

Beehive Basin Avalanche Fatality

2 splitboarders caught, 1 partially buried and fatally injured

Northern Madison Range, MT

Custer-Gallatin National Forest – February 14th, 2021

SYNOPSIS

On February 14, 2021, two splitboarders triggered an avalanche in Beehive Basin north of Big Sky. They were skinning up the slope when they triggered the avalanche. Both members of the party were caught, but Boarder 1 was able to grab trees and not be buried. Boarder 2 was carried approximately 300 feet downslope where he hit a tree and was critically injured. He was partially buried, entangled around a tree with his head downhill. Boarder 1 heard his partner's screams, called 911 and went to his aid. He administered first aid and worked to keep him warm and calm. Gallatin County Sheriff Search and Rescue in Big Sky (GCSAR) left the trailhead within 45 minutes of the 911 call, skied to the scene and began providing care. A GCSAR helicopter arrived soon afterward and the injured boarder was short hauled to Big Sky Fire Department and medical care. Boarder 2 died from his injuries that night. The avalanche was 300 feet wide, 500 feet vertical and averaged 2 feet deep. It broke on a layer of facets and depth hoar near the ground, and is classified HS-ARu-R4-D2.5-O.

GPS coordinates and elevation:

Crown: N 45.32733, W 111.38312; 9204'

Toe: N 45.32650, W 111.38630; 8750'

Victim Location: N 45.32673, 111.38431; 8930'

Video: https://youtu.be/_gLB_fAZsb8

Pictures: pages 6-10

AVALANCHE

On the morning of February 14, 2021 two splitboarders left the Beehive Basin Trailhead in the Northern Madison Range to ride with each other for the day. Boarder 1, a 44-year-old male, was visiting from out-of-town and had been riding in the backcountry regularly but not locally. Boarder 2, a 45-year-old male, lived in Bozeman and had not ridden in the backcountry in a few years. Neither had been to Beehive Basin before to ride. Both read the avalanche forecast that morning and carried rescue gear of a beacon, probe, and shovel. Rider 2 had taken an avalanche Level 1 class a couple years ago and also had a recent First Aid and CPR certification. Their intent was to stay in low-angle terrain and have a mellow day because they had been following the avalanche report and knew there was a weak, unstable layer of snow near the ground.

They followed the skin track and noticed at least one ski line descending the slope that they were headed to. The skin track they were following became buried in new snow and they had to break their own trail. As they ascended the slope they did not see any signs of instability (recent avalanches, collapsing, cracking) and they planned to dig a snowpit when they got higher. About ¾ of the way up the

35+ degree slope they felt it collapse, saw cracks spreading around them and got hit by the avalanche. Both members of the party were caught. Boarder 1 was slightly higher and to the north, trying to grab trees and fight off the slab as the avalanche went over him. Boarder 2 was carried approximately 300 feet downslope where he impacted a tree and was partially buried with his head downhill. Boarder 1 heard his partner yelling, knew that he was injured, and immediately called 911. Boarder 1 descended the slope and found his partner entangled in a tree with a life-threatening open fracture on his left thigh. He provided first aid and worked to keep his partner warm and calm while they waited for Gallatin County Sheriff Search and Rescue in Big Sky (GCSAR). GCSAR started skiing to the site in less than an hour after the 911 call. Shortly after their arrival Boarder 2 began losing consciousness. They moved him and provided first aid and soon began CPR. A GCSAR helicopter was already en route from Bozeman. It landed on the debris and two rescuers were attached underneath and short-hauled to pick up the patient. They were flown to Big Sky Fire Department where the patient was taken to Big Sky Medical Center and then transported by Life Flight to Bozeman Deaconess Hospital. Tragically, Boarder 2 succumbed to his injuries and passed away that evening.

RESCUE

The avalanche in Beehive Basin occurred at 11:43 a.m. Boarder 1 immediately called 911 to report an avalanche with an injured party. Boarder 1 then descended the slope to provide care to his partner. A call for Gallatin County Sheriff Search and Rescue (GCSAR) volunteers went out at 11:46 a.m. At 12:18 p.m. GCSAR hasty team from Big Sky arrived at the trailhead and began their approach at 12:35 p.m., less than an hour after the 911 call. A GCSAR helicopter rescue team met at their operations center in Bozeman at 1:04 p.m. and geared up for deployment. The ground hasty team quickly reached the scene at 1:22 p.m. Assessing Boarder 2 they found an open fracture on his left thigh, the patient going into shock and had a deteriorating level of responsiveness. At 1:32 p.m. the patient was A&Ox1 out of 4 (Alert and Oriented to only his name, but not place, time or event). At this time the GCSAR short haul team was visible overhead. At 1:42 p.m. rescuers initiated CPR when the patient stopped breathing and lost a pulse. Soon after, rescuers were short hauled by helicopter to the scene and evacuated the patient to Big Sky Fire Department Station 2 where they arrived at 2:07 p.m.

WEATHER

Snowfall and precipitation data are from the Lone Mountain SNOTEL site at 8,880', 2.6 miles SE of the accident. Wind data is from the summit of Lone Mountain at 11,162' at Big Sky Resort, 4.5 miles SW of the accident. From February 3 through 8 the Lone Mountain SNOTEL received 2.4" of snow water equivalent (SWE), and nearby Big Sky Resort and the Yellowstone Club recorded 47" of new snow. Between February 9 and 14 the area received 3-4" of snow equal to 0.3" of SWE (Figure 1). On February 10 and 11, after the large snowfall, wind speeds at the summit of Big Sky were 20-30 mph with gusts of 40-50 mph out of the northwest. Wind speeds decreased to 15-25 mph through the week. During the 24 hours prior to the accident winds were northeast-northwest at 5-20 mph with gusts of 10-25 mph (Figure 2). Temperature at the time of the accident was approximately 10 degrees F.

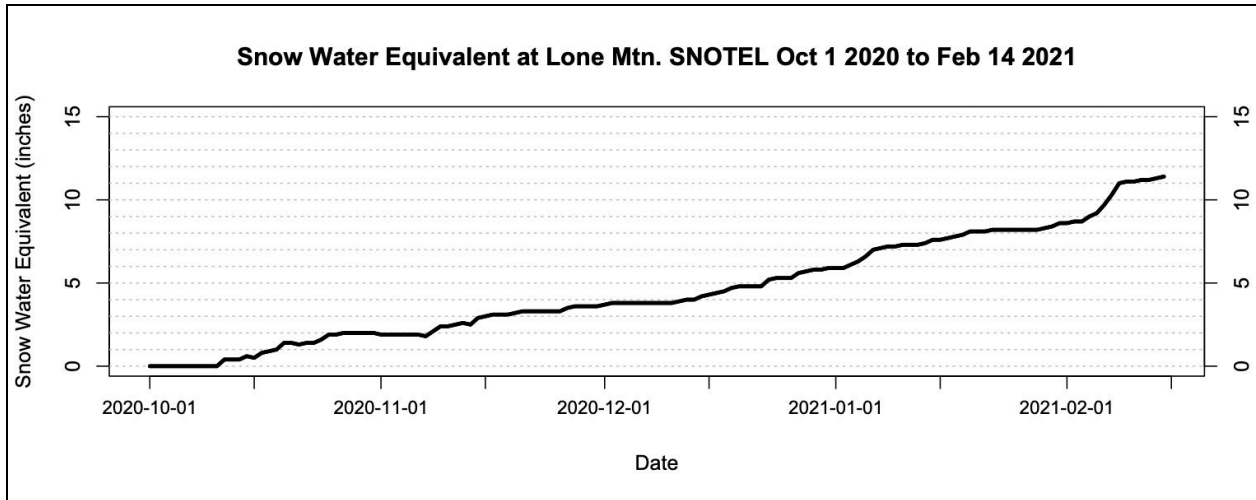


Figure 1. Snow water equivalent (daily values at midnight) at Lone Mtn. SNOTEL site from October 1, 2020 to Feb 14, 2021. Located at 8,880', 2.6 miles SE of the accident.

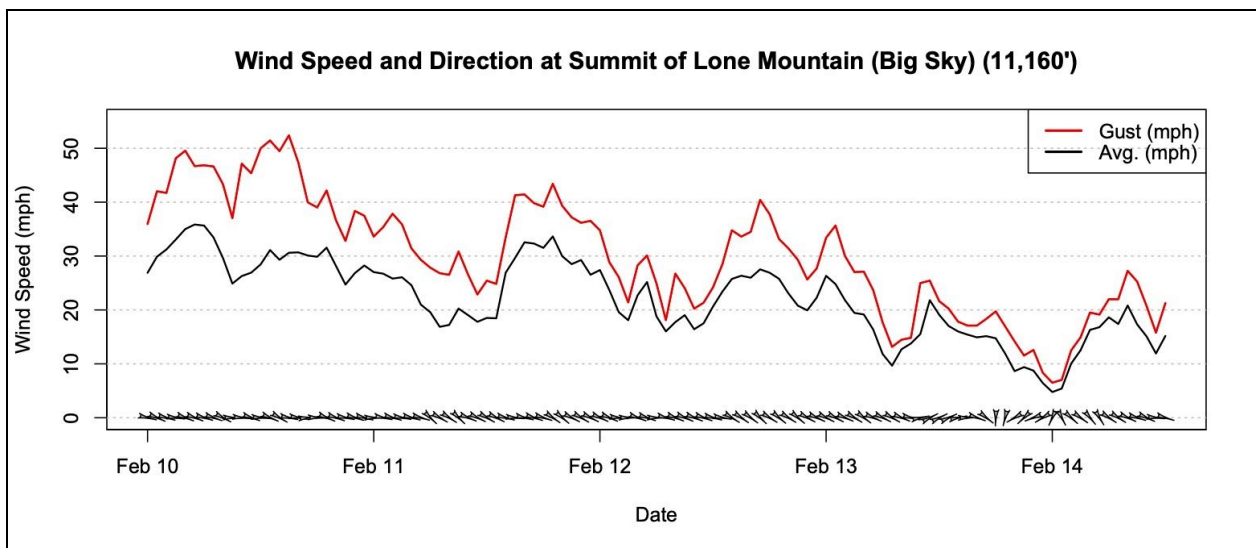


Figure 2. Wind speed and direction (hourly) from the summit of Lone Mountain (Big Sky Resort) from February 10 to the time of the accident on February 14, 2021. Wind direction is displayed as arrows along the bottom of the graph.

SNOWPACK

The avalanche occurred at 9,100' elevation on a west aspect (270 degrees) in Beehive Basin north of Big Sky, MT. The slope angle was 40 degrees at the crown and 43 degrees in the starting zone. The slide broke 1.5-2.5' deep, ran 500' vertical and 300' wide (measured on Google Earth). The runout angle (toe of debris to crown) was measured at 29 degrees. The avalanche is classified HS-ARu-R4-D2.5-O.

The avalanche broke on a weak layer of “Fist+” hardness facets (2-4mm size) 8-10” above the ground. The slab was 1.5 to 2.5 feet deep and consisted of layers of 1-2 feet of settled snow from the past week (F to 4F+ hardness) on top of small rounded grains (1F- to 1F hardness) and a melt-freeze crust (Figure 3).

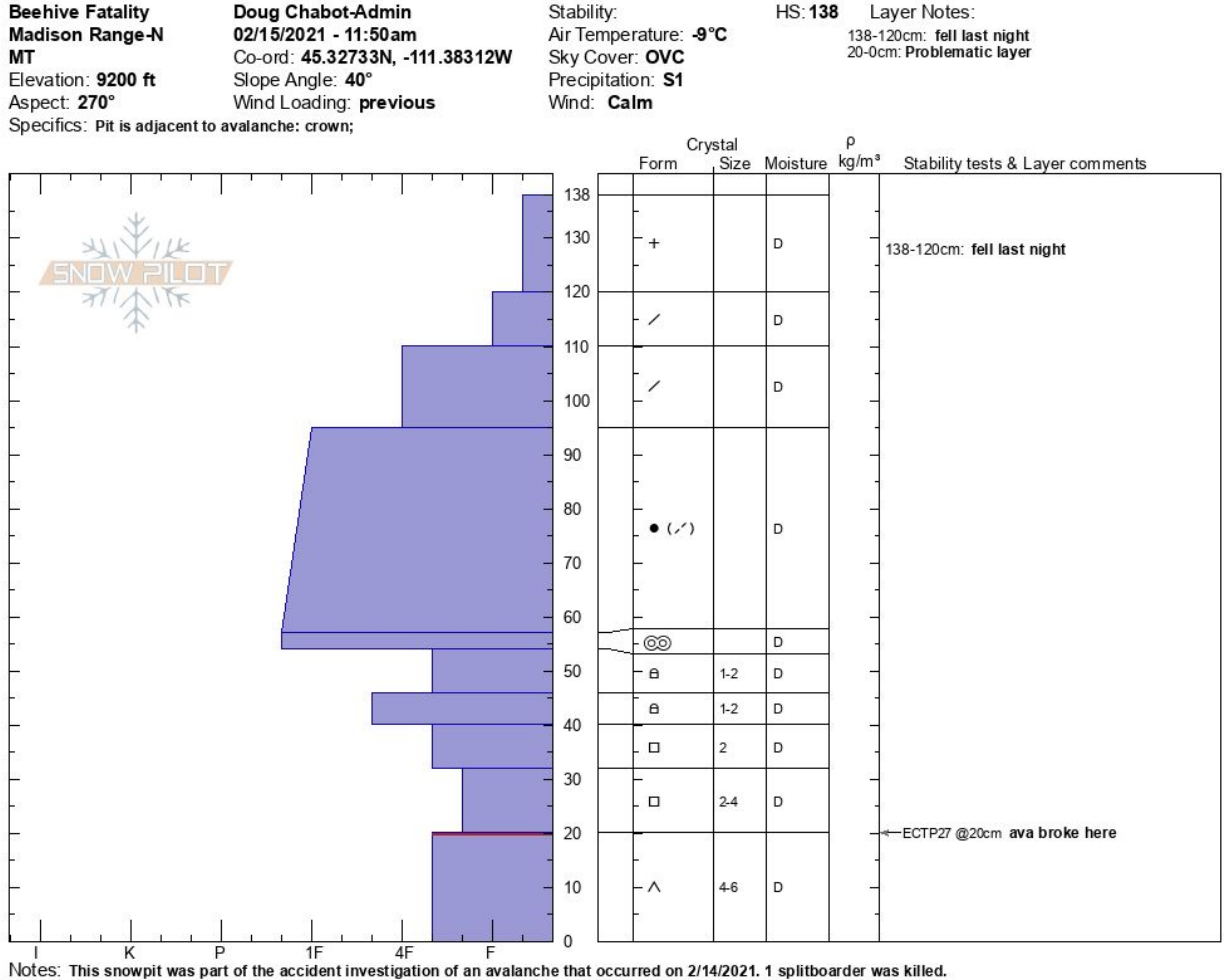


Figure 3. Snowpit profile from the crown of the avalanche. Observed by GNFAAC forecasters on 2/15/21.

The mountains near Big Sky received early season snowfall in October and early November. A prolonged period of below average snowfall from early November through the middle of December resulted in a widespread layer of weak facets and depth hoar near the ground. Average snowfall returned in the middle of December and continued through January. This snow added a slab and weight above the weak snow at the ground, and resulted in many natural and human triggered avalanches through January. Heavy snowfall from February 3rd to 8th resulted in an avalanche warning for much of the advisory area, including the Northern Madison Range on February 7th with continued HIGH danger on February 8th.

On February 14th the avalanche danger for the Northern Madison Range was rated MODERATE. The avalanche forecast stated:

Weak, sugary snow near the base of the snowpack makes large avalanches possible to trigger today. The snowpack has been slowly stabilizing since the mountains received 2-4 feet of snow last weekend, but we continue to get reports of unstable slopes. Yesterday in the Southern Madison Range a snowmobiler triggered and was partially buried in an avalanche....

Skiers in the Bridger Range saw a slide occur from wind-loaded terrain near the ridge, uncertain whether it was skier or naturally triggered. On Thursday, two separate groups triggered large avalanches in the Lionhead area and near Big Sky....

This season's untrustworthy snowpack continues to show signs of instability and creates heightened avalanche danger. Today the avalanche danger is MODERATE. Carefully evaluate the snowpack and consequences of a slide before riding on or underneath steep slopes.

GNFAC Avalanche Advisory for February 14th, 2021:

<https://www.mtavalanche.com/forecast/21/02/14>

INVESTIGATION

GNFAC forecasters obtained details of the avalanche on February 14, 2021 when Ian Hoyer was flown to the scene as a GCSAR member, and also on February 15 when Doug Chabot and Alex Marienthal visited the site to gather slope and snowpack data.

Any questions should be directed to:

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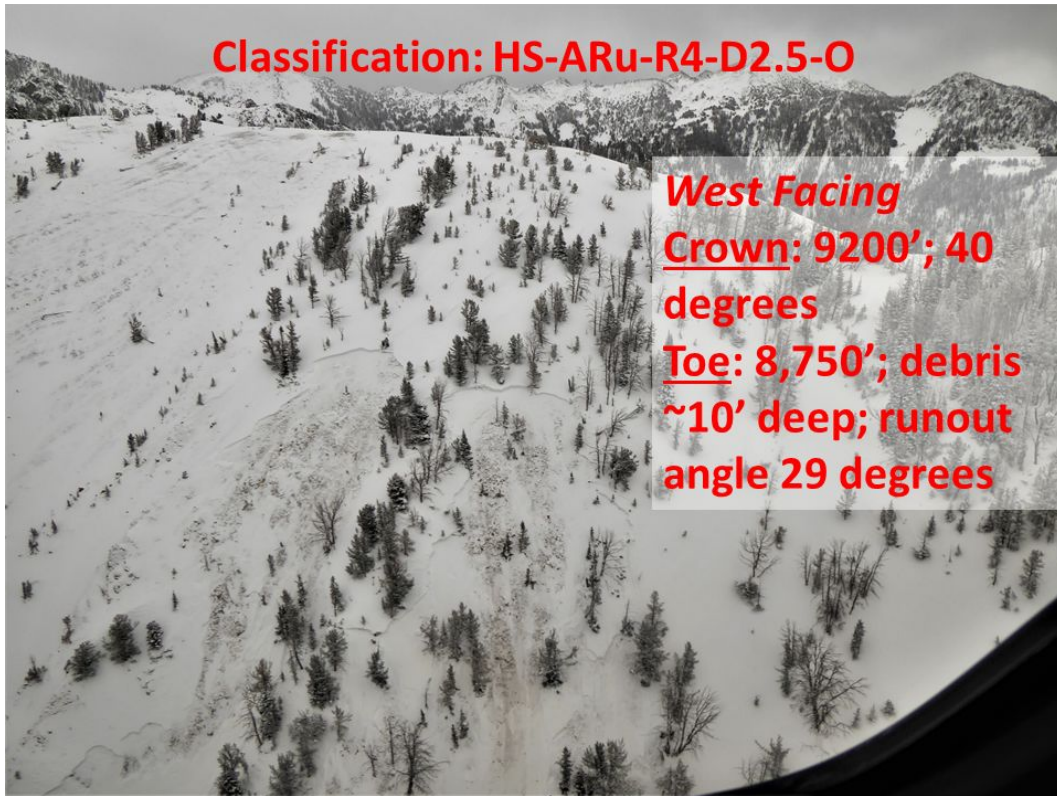
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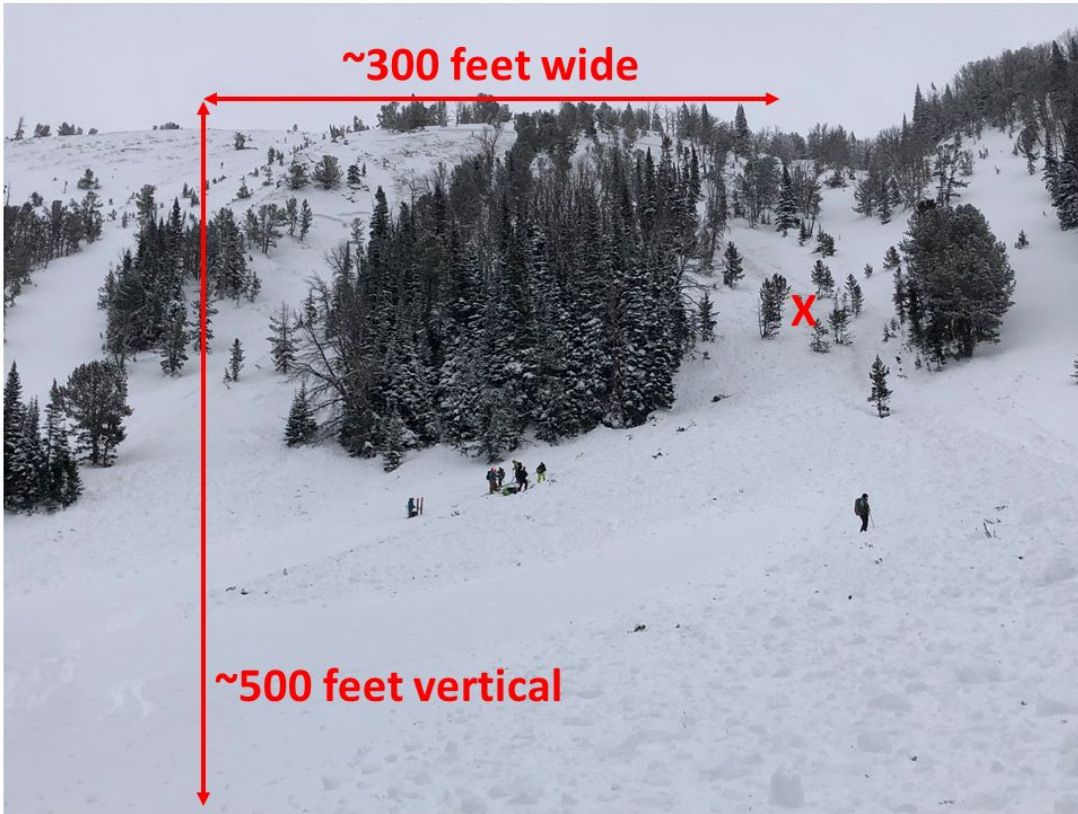
Avalanche Overview with classification from the air



Overview with location of victim from the air



Avalanche overview from below; Photo: GCSAR



Google Earth Overview



Rescue scene from below; Photo: B. Murray



GCSAR Short-haul team at the scene; Photo: B. Murray



GCSAR short-haul team insertion



Crown of the avalanche

