Prater Canyon Avalanche Fatality
Salt River Range, Wyoming; January 14, 2024

Avalanche Comments
On Saturday, January 14, 2024, at approximately 11:30 AM, a skier unintentionally triggered an avalanche on a mid-elevation (~8,500'), northwest-facing, sparsely treed slope above an indistinct gully on the Northwest Face of Little Poudre Mountain. This large, soft slab avalanche filled a relatively narrow path (SS-AS(u)-R3-D2). The area was too dangerous for a crown profile. Still, it is assumed that the avalanche broke on a layer of near-surface facets and surface hoar responsible for a widespread avalanche cycle in the region. The weak snow layer formed during a prolonged dry period in December that was buried by approximately 30" of snow falling during a series of storms that began on January 4th. The avalanche broke approximately 50' wide and 1-3' deep and entrained more snow along the flanks of a shallow gully. The avalanche fell approximately 600 vertical feet. The slide path is one of several sparsely wooded avalanche paths on the northwest face of Little Poudre Mountain that run the full 1,200' length of the face. (*Figure 1*) This avalanche was one of the dozens reported in the region during a particularly active avalanche cycle. (*Figure 2*)

Backcountry Avalanche Forecast
The Bridger-Teton Avalanche Center forecast on January 14, 2024, rated the avalanche danger in the Greys River zone at High in elevation bands above 7,500' and Considerable below. Persistent slab avalanches were the primary avalanche problem on all aspects above 7,500'. The expected size of the persistent slabs was projected to be large to very large (D2-3) and very likely to be human-triggered. Deep persistent slab avalanches were also listed as possible, ranging from large to very large or D2 to D3.5. The Bottom Line section of the day's forecast stated:

> *Very dangerous avalanche conditions exist today. Triggering an avalanche large enough to bury, injure, or kill a person is likely in avalanche terrain at all elevations. In addition, destructive natural avalanches are likely in the middle and upper elevations. Traveling in, near, or under avalanche terrain is not recommended today.*

Weather and Snowpack Summary
The snowy season started with early snow in October, followed by two drought periods. The first in November lasted 11 days. The second and more prominent one in December lasted 23 days, with only a small break for three days of light snow around Christmas. The December drought was accompanied by very cold temperatures and many days and nights of clear skies across the region. The time and weather conditions were conducive to extensive near-surface faceting and surface hoar growth, forming a 6+ inch thick layer of weak snow (*Figures 3, 4 and 5*). Winds remained light throughout this time, leaving many areas of surface hoar and facets intact, and it was noted in alpine areas up to 9,000 feet and higher. The following is an excerpt of the weekly Snowpack Summary issued 3 days prior to the avalanche:

> *On January 4th, we buried a weak layer that will remain active for the foreseeable future. January 4th-5th initiated the first round of light precipitation we received in weeks. Northwesterly flow favored the west Tetons and areas of the Salt portion of the Greys (forecast zone), depositing upwards of 7+ inches in these areas… On January 7th-8th, light snowfall continued, with the west side of the Tetons picking up an additional 6", the*

east side an additional 1-2", and the northern portion of the Greys an additional 2-3"... Throughout these storms, winds remained light and northwesterly. Due to the calm nature of these storms, many layers of weak snow that generally get disturbed with an incoming storm (surface hoar) were preserved, even at upper elevations across every forecast zone.

January 4th initiated the burial of the December drought snow with northerly flow and light-density snow accompanied by very light winds. This mild storm buried weak snow just enough to be preserved from strong winds from subsequent incoming storm systems. On January 9th, a strong Pacific weather system brought increasing southwest winds with gusts in the 30-40 mph range. Intense periods of snowfall on the 9th and 10th brought 11 inches of new snow containing 0.9" of water to nearby Willow Snotel. Northwest flow on the 11-13th brought another 6" of new light density snow containing another 0.5" of water. The December drought layer of weak snow was covered by light-density snow and light winds. Subsequent snowfall added up to 32" total on the weak layer since January 4th (*Fig 6*). Also contributing to the elevated avalanche danger were the strong winds that occurred on the 12th through the 14th. On Mount Coffin, a peak that reaches to 11,242 feet and is located 30 miles to the southwest of Prater Peak, the 24-hour average wind speed was 76 miles per hour. Gusts reaching 138 mph were recorded during that time.

Public messaging on the storm system's impacts was widespread. A winter storm warning was issued on the 9th and continued through the 11th. An avalanche watch was issued by BTAC on the 11th and upgraded to an avalanche warning on the 12th. This warning continued through the day of the accident and was finally canceled on the 15th.

The forecast on the day of the incident described the persistent slab avalanche problem as follows:

Large, deadly avalanches failing on very weak snow formed in December are a real threat today. In the mid and upper elevations, avalanches will break 3 to 5 feet deep. Below 7,500' slab depths will be in the 1 to 3 foot range. All aspects (shaded and sunny) at all elevations are suspect. Only the lowest elevation slopes that were bare ground prior to January 4th have escaped this problem. Slabs could be triggered from a distance, or wait until you have committed to the slope to release. Approximately 10 inches of new snow fell overnight in the upper elevations of the Salt River Range. This additional load will push an already weak snowpack over the edge. Extremely careful route finding is of the utmost importance today. Keeping slope angles below 30° and staying well away from terrain that is connected to avalanche paths is critical. This also means being aware of the terrain above you as remote triggering is possible. Groomed trails that cross avalanche paths should be evaluated carefully and crossed one at a time, if at all.

From January 4th to the 13th, 57 avalanches D2 in size or greater were reported in the Greys and Tetons forecast zones, most of which failed on this layer. As visibility improved on the 14th and 15th, another 30 avalanche observations were submitted.

Accident Summary

The skiers were residents of Alpine, WY and lived a short distance from the canyon. The pair approached via snowmobile to shorten the approach to the usual skin track which starts a mile from the end of the plowed road. They ascended a steep skin track on a wooded slope thought to be relatively free of avalanche hazards, although it crossed through several avalanche paths

(*Fig 7*). The pair gained the ridge, noting one collapse in the snowpack along the way, and headed east to the top of a sub-ridge of Little Poudre Mountain. The ridge is exposed to wind, and the pair found stiff, wind-hammered snow from moderate to strong winds two days prior which was now capped with soft snow. The pair made a quick plan to ski for a few hundred feet and regroup below a patch of trees to plan the next pitch of skiing. (*Fig 8*) Skier 1 told Skier 2 to follow his tracks, stay on the ridge, and then began skiing. Seconds later, Skier 2 followed. Skier 1 skied fast, his normal style, but soon noticed avalanche debris flowing in the gully to his left. He stopped on a high point on the ridge and planned to descend towards the debris pile first along the main ridge to avoid the bushes and trees in the gully and potential hang-fire above (*Fig 9 and 10*). He descended to where debris began to accumulate and initiated a beacon search. He acquired a signal 1.2m beneath the surface and quickly dug to expose his friend lying face up, head downhill. Skier 1 noted no signs of impact to his friend's helmet but later noted an angulated leg fracture. He also noted no ice mask or snow in the mouth. He found no carotid pulse or signs of breathing and began CPR, which he continued for one and a half hours. (*Edit – An autopsy would later rule that the cause of death was asphyxia.)*

Comments

All of the fatal avalanche accidents we investigate are tragic events. We do our best to describe each accident to help the people involved, and the community as a whole to better understand them. We offer the following comments in the hope that they will help people better understand and avoid future avalanche accidents.

Skier 1 had lived and skied on a regular basis in the area for 25 years. He had been skiing regularly with Skier 2 for over five years and was a mentor. Skier 1 shared that the adjacent and more obvious gully features avalanched more regularly and that he thought that the rib feature was generally a safe route that he had never seen slide. In this case, the chosen route down the rib did not avalanche, but skiing 30-40' left put Skier 2 into steeper terrain or perhaps over a thin spot in the slab. Considering terrain maps and photos, it's clear that the route, and most of the surrounding terrain, is between 35 and 40^0 even on the rib they intended to ski. (*Fig 11*).

Skiing at the same time during periods of instability reduces one's safety margin considerably, particularly in steep terrain and in high-hazard areas. Terrain choices like the crest of the rib are perhaps lower risk than the steeper terrain nearby, but 35 and 40^0 slope angles significantly narrow the safety margin, particularly when skiing at the same time during elevated avalanche danger.

Another misconception that was at play in the incident was the assumption that a recent avalanche had occurred and made the slope safer. Some portions of the face had avalanched, but during the previous avalanche cycle. Persistent weak layers can easily avalanche again since the snow crystals that make up the weak layer often remain undisturbed after the initial avalanche, only to be reloaded by new snow, which may avalanche again. It is unclear what parts of the area had avalanched, though a flank wall is visible beneath the storm snow (*Fig 12*)

The skier's familiarity with the terrain may have also contributed to this incident. In *Backcountry Skier's Guide: South*, author Tom Turiano describes this run as "a popular gem of the Salt Rivers, this 1,500' face features three main ribs divided by gullies that culminate in extremely dangerous starting zones" and "the safest routes down follow the ribs or the tree line on skier's left." This run was a "go-to" descent in the pair's backyard. They had skied here on days with elevated avalanche hazard for many years. It's possible that they had an elevated level of acceptable risk on this line during a period of high instability with an unusual weak layer in the

snowpack. We are all vulnerable to the normalization of deviance in risk acceptance, but hopefully, learning from others can help guard against this potential error.

BTAC staff are grateful for the information shared by the party involved. Sharing experiences like this openly is difficult but critical to creating an opportunity for the community to better understand and learn from these tragedies. Our sincere condolences to family, friends, and others impacted by this loss of life.

We are grateful for the efforts of Star Valley Search and Rescue and Teton County Search and Rescue to perform this mission in dangerous conditions and the county Sheriff's offices in Teton and Lincoln County for allowing BTAC personnel on the scene to begin the research needed to produce this report.

Media

Figure 1 Overview of the northwest face of Little Poudre Mountain.

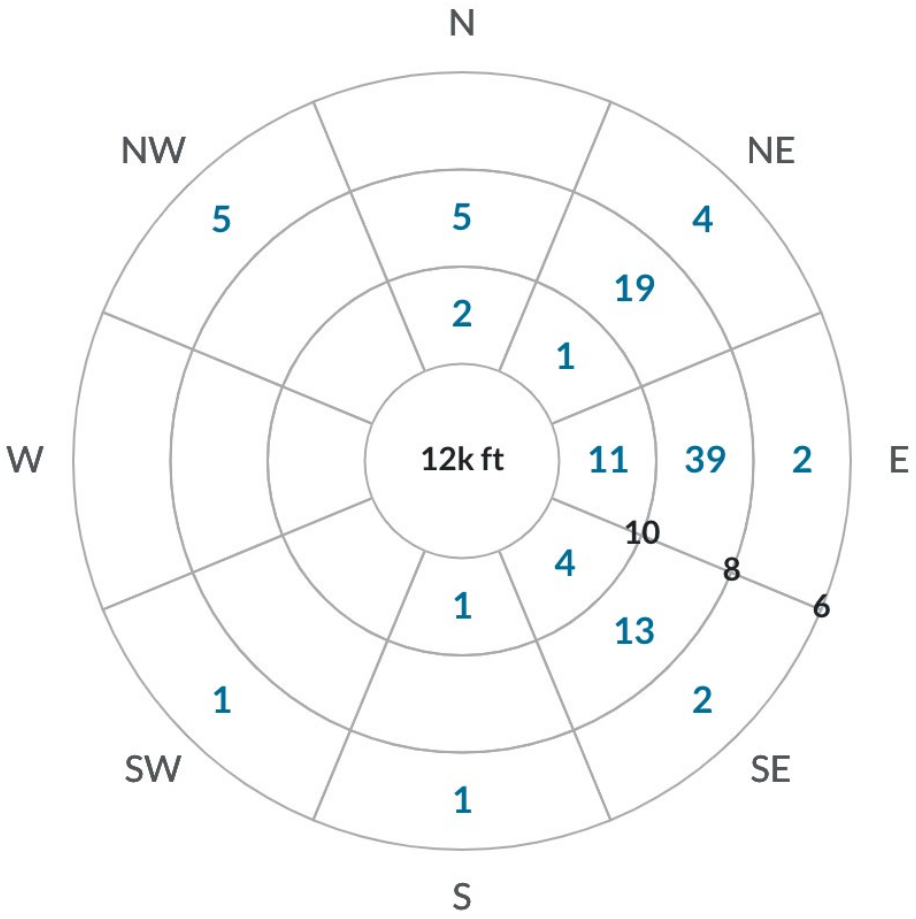

Figure 2 Radial plot of avalanche events from the previous 14 days. 5 avalanches were noted over this time between 6,000 and 8,000 feet. This avalanche started at 8750'.

Figure 3 Surface hoar capped the December drought snow in many locations up to 9,000 feet. Photo: BTAC

Figure 4 Extensive near-surface faceting of surface snow from the December drought. In many locations up to 9,000 feet, this layer is composed of a thick layer of near-surface facets capped with thick surface hoar. Photo: BTAC

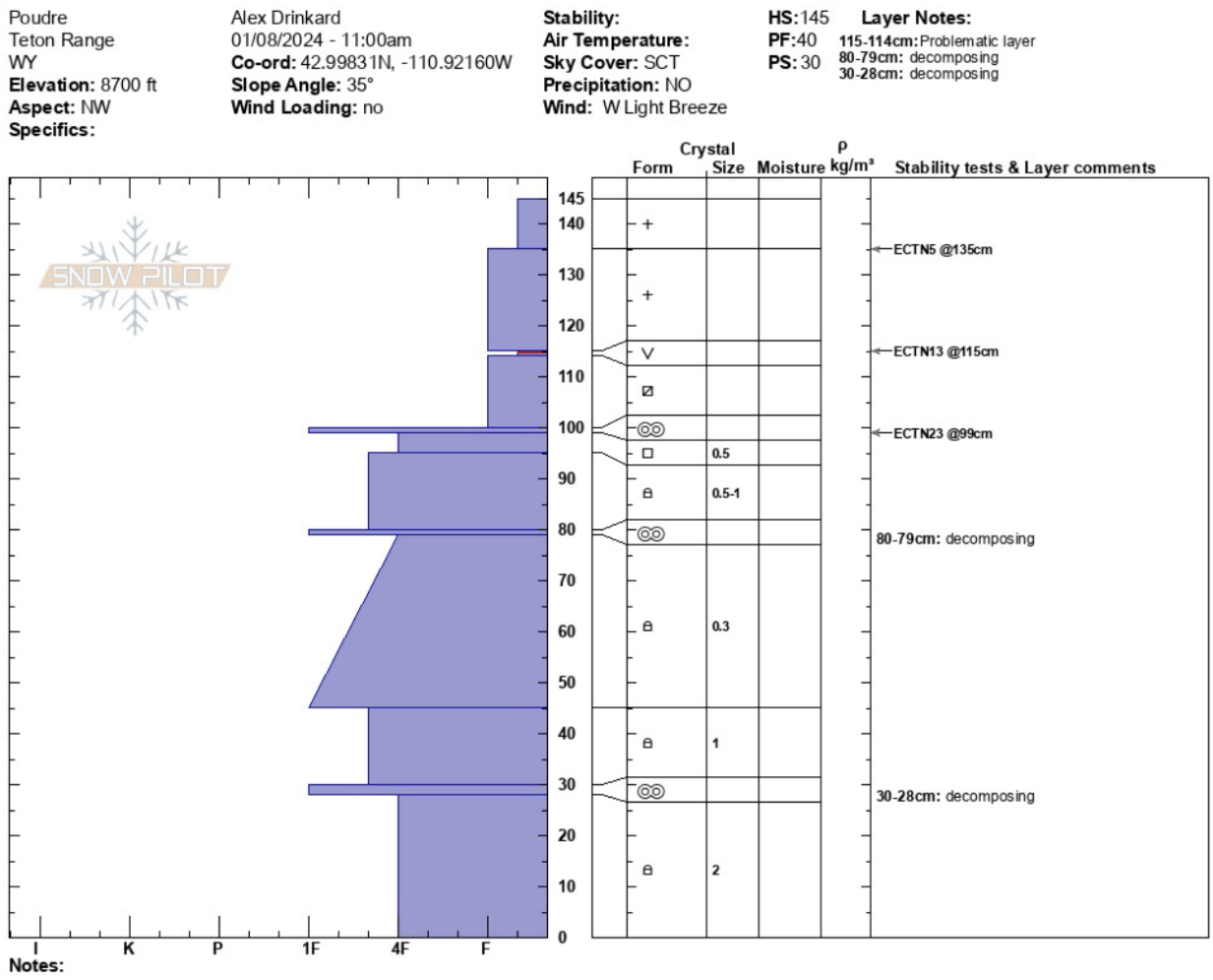

Figure 5 Two BTAC forecasters were in the Prater Canyon area at a similar elevation and aspect 5 days prior, noting surface hoar and facet layer beneath the new snowfall, and sensitive conditions developing with incoming snowfall and wind.

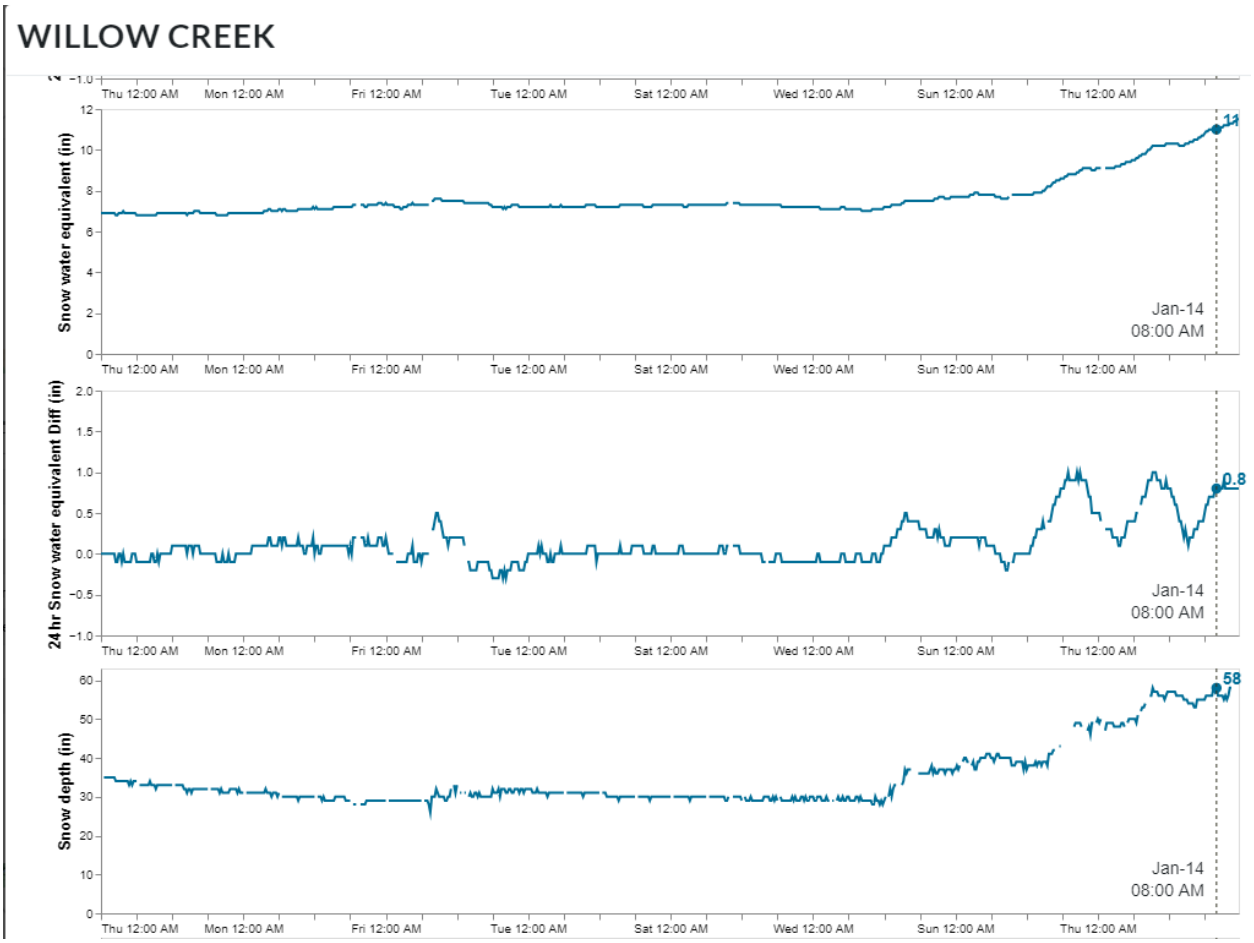

Figure 6 Graphs of the previous 30 days of snow data show the prolonged dry period in December followed by the incremental loading from January 4-14.

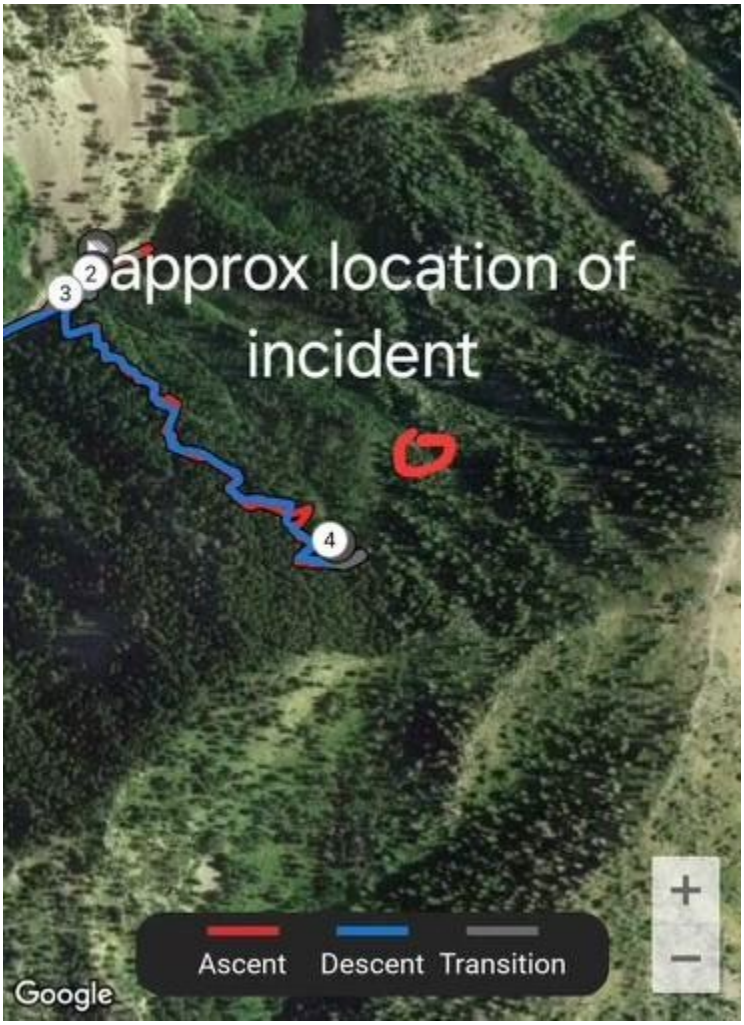

Figure 7 The party followed the skin track that another visitor recorded (pictured above) to their high point and then continued to the ridge.

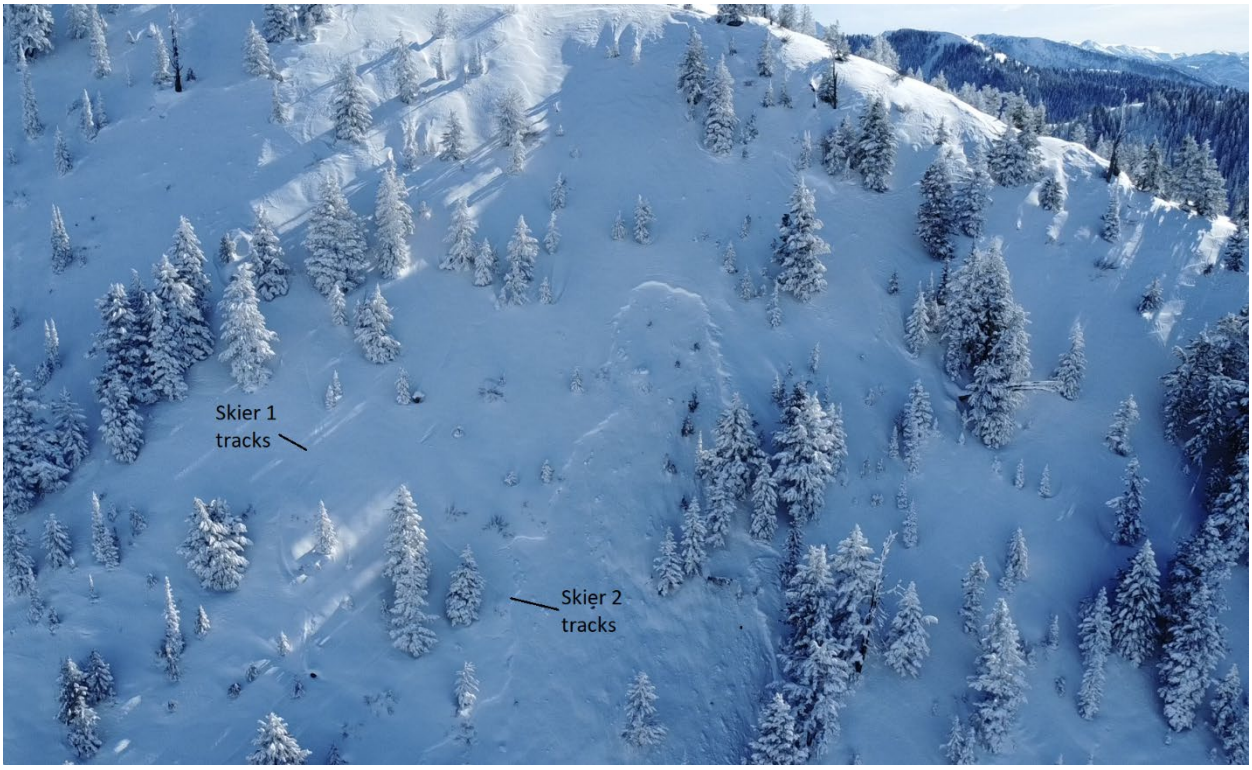

Figure 8 Skiers tracks near the top of the slope.

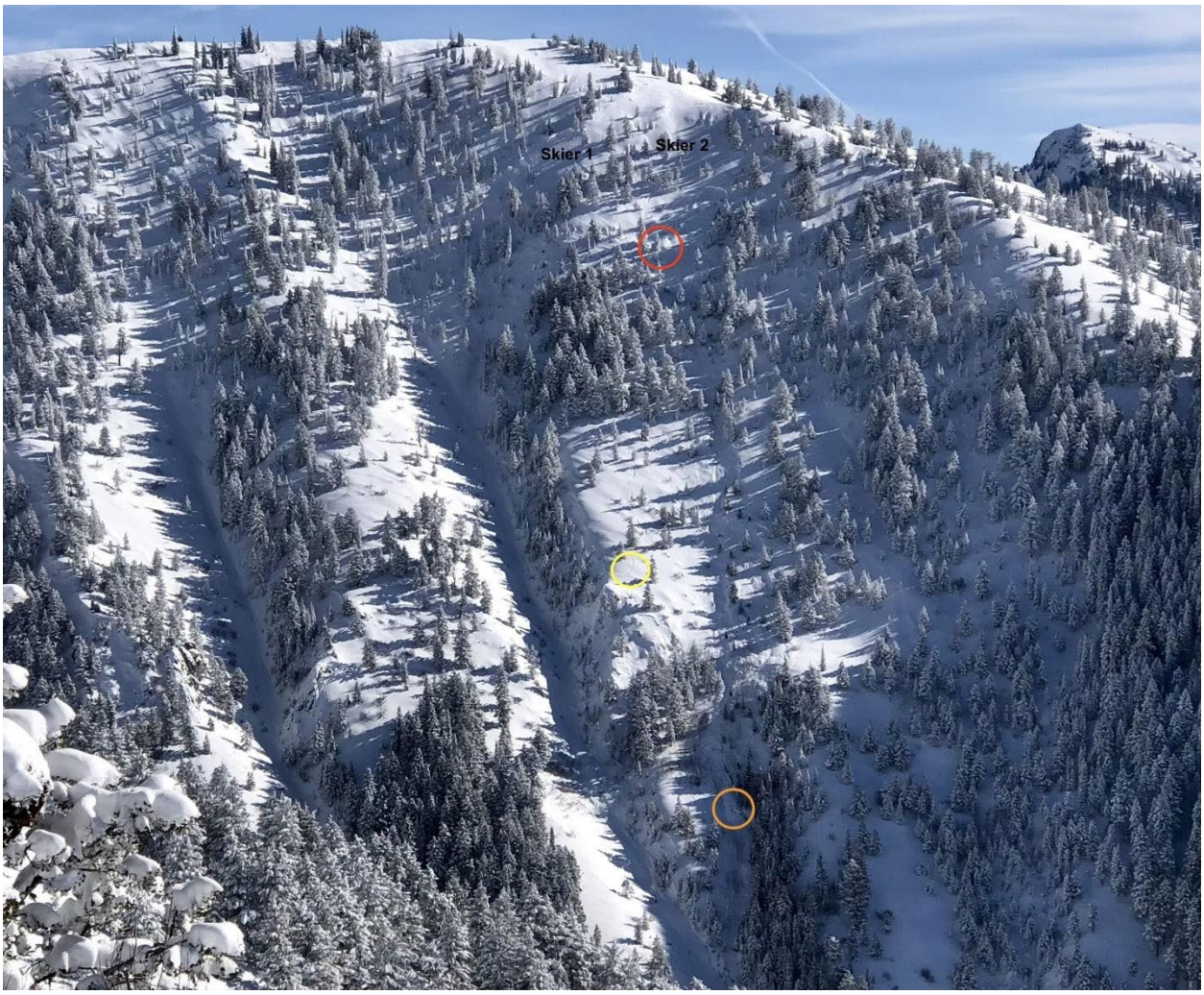

Figure 9 Another overview of the scene showing the points at which skier 2 most likely triggered the avalanche (red circle), where skier 1 began to search (yellow circle) and the point at which skier 2 was buried (orange circle).

Figure 10 Site of the burial. Note the trees in the path.

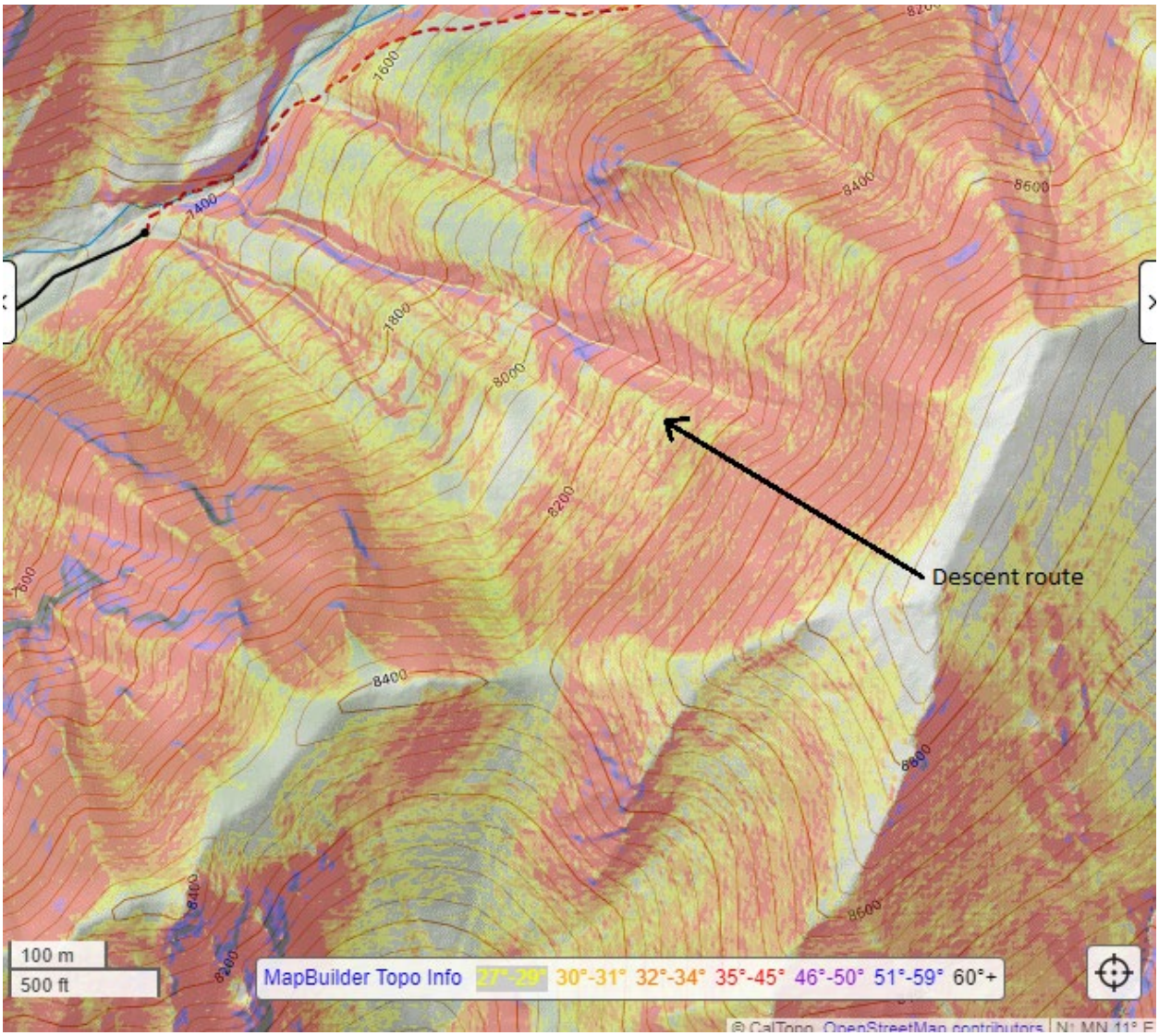

Figure 11 A digital terrain model indicates the overall steep slope angles of the terrain. It's important to note that models such as these are very coarse and do not capture critically important terrain features such as convex rolls and steeper terrain that falls between pixels.

Figure 12. Debris from the fatal avalanche shown in the middle of the photo with a flank wall beneath the new snow on the right. The force of the flowing debris knocked the snow from the trees in the path.