and began riding the adjacent slope.

"Could the snow slide?" Johnson said. "Well, it already did, yet they chose to ignore this obvious sign of instability."

The subsequent avalanche

measured 300 feet wide and slid 120 vertical feet, killing one of the riders. No one in the group had avalanche beacons, probes or shovels, prompting one of the riders to go to town for help.

Rescuers located the body 15 minutes after arrival. If the group had been prepared, Johnson believes, they may have been able to save their friend.

"You are the rescue team," Johnson said. "You need to have the knowledge and equipment to rescue your partner."

The Equipment

Carrying the equipment is a start — the avalanche beacons, shovels and probes.

Despite their cost, avalanche beacons save lives.

Johnson said everyone in the group must have a beacon, and everyone must ensure the instrument is set to transmit. If you're wearing a beacon and become buried, and it's set to receive, you're probably out of luck.

But simply having a beacon

is not enough. Those in the group need to know how to use one. Practice makes perfect, Johnson said, increasing the odds of conducting a successful rescue in the 15 minute-time frame, which begins once the victim is buried. Every minute the victim remains buried after 15 minutes, his odds of surviving drop.

"I don't know of a bad beacon, but I know dozens of people who are bad beacon operators," Johnson said. "It isn't the wizzbang, it's the person operating the wizzbang."

The best chance of surviving an avalanche, Johnson said, is to avoid one altogether.

"The conditions in the backcountry change daily, even hourly, and avalanche centers provide you with recent snowpack stability information," he said. "You still need to make your own assessments for any given slope, but avalanche centers can provide you with information about previous snow and wind events, buried weak layers and general concerns that you can focus on."

Big dump big boost for Bridger

By KAYLEY MENDENHALL
Chronicle Staff Writer

With snow accumulation ranging from 30 to 50 inches at Bridger Bowl Friday, a lot of people were playing hooky.

"Today, it's looking like about 3,500 skiers, which is a nice big Friday for us," said Terry Abelin, general manager of Bridger Bowl. "I think there was a lot of powder flu today."

All of the fresh powder fell overnight in a dump unlike anything Bridger has seen in quite some time.

"I went to the ski area and man was it nice, it was incredible," said Doug Chabot, of the Gallatin National Forest Avalanche Center. "It was the best skiing I've seen up there in three years."

(More on **Bridger**, page A12)

Bridger/from page A1

The storm was caused by what Chabot called the classic "Bridger Bowl Cloud," but that cloud seems to have broken up and moved on.

"A moist northwest flow of air comes down from the north, and with the geography, it doesn't hit any big mountain ranges until it hits the Bridgers," he said. "It's pretty juicy."

But, that big of a snowfall can also cause problems.

"More snow equals more avalanches," Chabot said. "Whenever you have a huge dump like this you're going to get something to move on steeper slopes."

Ski patrollers were up early setting off slides and digging out lifts to prepare for the rush of skiers.

"The amount of work it takes for them to open that area is phenomenal," Chabot said. "It's a hive of activity up there early in the morning. It's pretty wild to witness it. Most people never think about it, they just show up and the lifts are running."

Even with the extra work, the Bridger and Pierre's Knob lifts were both down for part of the morning because of mechanical problems.

"It was just due to the cold and the amount of snow," Abelin said. "Alpine lift, due to the avalanche concerns, is the last lift we open. The Deer Park lift was very crowded at 10 o'clock."

But with 30 inches of fresh powder surrounding them, he said skiers weren't complaining about the lift lines and everything

was open by about 10:30 a.m.

"They hoot and howl a lot," Abelin said. "I had people say it's the best snow they've skied in 30 years."

The ski hill had \$10 day Jan. 11 and anyone who skied that day was given a voucher to ski for \$10 again Friday. It was also the annual Bobcat day and Abelin said \$5 of every lift ticket will go to Montana State University's ski team.

On average the Bobcat ski day raises about \$4,000 for the MSU ski team, said Patty Kicker of MSU athletics.

"We have a great partnership with Bridger Bowl," she said. "The money comes back into the program to enhance the ski team."

Kayley Mendenhall is at
kmendenhall@dailychronicle.com.

SNOW ADVISORY

When you're out in the backcountry it's important to know your limits

Just the other day I skinned up Mount Ellis outside of Bozeman.

My partner and I were already concerned about the avalanche danger since a foot of new snow fell on top of a thin, weak snowpack. As we moved uphill, the spectacular collapsing and cracking of the snow justified our fears, which is an unmistakable sign of dangerous conditions. This meant we had to choose our route wisely in order to minimize our exposure to avalanche terrain. Today was certainly not the day to put a skin track up the gut of the open drainage even though the thinner trees would've made travel easier, nor was it prudent to center punch large open slopes. These signs of instability dictated a conservative route and the fact that we were on skis defined our routing options.

Snowmobilers eye slopes differently than skiers, who in turn, look at terrain differently than snowshoers or snowboarders. We're all out there having a good time, but we need to be

aware of the advantages and limitations of our sport.

SNOWMOBILERS

Other recreationists can't rival the sheer distance a snowmobiler can cover. This can be a huge advantage since they can find suitable terrain regardless of the avalanche danger by easily moving elsewhere. Sledgers can also test many small slopes before committing to an open bowl, and if they're caught in an avalanche, they have speed and power to ride out of it. Snowmobilers also have the advantage of not having any equipment attached to their body hindering their struggle to the surface.

Unfortunately, the ability to cover a large area also means that if there are unstable slopes they'll probably find them; so sledgers will need to constantly reevaluate the avalanche hazard as they change aspect and elevation. Another disadvantage of riding is that you're facing uphill much of the time as you begin a highmark,

which makes riding out of a slide more difficult. Additionally, a snowmobiler's power, speed and climbing ability tend to give a false sense of security.

It's always a good idea to test as many small slopes as possible and to occasionally get off the machine to see if any unstable conditions exist. Snowmobilers should also refrain from riding up onto a slope to help their stuck partner. The added stress of another sled on the slope has triggered many avalanches with 33 percent of snowmobiler fatalities involving a stuck sled. And if you are waiting at the bottom of a large slope, you may want to keep your sleds pointed downhill and running to make a fast escape in the event of an avalanche.

SKIERS

Skiers can gather a lot of information regarding snow stability

(More Safety on page 14)



Doug Chabot

Safety/from on page 11

since they travel slowly, have intimate contact with the snow, and are aware of subtle changes. Skiers also have the advantage of moving easily in mountainous terrain with varying snow conditions and can change their route or goal quickly. Many randonee skiers also have releasable bindings, which are a blessing if you're caught in a slide, although many cross-country and telemark skis don't have these. Instead, the attached skies anchor or twist your legs creating further injuries. Skiers, unfortunately, also lack the quick acceleration that snowmobilers have to power out of a bad situation. They're at the mercy of their own skill level and position on the slope if it avalanches.

To their benefit, skiers can choose a safe route by carefully working the nuances of the terrain, which is what I did to escape the dangerous conditions on Mt. Ellis. Skiers can also gather lots of information about the snowpack before they commit to a slope, or they can avoid avalanche terrain entirely. Skiers also will want to ski one at a time allowing their partners to watch from a safe location in case they trigger a slide. While lacking the power of a sled, skiers can sometimes angle off the slope to safety if circumstances are favorable.

SNOWBOARDERS

Snowboarders, like skiers, can gain a lot of information about the snowpack as they ascend, although many snowboarders boot uphill finding easier travel on windblown, thinner snowpacks. Once at the top of a slope snowboarders can ride through challenging snow conditions such as breakable wind crusts, irregular surfaces and thinner snowpacks, plus their additional floatation may help them escape off an avalanching slope.

Conversely, the ability to ride in difficult snow conditions also allows them

to possibly ride in more unstable snow conditions such as wind-loaded slopes. Snowboarders don't have releasable bindings either, which is a big problem if they're caught in an avalanche. Since many snowboarders hike to their chosen slope their ability to respond to changing conditions by going to a different area is limited and time consuming. Their routefinding power lies in the initial choice of slopes with a direct uphill route that allows easier travel on wind-eroded terrain.

SNOWSHOERS

Unlike skiers, boarders and sledders, snowshoers don't need steep, open slopes to recreate. They can assess the snowpack as they travel and due to the touring nature of their sport, they can choose to stay off of avalanche terrain relatively easily.

Unfortunately, snowshoers have the disadvantage of non-releasable bindings and are unable to slide off of a slope in the event of an avalanche. Snowshoers need to choose their terrain carefully since even small slopes can have deadly consequences. Creek bottoms, typically where trails are, can be notorious terrain traps. Additionally, many snowshoers find themselves traversing through the runout zones of larger avalanche paths. While snowshoers do not need to be in avalanche terrain in order to have a good time, by being outside in the mountains they can inadvertently enter dangerous ground.

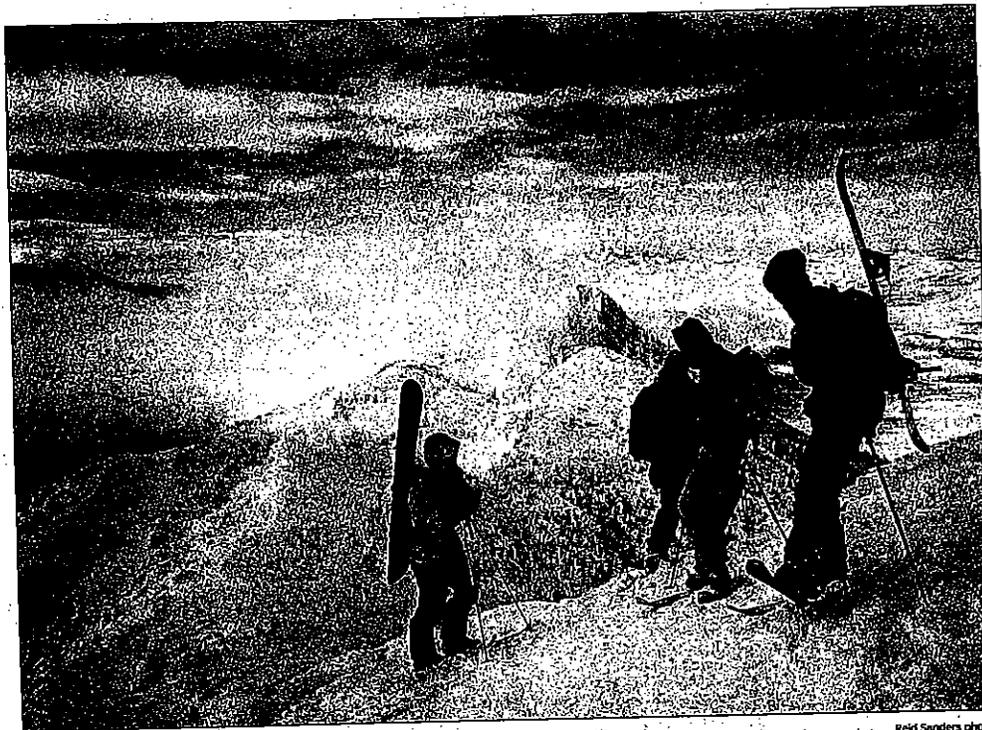
Each method of recreation has unique characteristics. It's important to look ahead at your routefinding choice and make sure that it matches your snow stability evaluation. The mastery of routefinding requires flexibility since every day, every group and every snow slope are different. Keep your eyes open and realize the advantages and limitations of your sport.

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The Source

Off the packed trail



Reid Sanders photo

Backcountry skiers pause atop Mount Jefferson in the Centennial Mountains in the Beaverhead National Forest. Nemesis Mountain is in the background. Hellroaring Ski Adventures, based out of West Yellowstone, guides trips into the area and also has a yurt set up nearby for overnight stays.

More and more people find winter recreation in the wilds of Montana

By BRETT FRENCH
Gazette Outdoor Writer

RED LODGE — In the 24 years Pete Shelley has been backcountry skiing, he's seen less snow and more people.

"But it's not crowded by any means," he said. "It's one reason I've hung out here as long as I have."

The face of the Beartooth Mountains, west of Billings and around Red Lodge, may be the exception to the rule of increased winter backcountry use around Montana's population centers.

"We don't get a tremendous amount of backcountry use in the Beartooths in winter because we don't have a lot of flat country," said Tom Highberger of the Red Lodge Ranger District.

But that's not the case around Bozeman, Missoula and Kalispell, where winter backcountry use is steadily increasing, according to forest managers.

"Certainly winter recreation in the Gallatin National Forest is hugely popular," said Kimberly Schlenker, wilderness and recreation staff officer for the



DAVID GRUBBS/Gazette Staff

Snowmobile guide Jeff Watt takes a break at Johnson Cabin in the Gallatin National Forest while on the way to Mount Two Top. More powerful, lighter snowmobiles has made it easier for riders to get into the backcountry.

forest. "People move to Montana to play, and they don't stop just because it's winter."

Besides backcountry skiing, recreation in winter can include everything from cross-country skiing to ice climbing, snowmobiling to snowshoeing, ice fishing to dog sledding.

The growth in such activities over the past five to 10 years can be attributed to several factors: better winter gear — including clothing, skis, snowshoes, avalanche beacons and snow-

mobiles — and a quest to get farther off the beaten track in search of perfect powder and a little serenity.

Fred Flint, resource forester for the Hungry Horse-Glacier View Ranger District in northwestern Montana, said he doesn't see a "huge number" of people in the Flathead's backcountry. "But five years ago you didn't see anybody."

Certainly, better technology has made a big difference in snowmobiles.

Please see Recreation, 7A

Recreation

Continued from 1A

Flint said. "Thirty years ago you didn't dare get too far off the road," he said. "The improvements in power and reliability have definitely changed things."

Although hard figures on winter backcountry use are slim, Schlenker said the Gallatin estimates that it averages 350,000 snowmobile visits a year, about 50,000 of those in the Cooke City area and 100,000 in the West Yellowstone region.

Gene Thompson, a forestry technician for the Lolo National Forest near Missoula, said the increase in backcountry use hasn't suddenly shot up, it's been gradual.

"We have a ready supply of backcountry skiers and snowboarders that come out of the university and the city," he said. And the community has a strong local snowmobiling group that prefers to plow through powder rather than ride roads.

Increased backcountry use can also be measured by the increasing attention to avalanche advisories. The Gallatin National Forest Avalanche Center's Internet advisories were accessed 150,640 times this past winter — a 62 percent increase over last year and a 400 percent increase from five years ago.

Naturally, packing more people into the wide winter expanse is going to cause a few problems.

Some of the effects of increased backcountry use have been:

- More social conflicts — such as disagreements between skiers and snowmobilers, or skiers and snowshoers;

- More animal vs. human conflicts — a lawsuit against the Gallatin National Forest claims snowmobilers are harming grizzly bear denning areas;

- And more people in the backcountry means an increasing number of deaths resulting from avalanches.

"The avalanche hazard exists all the time," Thompson said. "Obviously, the risk only increases if you put people in the high hazard areas."

According to the Avalanche Center Web site (www.mtavalanche.com/) winter recreation has skyrocketed on national forest lands across the country, and so have the number of avalanche accidents and fatalities.

Schlenker said the forest provides specific training courses for snowmobilers and snowmobile guides about avoiding avalanches and assessing conditions.

People used to think only hardcore backcountry skiers were going into avalanche terrain, Schlenker said. "That's not the case anymore."

Another problem associated with the increased use is more trespassing by snowmobilers into wilderness areas, Schlenker said, especially around Cooke City.

"That's due to the evolving technology of snowmobiles," she said. "They're more powerful, lighter and able to handle deeper snow."

Enforcing such boundary rules, she said, is difficult since funding is slim.

"We have a 365-day-a-year recreation program, but we don't get funded for that. We don't get funded for six months," she said.

Avalanche

Continued from 1C

But as long as it pays my bills, I'm happy. I like to ride. I'm putting on 3,000 to 4,000 miles a year, about 2,000 of it guiding."

Because he rides so often into the backcountry, Watt said he was one of the first snowmobile guide services in the lower 48 states to go through avalanche training offered by the Gallatin National Forest Avalanche Center. The center, based in Bozeman, offers basic and advanced avalanche workshops in addition to training seminars for snowmobilers and other backcountry users.

The center's Doug Chabot said so far this year 349 snowmobilers received avalanche training, up from 190 last year. Last year was the first time the center specifically targeted snowmobilers.

"The awareness in the community is snowballing," he said.

Watt is one of about 30 guides to get training, Chabot estimated.

Watt said the need for training was obvious. Powder riding is the No. 1 reason people come to him, he said, especially among Midwest visitors.

"Rather than take them up in the mountains and shoot them up those big fat hills, I'd rather teach them how to do powder turns," he said.

But even encouraging powder turns rather than high marking puts snowmobilers in avalanche country.

"Obviously, with the technology that snowmobiles have — look where we're going now — it's obvious that we're in avalanche country," he said.

Chabot said the fact that snowmobiles can travel so far so quickly, and play on so many more slopes, makes it more likely they'll encounter an avalanche. And because snowmobiles weigh more, it's easier for them to trigger an avalanche. That's especially true when one snowmobiler gets stuck on a slope and another rider drives up to help, adding to the weight.

Instead, riders are advised to stay away from the bottom of a chute when another rider is high marking, and to resist the temptation to go and help.

After taking a course, Watt invested in some avalanche gear. He now carries shovels and probes, and every one of his clients wears a transceiver that emits a signal that can be located with any of the other transceivers.

The gear helped lower his insurance and give him some peace of mind.

Serenity in a winter playground may seem natural. But the deadly nature of avalanches should give any rider pause. Consider the statistics, which are really fatalities.

So far this winter, out of six avalanche fatalities, four have been snowmobilers, according to the Colorado Avalanche Information Center. In Montana, one snowmobiler was killed last month in an avalanche while rid-

ing in the Flint Mountains near Philipsburg. Three other snowmobilers were killed in Alaska in December.

Those numbers pale when compared to overall avalanche fatalities.

Since the winter of 1985-86, snowmobilers have accounted for 83 of the 327 avalanche fatalities in the United States, not including this year's deaths. The worst season was last year when 15 riders were killed in avalanches.

The next most dangerous activity in terms of avalanches was backcountry skiing where 68 skiers have been killed since 1985-86.

While the number of skiers killed by avalanches has remained fairly flat, the number of snowmobilers killed by

avalanches has jumped considerably in the past four years.

Watt has kicked off two avalanches while riding, but he's never been buried. He advises his clients to first try and outrun the avalanche, but if caught to kick off the snowmobile and "fight like hell" to stay above the snow.

If buried, he advises clients to try and dig an air pocket out around their face or to stick a hand up when tumbling through the snow.

"In a sense, we are trying to scare our clients a little bit," Watt said, "by educating them about avalanches."

Brett French can be reached at 657-1387, or at french@billingsgazette.com

Snowmobiler survives avalanche

01/29/02

By NICK GEVOCK Chronicle Staff Writer

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Email this story to a friend

A Billings snowmobiler who was buried under four feet of snow near Cooke City Sunday got by with a little, make that a lot, of help from his friends.

Two pals dug him out within 15 minutes, but not before Scott Olson had a brush with death.

"I was holding on so tight I ripped the grips off the aluminum bars," the 36-year-old Olson said of his ride.

Olson said he was blazing up a gully around noon Sunday in the Miller Creek drainage, with friends Donny Beer and Tyler Reichert following, when he saw the slide coming at him.

"By the time I noticed it, I was on it," he said. "All I wanted was to get to this rock pile."

Olson made a sharp turn in an attempt to avoid the bulk of the slide, but it was too late. He said he felt the immense power of an avalanche as he tried to keep from getting buried.

"I was swimming as hard as I've ever swam in my life, trying to stay on top of the snow while avoiding trees," he said.

He couldn't pull it off. The slide took him "over, around and through" trees.

One of those trees broke his lower left leg. Olson said he did everything recommended, taking a huge breath as the snow shallowed him and cupping his hands in front of his face to create an air pocket.

It didn't matter. His chest was crushed by the weight, pushing all of the wind out of him, he said.

Beer and Reichert managed to barely escape the slide, although their machines were buried, but later dug out and restarted. They located Olson right away, and had him out within 15 minutes.

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<http://news.mywebpal.com/partners/311/public/news245572.html>

Avalanche gear not good without knowledge

01/29/02

By Chronicle Staff

Email this story to a friend

The recent steady march of snowstorms is holding forth the promise of a good old fashioned winter for western Montana. That's great news for skiers, snowboarders and snowmobilers who have been bemoaning a succession of drought-stricken winters.

But it can also spell bad news — the worst — for those who venture into the backcountry unprepared. Witness the tragic avalanche deaths of four snowmobilers in Missoula County Saturday.

Winter backcountry recreation has enjoyed explosive growth as legions of the young and healthy venture further afield in search of unbroken expanses of fresh powder.

The growth in these sports' popularity has also prompted an explosion in the recreation gear industry. Catalogs proliferate with selections of avalanche transponders for locating victims, telescoping probes for penetrating avalanche debris and "Avalungs," devices that help the buried breathe while rescuers search.

But the most important avalanche protection device of all — knowledge — is not found in a catalog.

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The daily avalanche information is a vital component of any backcountry recreationists, but it must be accompanied by some basic knowledge about avalanche-safe behavior.

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Winter is a time of unparalleled opportunity for exhilarating adventure in the Northern Rockies. But that adventure could turn deadly — as it did for the Bitterroot snowmobilers — without some basic equipment, the ability to use it, and knowledge.
<http://news.mywebpal.com/partners/311/public/news245566.html>

Survival gear no match for snow in avalanche

By SUSAN GALLAGHER
Associated Press Writer

HELENA — The victims all carried the essential avalanche survival gear: special locator beacons, snow probes, even shovels for digging out. But in the end, all of it was of no use for four snowmobilers trapped and killed in a weekend avalanche.

Experts say it is an unfortunate reminder that while safety gear is important, it is not a free pass to disregard hazard warnings.

"Some people start to feel that because they've got the gear, somehow they're going to be able to come out OK," Scott Schmidt, an avalanche specialist for the Gallatin National Forest, said Monday.

Two days earlier, four experienced snowmobilers died in an avalanche that trapped them under up to 20 feet of snow northeast of Missoula, in a high-risk area for snowslides.

Missoula County Undersheriff Mike McMeekin said the men, who suffocated, were "someplace they shouldn't have been."

The area was not restricted, but the Forest Service had warned the avalanche risk was high, McMeekin said.

Killed Saturday were Garrett Grothen, 29; Christopher Novak, 25; Adam Ployhar, 17; and Bradley Popham, 31, all of the Missoula area. They were in a group of 10 snowmobilers.

The deaths pushed to 339 the number of people killed in U.S. avalanches since the winter of 1985-86, according to the Colorado Avalanche Information Center.

Montana ranks fourth nationally, behind Alaska, Colorado and Utah in the number of avalanche deaths.

When the Montana slide struck on Saturday, the party was equipped with locator beacons, shovels and avalanche probes. The equipment is a safety net, but with large holes, Schmidt said.

"One out of three victims dies whether they have a beacon or not, because they get beaten to death" by debris during the snowslide, he said.

A survivor of the weekend slide, Jason Stapleton, 24, of Missoula, dug out the four victims and said two had slammed into trees.

Apart from the risk of fatal trauma, people swept up in avalanches

“
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— Scott Schmidt, avalanche specialist for Gallatin National Forest

”

stand a diminishing chance of survival if they are not reached within 15 minutes, Schmidt said.

"It's not that easy to find a beacon and reach someone in that amount of time, without practice," he said.

The \$250-\$300 transceivers are worn next to the body and send a signal; rescuers can home in on the beacon to find the buried person. To pick up the signal, the rescuer must wear a transceiver, as well.

He said use of transceivers has risen, as has the ability to take snowmobiles onto steep slopes where the threat of an avalanche may be particularly high. The informal competition among snowmobilers to "high mark" steep

slopes has moved onto more dangerous terrain as snowmachines have become more powerful.

Snow that moves in an avalanche bonds quickly and "people who have been caught in it talk about how it felt like they were poured in concrete," Schmidt said.

On Sunday, a snowmobiler was rescued by companions after he became trapped in an avalanche in the Cooke City area, near the northeastern corner of Yellowstone National Park.

On Monday, avalanche specialists went to the scene of Saturday's deadly slide northeast of Missoula, in an attempt to figure out what caused it.

G R E A T F A L L S T R I B U N E

Tuesday, January 29, 2002

Friends rescue man from avalanche

By NICK GEVOCK
Chronicle Staff Writer

A Billings snowmobiler who was buried under four feet of snow near Cooke City Sunday got by with a little, make that a lot, of help from his friends.

Two pals dug him out within 15 minutes, but not before Scott Olson had a brush with death.

"I was holding on so tight I ripped the grips off the aluminum bars," the 36-year-old Olson said of his ride.

Olson said he was blazing up a gully around noon Sunday in the Miller Creek drainage, with friends Donny Beer and Tyler Reichert following, when he saw the slide coming at him.

"By the time I noticed it, I was on it," he said. "All I wanted was to get to this rock pile."

Olson made a sharp turn in an attempt to avoid the bulk of the slide, but it was too late. He said he felt the immense power of an avalanche as he tried to keep from getting buried.

"I was swimming as hard as I've ever swam in my life, trying to stay on top of the snow while avoiding trees," he said.

He couldn't pull it off. The slide took him "over, around and through" trees.

One of those trees broke his lower left leg. Olson said he did everything recommended, taking a huge breath as the snow shallowed him and cupping his hands in front of his face to create an air pocket.

It didn't matter. His chest was crushed by the weight, pushing all of the wind out of him, he said.

Beer and Reichert managed to barely escape the slide, although their machines were buried, but later dug out and restarted.

They located Olson right away, and had him out within 15 minutes.

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FRONT PAGE
BOZEMAN DAILY CHRONICLE

TUESDAY, JAN 29, 2002

**"All I
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— Scott Olson



OUR OPINION

The latest gear useless without knowledge

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But it can also spell bad news — the worst — for those who venture into the backcountry unprepared. Witness the tragic avalanche deaths of four snowmobilers in Missoula County Saturday.

Winter backcountry recreation has enjoyed explosive growth as legions of the young and healthy venture further afield in search of unbroken expanses of fresh powder.

The growth in these sports' popularity has also prompted an explosion in the recreation gear industry. Catalogs proliferate with selections of avalanche transponders for locating victims, telescoping probes for penetrating avalanche debris and "Avalungs," devices that help the buried breathe while rescuers search.

The weekend's four snowmobile victims in the Bitterroot Mountains were in an area for which the Forest Service had issued a high avalanche danger warning

But the most important avalanche protection device of all — knowledge — is not found in a catalog.

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From Gallatin National Forest Avalanche Center, Bozeman

Good elk hunting may mean a bad avalanche year

By Scott Schmidt
Avalanche Specialist
Gallatin National Forest
Avalanche Center

Every year, come mid-September, I start wishing a winter's worth of misery on myself. In anticipation of elk

season, I start hoping for a little bit of snow and some good cold temperatures. As an avalanche professional, I know this is a stupid thing to do, but I can't help it. You see, when it comes to elk hunting, I need all the help I can get.

Everyone that has spent much time hunting elk knows the type of weather

that makes for a good hunt. You need some snow to quiet things down and give you good tracking. Not a lot of snow! We don't want to be out there wading around in two feet of the stuff! About six inches to a foot is perfect. Then we need cold temperatures. Not a little pitiful bit of cold. No sir, we need that good old Montana style, freeze-your-nose-hairs-to-your-mustache, cold—that good cold weather that drives the elk down out of the park so we can hunt them. Unfortunately for those of us who like to spend our winters playing in the snow, this is the recipe for a bad avalanche year. The reason is a snow process we call *ifaceting*. After about a week of these really cold temperatures, the snow has changed or metamorphosed, some say. It has all turned to loosely bonded sugar snow, otherwise known as *faceted*. Now the tracking is terrible! The snow won't hold its shape, and you can't be sure if the tracks you see are those of the biggest bull elk in the history of the planet, or your buddy, Bob's, big ol size twelves.

Snow falls out of the sky in many forms. Sometimes it falls as big, iCharlie Brown Christmas flakes. Other times it falls in hard, little ice balls, known as *graupal*. Regardless of the crystal type that lands on the ground, changes in the crystal form start to take place immediately. The driving force behind these changes is meteorological conditions in the atmosphere—you know—the weather. Sometimes the weather conditions cause the snow crystals to bond together. In the case of *ifaceting*, it causes the bonds to erode. Here's how it works.

It may be surprising, but the snowpack is mostly made up of very moist air filling all the spaces between the snow particles. Light, fluffy powder that has just fallen from the Montana sky is typically 90-95% air. Even old, well-bonded snow, that has been on the ground a while, is around 60% air. Now, everyone knows that warm air can hold more moisture than cold air, and most folks know that—in nature—things like to move from areas of high concentration to areas of low concentration (like people—moving from California to Montana). So if warm air can hold more moisture than cold air, and things like to move from areas of high concentration to areas of low concentration, then it stands to reason that moisture in the snowpack wants to move from warm areas to cold ar-

reas where the moisture content is lower. Because of all the air that is in it, snow is a great insulator. Once the ground is blanketed with a layer, it is protected from freezing air temperatures. As a result, the ground in the mountains of Montana remains unfrozen, and the temperature at the bottom of the snowpack is always near 32 degrees Fahrenheit. During a good cold spell, the temperature at the top of the snowpack is usually as cold as the air. Nighttime temperatures drop to ten or fifteen below for good elk hunting weather. In a shallow snowpack (such as the one in our scenario) this results in a rapid movement of moisture from the bottom of the snowpack toward the top. The temperature of the snowpack cools as we move toward the surface and, at some point, the air in the pore spaces can no longer support the moisture that is moving in from the bottom of the pack. This moisture freezes to snow crystals in the upper part of the pack. Water can go from a solid to a vapor without going through a liquid phase (a process called *sublimation*), and this supplies a continuous source of moisture for transport from the bottom of the snowpack to the top. Unfortunately for us sledheads, this moisture supply comes from the bonds that hold the snowpack together. After several days of cold temperatures, that six to twelve inches of snow that made for good hunting has become unconsolidated, sugary garbage. And then here comes winter.

Remember last season. That little bit of snow early in November and then it got cold. Coldest November in a long time - or so they say. Your elk was butchered and in the freezer. Your thoughts turn to the sweet sound of a powerful two-stroke harnessed to a long track. It was Christmas, just starting to snow, and you had some time away from the grind. You loaded up the sled and head for the hills. There was only one problem. All that snow was falling on the weak, sugary, faceted crystals that formed during elk season. Kinda like stacking a pallet of cinder blocks on Styrofoam packing peanuts. Next thing you know people were dying in avalanches all up and down the Rocky Mountains and them boys down at the Avalanche Center are harping about a weak snowpack and a high avalanche danger. Almost makes a person wish it hadn't been quite so easy to get an elk. Why, I think that fella, Schmidt, down at the avalanche center, was the only one that didn't fill his tag last season.

Daisy Pass rescue

Snowmobiler buried by avalanche

By RYAN SONES
Enterprise Staff Writer

Quick thinking, the right equipment, and a dramatic rescue saved a Billings man Sunday who was buried in an avalanche near Cooke City.

Scott Olson, 36, owes his life to a few savvy snowmobilers after being buried in five feet of snow for almost 10 minutes in Daisy Pass.

That area had just received more than four feet of fresh snow, and avalanche conditions were approaching their peak, said Scott Schmidt of the Gallatin National Forest Avalanche Center on Monday.

Olson was snowmobiling below two other sledders Sunday afternoon when they triggered the snow to break free above him, he said during a telephone interview Monday.

The two other sledders, Don Beer and Tyler Reichert, both of Columbus, escaped the avalanche without injury, although their machines were buried.

The wall of sliding snow swallowed Olsen after he was knocked off his snowmobile while trying to steer away from the slide.

"I started trying to swim like people tell you to do and was doing fine until I hit the first tree and felt my leg break. It hurt pretty bad," Olson said.

"I was able to get back near the top of the avalanche and then bounced off another tree with the same leg. Then I hit the third tree and knew I was in trouble because I was pushed under," he added.

"I knew I was going to have one last chance to take a big breath and put my hands in front of my face before I stopped. That didn't work though. I tried, but when it stopped, the snow set up and crushed everything out of my body," Olson continued.

Then I told myself, 'I ain't dying today.'

— Avalanche survivor Scott Olson

"Laying there I had three short thoughts before I passed out. The first was I hoped my transceiver was working because I knew those other guys were nearby and would find me. Second, I freaked and was scared. I finally calmed down and knew there was nothing else I could do. Then I told myself, 'I ain't dying today,'" he said.

In a telephone interview Monday, Beer talked about the rescue.

He said it could not have been done without the help of Reichert and others near the scene.

After working his way down the avalanche's destructive path, Beer finally got a reading from Olson's transceiver that said he was 80 meters away.

"A lot of snow had moved. It was about five feet deep — I'd guess about 500 feet wide — and almost 1,000 feet long. It was big enough to snap quite a few trees," Beer said.

Reichert and Beer then began digging furiously and found Olson's leg

about three feet under the snow. Olson was somewhat inverted and his head was another two or three feet deeper, he said.

"After we took off his helmet, I checked for a pulse and there wasn't one. Then I noticed he wasn't breathing either. I put my hand in his mouth and felt that he had swallowed his tongue. I pulled it out and a few seconds later he took a short gasp of breath," Beer said.

The entire rescue took less than 10 minutes, he said.

Olson gained consciousness four or five minutes after he began gasping for air, Beer said. A few minutes later Beer was able to talk to the weary Olson.

"I asked him how it felt ... He smiled and said, 'Good, really good,'" Beer said.

"Without an avalanche beacon, a good shovel and the experience we had about what to do, he would have definitely died," Beer said.

Beer's experience comes from having been buried in an avalanche himself in 1991, he said.

Olson, owner of Extreme Machines, a shop in Billings that sells snowmobiles, motorcycles and other racing equipment, said an avalanche awareness and rescue class will be planned once he recovers.

"They knew what to do," Olson said of his rescuers. "Not only did they have all the right equipment, they knew how to use it. Otherwise I'd be dead."

GSTON ENTERPRISE - CALL 222-2000

FRONT PAGE LIVINGSTON ENTERPRISE
MONDAY - JANUARY 28, 2002

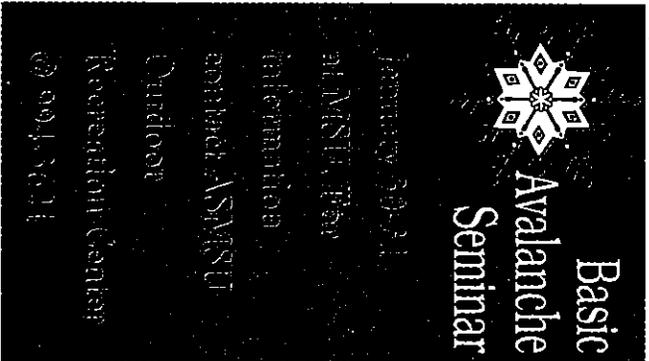
Avalanche danger always a possible threat

Pat Hill
Exponent Writer

Four snowmobilers killed in an avalanche on Saturday in Missoula County were riding in an area where the Forest Service had warned of high slide danger, but local officials report fairly stable snow conditions in southwest Montana.

"Avalanche danger is pretty variable within our region, but it's looking fairly good," said Scott Schmidt, of the Gallatin National Forest Avalanche Center, on Monday. "Of course, even moderate danger of an avalanche means there's a possibility of one." Schmidt said that one man was buried in the Cooke City area on Sunday, after the three snowmobilers in his group triggered a slide. "They did a bang-up job on the rescue," said Schmidt. He said that the man had stopped breathing by the time rescuers got through the four feet of snow burying him. Schmidt said that the man survived, but did break a leg in the avalanche. The four men killed in Missoula County on Saturday died of suffocation after being buried in 5 to 12 feet of snow. The dead are identified as

Bradley Popham, 31, Lolo; Garrett James Grothen, 29, Florence; Christopher Michael Novak, 25, Missoula; and Adam Louis Ployhat, 17,



Potomac. All the men were experienced snowmobilers equipped with avalanche probes, shovels, and transceivers. "They were someplace they

shouldn't have been," said Missoula County Undersheriff Mike McMeekin, according to the Associated Press (AP). The avalanche occurred in a large bowl on Sheep Mountain, northeast of Bonner

The Montana Dept of Transportation also reported that an avalanche deposited up to 20 feet of snow along a 200-foot section of U.S. Highway 2, near Essex, on Friday afternoon, but no one was injured on the road. According to officials, southwest Montana highways are not in any avalanche danger at present.

"At the moment, we have no reasons to be concerned," said Maryanne Mathews, an administrative assistant with the Bozeman division of the Montana Dept of Transportation. "We really aren't in the predicting business... we're more reactive than anything."

The team at the Avalanche Center is into predicting, however, as evidenced by their avalanche advisories. These comprehensive telephone advisories, available at 587-6981, are updated daily with fresh field data. The team covers the area from the Gallatin and Madison mountain ranges to

Cooke City, including Big Sky and the Bridger range.

"The Bridgers are stable right now," said Schmidt. "If the wind comes up it could be a different story... there's no obvious weak layers up there, however." He said that Big Sky is "healing up pretty good" as well, with no obvious weak snow layers present, though Monday's avalanche advisory did warn of possible snowslide danger on Lone Peak.

"We'll know more about Cooke City area conditions tomorrow," said Schmidt, adding that team member Doug Chabot, who took part in Sunday's Cooke City rescue, was still assessing conditions there on Monday. Schmidt said that the northern Gallatin range was "unstable early on this season."

"I wouldn't jump up and down and say it's all fixed," said Schmidt, who skied in the northern Gallatin's Mount Ellis area on Sunday. "It wasn't bad, but I wouldn't bet the bank on it."

Schmidt added that conditions in the Lionshhead area near West Yellowstone contain "isolated pockets of really weak snow" that also pose

a threat to winter recreationists.

"The snow is stable between those pockets," he said. "That can cause complacency." Schmidt said that such complacency can lead to what he termed a "dysfunctional method of learning."

"Accidents are avoidable," he said. "Take an avalanche course first." Montana State University is offering a course this week, with a Basic Avalanche Seminar being taught on Jan. 30-31.

"The seminar will cover hazard recognition, route selection, fundamental snowpack analysis, and basic search and rescue procedures," said Mike Cavanaugh, director of the ASMSU Outdoor Recreation Center. "Our class is applicable to all winter sport enthusiasts." For information on this seminar, as well as an advanced course being taught on Feb. 6-7, contact the Outdoor Recreation Center at 994-3621.

"I'll be teaching the field course portion of this week's seminar at Bridger Bowl on Saturday," said Schmidt. "I urge people to avoid the dysfunctional method of learning about avalanches."

SNOW ADVISORY

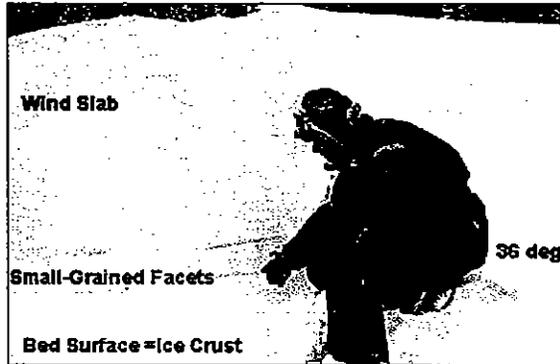
Good friends save lives when backcountry avalanche sweeps through Daisy Pass



Doug Chabot

I just finished digging my snowpit and was strapping my pack onto the back of the snowmobile when I heard over the radio, "There's been an avalanche at Daisy Pass, and one snowmobiler is buried." Talk about a shot of adrenaline. I was a few miles away at Lulu Pass with Cliff, who was helping me get field data for the Avalanche Center. I shouted the information to him, pulled the starter cord and hit the accelerator. Cliff was right behind me thinking, "What have I gotten myself into?"

It was blowing and snowing that Sunday, with over 3 feet of snow falling in the previous two days. Given the new snow and wind, the avalanche danger was rising throughout the day. Our snowpit was showing some deeper weakness, and with the weekend crowd riding hard, I commented that I'd be surprised if we escape the day without an avalanche. Moments later the call



came.

We arrived at the bottom of the avalanche path and met a rider who was in contact with people at the scene via a small walkie-talkie. She told us they dug out the victim and that he was alive, conscious and suffered a broken leg. I sighed in relief. A body recovery wasn't high on the agenda for the day. As Cliff and I hiked up the slope, it became apparent that the snowmobilers on the scene really had their act together. Because an unavalanched slope loomed above exposing rescuers, they broke a foot trail through the safety of the trees to the accident site. They yelled to us

to use this trail as a precaution and we promptly followed their advice.

Concerned about further avalanche danger Cliff set up a staging area off to the side, out of the way of any future slides. While I administered first aid and waited for rescue supplies, I was able to interview the injured rider Scott, and his partners Donnie and Tyler. Their story is a perfect example of how to respond in an emergency and implement an effective rescue.

All three of them were riding in a shallow gully with steep, open sides. Donnie and Tyler were sledding downhill, while Scott was gunning upwards when the avalanche was triggered. Donnie, furthest uphill, was able to see the slide approach, literally jumped off his machine, and ran up the opposite bank a few steps. His sled was swallowed under 6 feet of debris. Tyler, in the middle, was able to get to the edge of the avalanche where he was separated from his snowmobile. He was OK, although his sled was crushed against some trees.

(More on **Avalanche**, page 14)

Avalanche/from page 13

Coming up the hill, Scott saw the avalanche and tried to veer away. Slammed by the full force of the slide he tried to hang on to the handlebars, but got ripped off, tumbled and banged against trees breaking his lower leg. Swimming in the debris, he tried making an air pocket as the slide slowed and solidified around him. He panicked hoping his avalanche transceiver was working, but realized that everything was out of his hands. His life now rested in the hands of his friends.

Luckily for him, they were capable hands. Donnie and Tyler immediately realized that Scott was buried and turned their transceivers to "receive" so they could pick up Scott's lone signal. Within minutes,

this electronic lifeline led them close to his position. Tyler turned his beacon off and got a shovel ready as Donnie finished the search, pinpointing Scott's location. They both began digging and struck his leg 3 feet down. Lower still was his head. After more digging and removing his helmet, Donnie was able to clear his airway, which allowed Scott to begin gasping for air. He was alive.

They uncovered him within a crucial 15-minute window. Statistics bear out that an avalanche victim has a 90 percent chance of survival if they're uncovered in 15 minutes. After a half an hour the survival rate drops to below 50 percent and continues to plummet as the minutes tick by.

We splinted his leg and drug him

off the slope to the competent volunteers of the Cooke City Search and Rescue. It was refreshing to see an accident like this have a happy ending. All too often we read about death and tragedy, yet stories like this can be eye-opening experiences. When faced with horrible circumstances these guys turned the situation around and came out the other end as heroes.

Donnie and Tyler saved their friends life. Carrying proper rescue gear was only half the story. These tools, together with their combination of avalanche education and calm demeanor in the heat of battle, gave Scott his best chances of survival.

Doug Chabot is the director of the Gallatin National Forest Avalanche Center.

2 county residents killed in avalanche

By JAMES HAGENGRUBER
Of The Gazette Staff

Two Yellowstone County snowmobilers were killed Saturday morning in an avalanche near Cooke City.

Rescuers using dogs and probe poles spent more than four hours searching for Worden resident Michael G. Martin, 41, and Joey W. Pierce, 37, of Pompeys Pillar. Three other men in their group survived the 1,000-foot-long and 450-foot-wide avalanche, said Park County Sheriff's Deputy Scott Hamilton.

Martin and Pierce were "high-marking" on the south face of Mount Abundance when the snow let loose at about 10 a.m., Hamilton said.

The slope is in a roadless area of the Absaroka Range about 4 miles north of Cooke City. High-marking is a common practice among snowmobilers in which a run is made up a slope until the machine is slowed by the powder and must turn around.

Trent Lofing, a 35-year-old Worden resident, was also caught in the slide but was able to dig himself out, Hamilton said. Alan Balzer, 38, of Gillette, Wyo., and 38-year-old Toby Lofing, of Sheridan, Wyo., saw the avalanche but were able to avoid it.

At least one member of the group rode back to Cooke City and telephoned emergency dispatchers at 10:48 a.m.

The trapped snowmobilers did not have radio transceivers, which made finding the men in the vast debris field difficult, Hamilton said. Rescuers found Pierce near the lower reaches of the avalanche at 2:25 p.m. He was buried under 2 to 4 feet of snow.

Avalanche

Continued from 1A

Martin was found higher up at about 3:15 p.m. under 4 to 6 feet of snow, Hamilton said.

Neither had a pulse, but resuscitation was attempted, including using a portable defibrillator, Hamilton said. Both were pronounced dead at the scene.

The avalanche dumped more than 10 feet of snow in some areas. The snow came down with such force that it packed together like concrete, making it easy to walk on but tough to survive in, Hamilton said.

The accident underscores the need for snowmobilers and skiers to carry rescue equipment, including shovels, probe poles and transceivers, Hamilton said.

"By the time emergency rescue personnel can get on scene it's generally too late," he said. "If people are going to be up in this sort of country, it's up to them to save their own lives. All we can do in some of these cases is recover bodies."

Avalanche danger is low to moderate right now in the mountains near Cooke City, according to the Gallatin National Forest Avalanche Center's web site, www.mtavalanche.com. Investigators from the center are traveling to the scene to study what caused the slide.

Recent surveys have shown a buried layer of weak snow sitting atop a crust of ice on some slopes in the area. This weak layer likely caused the avalanche, according to the Avalanche Center.

Training and rescue equipment helped a 36-year-old Billings man survive an avalanche near Cooke City Jan. 27. Scott Olson was buried under 4 feet of snow and had passed out, but his radio transceiver was still alive and sending signals. Two snowmobilers from Columbus quickly honed in on Olson's signal and pulled him from the snow less than 10 minutes after the avalanche. He regained consciousness five minutes later.

James Hagengruber can be reached at 65-1232 or at jhagengruber@billingsgazette.com

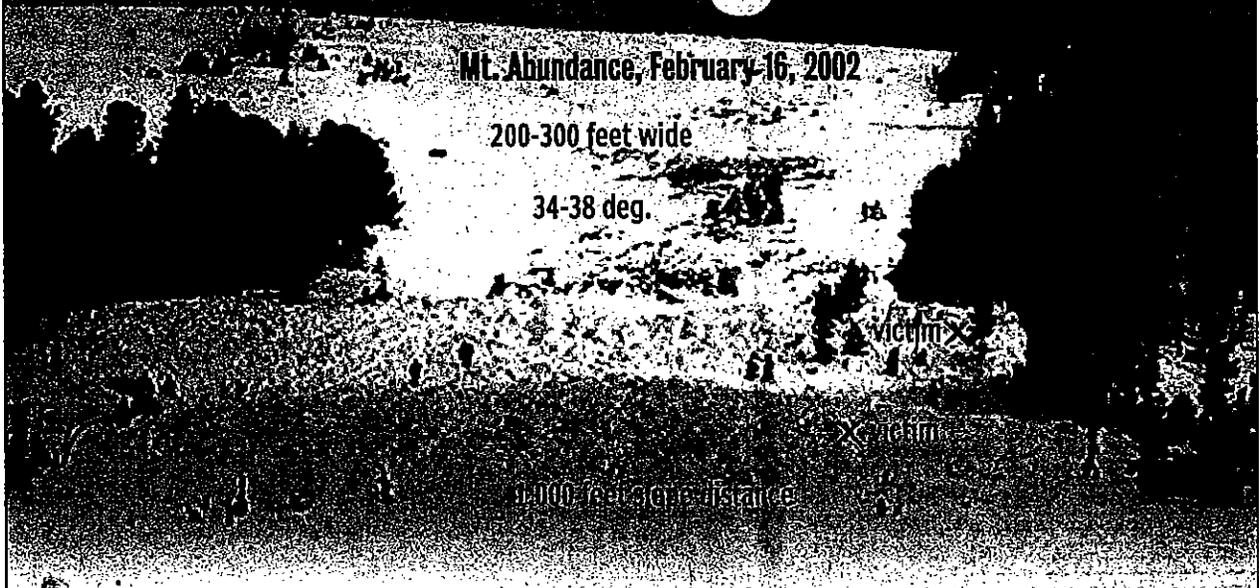
Front Page Billings Gazette February 18, 2002

Billings Gazette

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The Source

A deadly toll



Gallatin National Forest Avalanche Center
A photo of Mt. Abundance, just northwest of Cooke City, shows the site of the avalanche that killed Michael Martin, 41, of Worden, and Joey W. Pierce, 37, of Pompeys Pillar on Saturday.

8 avalanche deaths in Montana set record

Common problems seen in most of the 8 accidents

By **BRETT FRENCH**
Gazette Outdoor Writer

The deaths of two snowmobilers northwest of Cooke City on Saturday pushed Montana to a morbid record — the most people killed in avalanches in a season — and the season's not over.

When Worden resident Michael G. Martin, 41, and Joey W. Pierce, 37, of Pompeys Pillar died under tons of snow, they raised the avalanche death toll in Montana to eight for the season. Nationally, there have been 18 avalanche fatalities. Alaska has recorded six, Colorado, three, and Utah, one. Of the 18 victims, 13 were on snowmobiles.

Doug Chabot, of the Gallatin National Forest Avalanche Center, said there's a common thread in

most avalanche deaths in Montana. "Out of those eight, in seven cases there was more than one person on a slope at one time," he said. "They're just increasing stress on the snowpack. Each machine with a person is 600 to 700 pounds. If they're on a slope with a weak layer, they will cause a slide."

Without that one factor, Chabot said, the number of deaths could have been halved.

"We try to emphasize that in our educational programs," Chabot said. "And we emphasize carrying rescue gear and transceivers and knowing how to use them. But if everyone is on a slope and gets caught, there's no one left to do a rescue."

Martin and Pierce weren't wearing rescue transceivers. Three other members of the group of riders avoided the avalanche, but had no rescue gear such as probes or shovels.

Martin, Pierce and their three

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To help and to stay safe

The increase in search and rescue efforts in the Cooke City area has drained the local group's bank accounts. To make a contribution, send a check to

**Cooke City Search And Rescue
P.O. Box 1033
Cooke City, Mont. 59020-1033**

For more information on local avalanche conditions, log on to the Gallatin National Forest Avalanche Center's site at: www.gnfa.com/

An educational article on safe snowmobiling in avalanche country can be found at the Cyberspace Snow and Avalanche Centers Web Site at: <http://www.usa.gov/snowman/papers/snowmobilers.htm>

Avalanches

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other riding partners were "high marking" on Mount Abundance when the avalanche started. When high marking, snowmobilers climb steep slopes, turning around when their machines begin to bog down.

But when a snowmobiler gets stuck on one of those steep slopes and another rider drives up to help, the chance of causing an avalanche has just doubled.

According to Scott Hamilton, Park County sheriff's deputy, the five riders were in a line going up the slope when the avalanche broke on Mount Abundance. Three of the riders were buried, but only one was able to dig himself out. The other two riders, at the back of the line, turned and outran the avalanche.

Avalanche education courses advise people to stay to the side of avalanche-prone slopes when a rider is high marking and not to go to help a friend if the friend gets stuck. At least then, if an avalanche does occur, only one person is buried and the rest, with appropriate rescue gear and

transceivers, stand a better chance of digging their friend out.

But five of the eight Montana avalanche victims had transceivers and rescue equipment. Are riders putting too much faith in their rescue gear?

Chabot doesn't think that's the case.

"I just don't think people understand how fast avalanches happen and how helpless they can be in an avalanche," Chabot said.

An avalanche can hit speeds of 100 mph, Chabot said, moving tons of snow capable of snapping off trees like twigs. When the snow settles at the bottom of an avalanche, it's compacted like concrete.

When avalanches are widespread, Chabot said it's obvious that slopes of more than 30 degrees in pitch are going to be dangerous. It's when the danger is less obvious that accidents are more likely, he said.

"We're finding that, especially on south-facing slopes, there's a weak layer of snow there, and it's not everywhere," Chabot said. "There's all these slopes in the Cooke City area, and only a small percentage are unstable."

Cooke City resident Bill Blackford, who's also a ski guide and member of the local search and rescue team, said, "If anything, this year the snow is safer than last year. Lots of people were buried last year, but there weren't as many fatalities."

Blackford said people who have no avalanche training may be in danger when in the backcountry. As long as there's snow on the ground and steep slopes, there's a chance of avalanches, he said.

"What might deceive people is the amount of people getting away with high marking and not getting hurt," he said.

Montana's deaths have been spread out across the western quarter of the state, from the far north near Whitefish and Bonner, to outside of Deer Lodge in the Flint Mountains and outside Cooke City.

Blackford said there are plenty of other areas around Cooke City to snowmobile, without fear of avalanches. "You just have to use your judgment and not go where you shouldn't be," he said.

Brett French can be reached at 657-1387, or at french@billingsgazette.com

OUR OPINION

'Bilers not paying heed to avalanche information

It used to be that an avalanche death was one of those freak things that made the national news.

That's changing.

The deaths of two snowmobilers near Cooke City in February pushed the state total for avalanche deaths this winter to a record-high eight.

Here's a prediction: That record won't stand for long. The snow's still falling this winter, and the number of recreationists heading into the backcountry is going higher with each passing year. Ten years from now, avalanche deaths in a winter will be routinely in the double digits.

Avalanche danger has spawned its own science, with the U.S. Forest Service providing personnel for research, avalanche danger forecasts and courses in recognizing and avoiding avalanche danger.

But this year's avalanche deaths have produced another startling statistic: All the Montana fatalities were snowmobilers. Of 18 deaths recorded nationally this year, 13 were snowmobilers.

This should alert even the most casual observer that the benefits of avalanche fatality prevention are missing an important audience. ~~Or the audience may not be paying attention.~~

The continued escalation in avalanche deaths is one snowmobiling image problem that can be fixed.

The Gallatin National Forest Avalanche Center tries to disseminate safety information to snowmobilers, and yet recreationists continue to engage in lethal practices. Snowmobilers like to "high mark," power the snowmobile up increasingly steep slopes to see who can reach the highest point before spinning out. The center has found that, in seven of the eight Montana deaths, more than one machine was on the slope at one time. Center personnel have identified this as an issue of particular concern and have emphasized it in their educational programs.

But snowmobilers are not getting the message.

Snowmobile clubs, rental services and other businesses who cater to visiting snowmobilers in high-use areas could help by spreading the word and emphasizing the importance of getting properly equipped and informed before heading out. They could likewise direct snowmobilers to the center's Web site at <http://www.mtavalanche.com/> for information on current conditions and safety precautions.

And snowmobilers could help themselves by listening up and heeding the advice the experts are handing out for free.

Snowmobiling as a sport is struggling with image problems. It's been the focal point of the winter-use debate in Yellowstone National Park.

The continued escalation in avalanche deaths is one snowmobiling image problem that can be fixed.

SNOW ADVISORY

Education gives hope for reversing trend in avalanche fatalities



Doug Chabot

The U.S. already has 19 avalanche fatalities this season, 14 of them snowmobilers.

Here in Montana we have the dubious distinction of leading the nation in fatalities with a grand total of eight. All of them are snowmobilers. When we do a little research and investigate the causes, we find surprising similarities. How can we possibly stem this rising tide of fatalities? On the face of it, it seems hopeless. I've heard people say that it's just part of the risk of snowmobiling, that it's inevitable. Luckily, this isn't true. With a little education and behavior modification we can easily stop this trend, and hopefully reverse it.

Seven out of Montana's eight fatalities occurred with more than one person on a slope. When weak layers exist within the snowpack, the weight of a machine and rider can sometimes add enough stress to avalanche the slope, and if we add multiple riders, the chance of triggering a slide increases. There's little chance of survival if everyone is caught and buried. By only riding one

at a time on a slope you'll only expose one person to the risk of getting caught, which leaves others to do a rescue if needed. Historically, many snowmobilers have been caught and killed riding onto a slope to help their stuck friend.

Unfortunately, the rider going to help is usually the one who triggers the slide. Sometimes he can ride out of it if luck is on his side, however, the stuck snowmobiler doesn't stand a chance. If riders just did this one thing, and only exposed one person at a time to a slope, we'd see avalanche fatalities among snowmobilers plummet. This would easily halve the eight fatalities here at home.

Another common thread is that riders don't recognize obvious signs of instability. Mother Nature's brightest, and most obvious sign that slopes are unstable are recent avalanches. This sounds almost too easy, but it's overlooked time and time again. Slopes that have a similar aspect and similar elevation have similar snowpacks. If you're out riding and see recent avalanche activity, Mother Nature is warning you. Stay off of similar slopes. We've investigated many avalanches where

riders high marked or played immediately adjacent to a recent slide. This is like playing Russian roulette. Remember, one of the questions we try and answer when we're out riding is, "Could the snow slide?" There are no clearer signs of instability than recent avalanches. Look around and pay attention. There's no excuse for missing this freebie.

And last, but certainly not least, is a lack of rescue gear. For comparison, all NASCAR drivers wear seatbelts, kayakers wear life vests, and climbers wear helmets. If you're going to play in avalanche terrain then you should carry an avalanche transceiver, shovel and probe. Let's face it, we make mistakes. Snowmobiling in avalanche terrain carries a certain level of risk. We try and mitigate this risk by making educated decisions, but we can't be 100 percent accurate all the time. By carrying rescue gear we can increase our odds of living when situations spin out of control. We can learn from near misses, but we shouldn't count on them, or luck, to keep us alive. If everyone carries

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Avalanche/from page 9

and knows how to use rescue gear then at least you've got a chance of surviving a burial. Without it, your chances are almost zero. Remember, rescue gear doesn't take the place of knowledge, it just silently gets carried everywhere in the event that we

made a bad choice. People still die wearing beacons. There's no guarantee, but it certainly gives you a better shot to see another day. If you doubt the validity of this, let me remind you that already this season there have been three live

recoveries of snowmobilers completely buried in avalanches. Their partners saved their lives because they were all wearing transceivers and had shovels. Snowmobiling is fun, but we can make it safer. Stack the deck in your favor,

pay attention to recent avalanche activity, ride the slope one at a time, and have everyone in your party carry an avalanche transceiver, shovel and probe.

Doug Chabot is the director of the Callatin National Forest Avalanche Center.