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## Ski areas continue to battle avalanches

### "Snow wars"

By Jason Blevins  
The Denver Post

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(HR) A plume of smoke comes off a round of ANFO, or ammonium nitrate and fuel oil, while patrollers in 25-pound charges that rattle snowpack. They were firing onto Dihedral Chute or Helen H. Richardson | The Denver Post)

TELLURIDE — The thunderous blast from a World War II-era howitzer vibrates across the valley below

this ski area's iconic Palmyra Peak.

Three seconds later, as the sun illuminates Palmyra's serrated turrets, a plume of black smoke belches from the middle of a steep snowfield. A billowing wash of snow engulfs the peak's nearly sheer "Nice Chute."

"Nice shot!" says Craig Sterbenz, Telluride ski area's director of snow safety, as ear-muffled ski patrollers slap high-fives behind their refurbished Army green cannon.

That's the kind of avalanche that red-coated patrollers love: the kind they make.

Across the Western United States, dozens of resorts like Telluride — ski areas with steep, avalanche-prone slopes



Telluride ski patroller Mike Myers fires a howitzer cannon aimed precisely to trigger a controlled avalanche. Some say that resorts' successful safety records have lulled visitors into forgetting avalanches are still a threat. (Helen H. Richardson, The Denver Post)

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— are waging a volatile daily battle to create their own manageable and expected avalanches before Mother Nature releases her own unpredictable monsters.

Last month, in an unprecedented two-week span, avalanches inside resort boundaries killed three skiers in Utah, Wyoming and California, and there were several close calls, including partial burials on just-opened slopes in Vail and Telluride. By comparison, only three skiers died in in-bounds avalanches in the 15 ski seasons between 1990 and 2005.

Paul Baugher, director of the Northwest Avalanche Institute and a decades-long student of avalanches, says the three deaths "are likely a statistical blip."

But it's still worth looking into, he says.

The forensics behind this season's in-bounds avalanches trace back to the first snowfall in November. Shortly after resorts began to see early snow coverage, a furious December descended, burying the early snowpack under daily layers of snow.

Bitter cold prevented good bonding between each day's layers. Then came powerful wind storms that created instability and heavy, wind-loaded slabs. Wyoming's Jackson Hole, where an expert skier was buried and killed Dec. 27, even saw rain, furthering avalanche potential on an already unstable snowpack.



Pat Ahern, Director of the Telluride Ski Patrol, heads out early in the morning for avalanche work on the mountain. (Helen H. Richardson | The Denver Post)

But sketchy early snowfall and big Decembers are not that rare. So snowpack can't be totally to blame.

In searching for a reason, Baugher wonders whether aggressive snow-safety programs at resorts have lulled skiers into complacency as they venture deeper into in-bounds avalanche terrain. The terrain looks like the backcountry, where skiers wear avalanche safety gear and practice safety-oriented protocol, but it's in-bounds, where skier concerns over safety rarely veer toward avalanches.

"It's almost like we are victims of our own success," Baugher said. "People blot out that the area they are skiing — the steep and deep terrain — are at risk for avalanches because our snow-safety programs have been so successful."

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Patroller Craig Sterbenz looks at what is called surface hoar. Hoar is a recrystallized snow layer. It is one of the most insidious layers in the snowpack and has killed more avalanche professionals due to its instability. (Helen H. Richardson | The Denver Post)



Click on image to enlarge (The Denver Post)

## "Big mountain" trend

Today, more resorts like Telluride embrace the backcountry-inspired "big mountain" trend, expanding their boundaries into precipitous walls of hanging snow.

"Baby boomers want more from their vacation than wide, flat runs. They may be moving past their wealthy years, but they are not giving up on their pursuit of adventure," said Telluride Ski & Golf chief executive Dave Riley, who estimates one-third to one-half of his guests venture into the expert terrain he helped open in 2007. "We deliver that with controlled, backcountry-like terrain that no one else has."

But with that comes an added challenge for ski patrollers charged with keeping the terrain safe.

This season, terrain like Palmyra Peak and the Gold Hill Chutes has yet to open. The snow coverage is there. The safety is not. But it's slowly getting better.

"I have a zero-tolerance policy," Sterbenz said. "If it's not safe, it's not open."

Telluride — with a host of avalanche-mitigating tools and a scientific approach to snow safety — ranks as one of the nation's most aggressive warriors in the battle to tame unstable snowpack.

In recent years, the snow-safety tab at Telluride has surged deep into the millions of dollars. It draws on everything from old-fashioned boot-stomping to a variety of explosives and reams of data to help

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predict where the next avalanche might occur.

This year the area added two World War II-era howitzers — on loan through a U.



Patroller Kevin Cahalane shows the variety of sites where the crew fired off rounds to try to set off avalanches. (Helen H. Richardson | The Denver Post)

S. Forest Service program — that can plant snow-shaking explosions with pinpoint precision, making Telluride the only ski area in Colorado with howitzers. Several of the area's patrollers spent time last fall at Nellis Air Force Base in Nevada learning the military-forged protocol for safely firing the big guns.

"It's such a great tool for public safety, protecting both their employees and the public," said Scott Spielman, the Forest Service snow ranger who worked with Telluride to secure the guns. "It's amazing how precise it is."

## Slower to open runs

Across the western mountains of North America, resorts like Telluride are digging deep to combat the season's unpredictable snowpack. In addition to throwing every type of explosive and snow-safety

technique on the books at the snowpack — which experts say is slowly stabilizing as it settles into January — resorts are slowing their openings to let the snow settle and patrollers work.

At Whistler in British Columbia, where two skiers were killed this month in avalanches in areas marked out-of-bounds, guards are positioned on closed, avalanche-prone slopes to keep powder-hungry skiers from risking their lives for a thrill. At Crested Butte, snow-safety crews are working extra hours to reduce the potential of catastrophic slides, and its vaunted extreme terrain is only 60 percent open despite a near-record snowfall total so far this season.

"We are not being reactive; we are being proactive," said resort spokesman Todd Walton. "We are very cautious and very conservative."

## Forest Service gets involved

The in-bounds fatalities have already prompted intense scrutiny from the Forest Service, which signs off on resort snow-safety programs on federal land. But it's unlikely that close inspection will prompt wholesale changes in resort snow-safety policies, says Doug Abromeit, director of the U.S. Forest Service National Avalanche Center in Idaho.

"There is no sense in the Forest Service, at all, that anybody did anything wrong. These unfortunate and tragic incidents occurred, and now what we need to do is learn what we can from them," he said.

"If anything, avalanches will now be included on the (ski industry's) list of skiing's inherent risks, and I think the public needs to realize that snow-safety crews, because snow is such a complicated medium, they can reduce the risk to almost zero, but they can't eliminate it."

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Telluride's army of ski patrollers still fights for that zero. The group has grown from a dozen in the late 1980s to 70 today, including 21 patrollers hired in the past two years. On any given day, there are 38 red coats patrolling the mountain's 2,000-plus skiable acres.

Patrollers must be able to locate a buried avalanche transceiver in less than two minutes. They must have intimate knowledge of the ski area's routes and avalanche history, as well as be skilled in rescue techniques.

"We have a lot of training for everyone before you can trust them with your life," said ski-patrol director Pat Ahern, who spent six years establishing Silverton Mountain's snow-control program before returning to Telluride two years ago. "And that's what we do every day: trust each other with our lives."

All in more than a day's work

The ski area's snow-safety crew begins each day's work the day before, comparing current weather patterns with similar weather events in a 15-year database and forecasting areas that will need avalanche mitigation.

At 5 a.m., teams of two patrollers assemble the tools for their day's work. One of the patrollers on each team is a licensed blaster who has studied for two years to pass a state explosives test and takes an annual test — along with six hours of yearly training — to maintain the blaster license.

Patrollers then fan across the mountain, hiking long ridges with 50-pound packs loaded with explosives, making sure new snow is stable and old snow remains solid.

"We are the hikingest patrol around, I know that,"

said veteran patroller Mike Myers.

One of the biggest problems for patrollers across the West is skiers second-guessing them by charging into closed areas. Telluride has upped its punishment for closure violators, taking passes away for two years or even life. Addressing that problem, avalanche experts say, boils down to education and perhaps an awareness that despite the best efforts of patrollers, there is no way to completely banish avalanches from steep slopes.

Telluride instructor Galan Fowler was surprised last week when his class of local grade-school snowboarding students showed up wearing avalanche beacons. He's ridden Telluride for 11 years, and while he always carries avalanche safety equipment — beacon, shovel and probe pole — into the backcountry near Telluride, he rarely does when riding in-bounds.

"Patrol is really on top of it here. When they open something off Palmyra, I feel confident it's safe," he said. "Once they open it, I never really think about avalanches. But as soon as I go to a place that is uncontrolled, it's top on my mind."

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## In-bounds avalanches

Between the 1990-91 and 2005-06 ski seasons, there were four avalanche fatalities inside the boundaries of open ski areas in North America — three in the U.S. and one in British Columbia — according to a study by Paul Baugher of the Northwest Avalanche Institute.

Between the 2005-06 and 2007-08 seasons, there were three in-bounds avalanche fatalities.

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Jan. 11, 2005: 13-year-old Allen Hutchinson was killed at the Las Vegas Ski and Snowboard Resort. He was swept off a chairlift by a wall of snow reported to be 20 feet high.

May 20, 2005: David Conway, 53, of Boulder died in a wet-snow slide on the Pallavicini run at Arapahoe Basin, the first in-bounds avalanche fatality in Colorado in 30 years.

Dec. 23, 2007: Jesse R. Williams, 30, of Grand Junction was buried in an avalanche in the Red Pine Chutes at The Canyons Resort in Utah.

So far in the 2008-09 ski season, three skiers have died in avalanches in expert terrain inside ski-area boundaries.

Dec. 14: 27-year-old Salt Lake City local Heather Gross was buried and killed in a slide on the flanks of Snowbird's Mount Baldy.

Dec 14: An avalanche in Vail's Blue Sky Basin buried skier Matt Jones, who was uninjured.

Dec. 21: An avalanche at Telluride swept three skiers off the run Genevieve, a double-black diamond. Two were partially buried, but no one was injured.

Dec. 25: 21-year-old Randall Davis of Tahoe City, Calif., was killed in a slide at Squaw Valley's expert Red Dog area.

Dec. 27: David Nodine, a 31-year-old skier from Wilson, Wyo., was killed in Jackson Hole ski area's expert Paintbrush-Toilet Bowl terrain. Another skier was caught in the slab avalanche. Two days later, a massive slide released in Jackson's hike-to Headwall area, filling a restaurant with snow and burying four ski patrollers who escaped injury.

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