

3/8/2016 – Oregon – Wallowa Mountains

Published by Michael Hatch (Wallowa Avalanche Center) and
Scott Savage (on behalf of USFS National Avalanche Center)

Location:

Place Chief Joseph Peak, Wallowa Mountains
State Oregon
Date 3/8/2016
Time 1630 hrs
Summary 1 skier partially buried and killed

Number:

Caught 1
Fully Buried 0
Injured 0
Killed 1

Avalanche Details:

Type C (cornice fall)
Trigger AC
Subcode u
Size D2
Weak Layer N/A
Aspect NE
Elevation 9380 feet
Slope Angle 35-38 degrees, steeper at the entrance in the center of the chute
Character Planar chute below corniced ridge
Cornice Size 50 feet wide by 25 feet tall by 20 feet from failure to lip

Incident Summary:

Two experienced ski mountaineers were completing a long tour in the Wallowa Mountains. The skiers were on a ridge near the summit of Chief Joseph Mountain (Fig. 1). They were evaluating whether they could safely enter and ski the “Central Couloir”, a prominent corniced chute (Fig. 2). While standing near the center of the chute approximately 20 feet from the cornice edge and 20 feet from exposed rocks on the ridge, they identified an entrance on the skier’s right side that involved a relatively small, three to five foot drop off the cornice into the chute. They decided to ski the chute from the right side and began moving that direction, parallel to the ridge and cornice. A 50 foot wide piece of the cornice cracked and broke approximately 20 feet from the edge (Fig. 3). Skier 1 (male, age 28) was near the cornice break line but was not caught. Skier 2 (male, age 29) was about five feet closer to the cornice edge (Fig. 4). He fell into the crack that had opened as the cornice chunk rotated downhill, falling an estimated 25 feet and landing on his back. According to Skier 1, the cornice entrained snow as it broke up and moved downhill but did not trigger a slab avalanche. Skier 2 was carried downhill approximately 1150 vertical feet. He was partially buried with his head three feet deep and his feet and one hand sticking out of the

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snow. Skier 1 quickly skied down to Skier 2, excavated him, and cleared his airway within 3-4 minutes of the burial. Skier 1 determined Skier 2 to be not breathing and pulseless. Following CPR efforts, Skier 2 regained consciousness. The skiers moved downhill to a safer location but were unable to continue through flatter, forested terrain (Fig. 5). Skier 1 built a small snow cave and fire and they awaited rescue. The injured skier's condition gradually deteriorated. After two to three hours, he stopped breathing and could not be revived with CPR.

Avalanche and Terrain:

The Central Couloir is a prominent, NE-facing chute accessed via a ridgeline extending NW from the summit of Chief Joseph Mountain. The ridgeline is oriented normal to the prevailing winds and develops large cornices due to the relatively warm, intermountain snow climate. As in most alpine terrain, cornice size varied due to local terrain features. The cornice was largest near the center of the chute and tapered on the sides (Figs. 3 and 4). The chute itself is generally planar, ranging from 35-38 degrees in steepness except for a short, steeper section at the very top. The cornice that failed was 50 feet wide, 25 feet tall, and 20 feet from the lip to the failure point. Using an estimated 33% density (333 kg/cubic meter) for the involved cornice, this mass of snow weighed approximately 500,000 pounds. This large block of snow did not trigger a slab avalanche when it struck the slope beneath it, but it did entrain loose surface snow as it descended.

Snowpack and Weather:

Natural slab avalanches occurred in this cirque and in the surrounding area three days prior to the incident on March 5, 2016, including an avalanche in the Central Couloir (Fig. 6). These avalanches (SS-N-R2-D2) occurred in wind-loaded terrain beneath ridgelines. Crowns were 1-2 feet thick and up to 200 feet wide. The activity resulted from a warm Pacific storm system that brought rain to approximately 8000' (well below the incident location). The Aneroid Basin SNOTEL site (7 miles SE of Chief Joseph Mountain, 7400' elevation) recorded 1.3" of Snow Water Equivalent (SWE) on March 5-6, mostly as rainfall. Local professionals estimate 6-12" of dense snow fell above 8000'. The Wallowa Avalanche Center's Mt. Howard weather station (5 miles SE of Chief Joseph Mountain, 8150' elevation) recorded moderate to strong SE to SW winds (20-30 mph gusting 50-60 mph) during and immediately following the March 5-6 storm. At the Mt Howard site, temperatures reached the upper 30's F during the precipitation event on March 5th. The combination of snowfall, wind, and relatively warm temperatures likely caused significant cornice growth on March 5-6.

Following the storm, temperatures cooled to the teens to 20's F, skies gradually cleared, and winds slowly diminished. On March 8th, skies were mostly clear, the temperature at the Mt. Howard station ranged from 16-22 degrees F, and ridgetop winds were light from the south. At the time of the incident, cloud cover was increasing but visibility remained good. Local avalanche professionals did not observe

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any fresh avalanches or other recent cornice failures the day of the fatality; natural activity appeared to cease on March 6th. A few large, natural cornice failures were observed in the Wallowa Mountains earlier in the winter. According to local professionals, this is typical for the area.

Discussion:

Both individuals were experienced ski mountaineers. Skier 1 spends well over 100 days each winter in backcountry alpine terrain. Skier 2 also spent many days each winter in alpine terrain, was the Director of the Wallowa Avalanche Center, and had completed advanced professional avalanche training. Skier 2 was familiar with their route and had skied the Central Couloir twice this season without incident. The skiers thoroughly planned their route prior to travel, creating multiple options with varying levels of exposure for each leg of their tour. They embarked on the tour when weather had produced generally stable avalanche conditions. They did not observe or trigger fresh slab avalanches during their travels and saw no recent, natural cornice falls. While the skiers had already ascended 11,000-12,000 vertical feet climbing four major peaks that day, Skier 1 stated they were not overly fatigued; in fact, they had planned to ski an additional peak that afternoon but did not due to the increasing cloud cover. Visibility was good at the time of the incident and was not a factor. The skiers were attempting to enter the couloir in a location that minimized the cornice hazard. Tragically, the ~500,000 pound mass of snow was sensitive to the weight of the two skiers (approximately 400 pounds) and broke while they were seeking a safe entrance to the couloir.

Cornice incidents occur far less frequently than slab avalanche involvements but are not that uncommon. Cornice failures played a role in 64 mountaineering deaths in North America since 1977 (American Alpine Club accident database), and many if not most veteran avalanche professionals have experienced or observed close calls involving cornices. As it's impossible to predict how much additional weight will cause any given cornice to fail or exactly where a cornice will fracture, the only way to minimize this hazard is to avoid cornices by staying on or very near exposed rocks while on ridgelines. In this incident, the skiers recognized they were in avalanche terrain on the cornice. The flat nature of corniced ridgetops can create an illusion that these areas are less dangerous than steeper avalanche terrain below. Ultimately, the same safe travel techniques practiced in steep terrain – expose one person at a time, minimize the time exposed, choose the safest route, etc. – apply.

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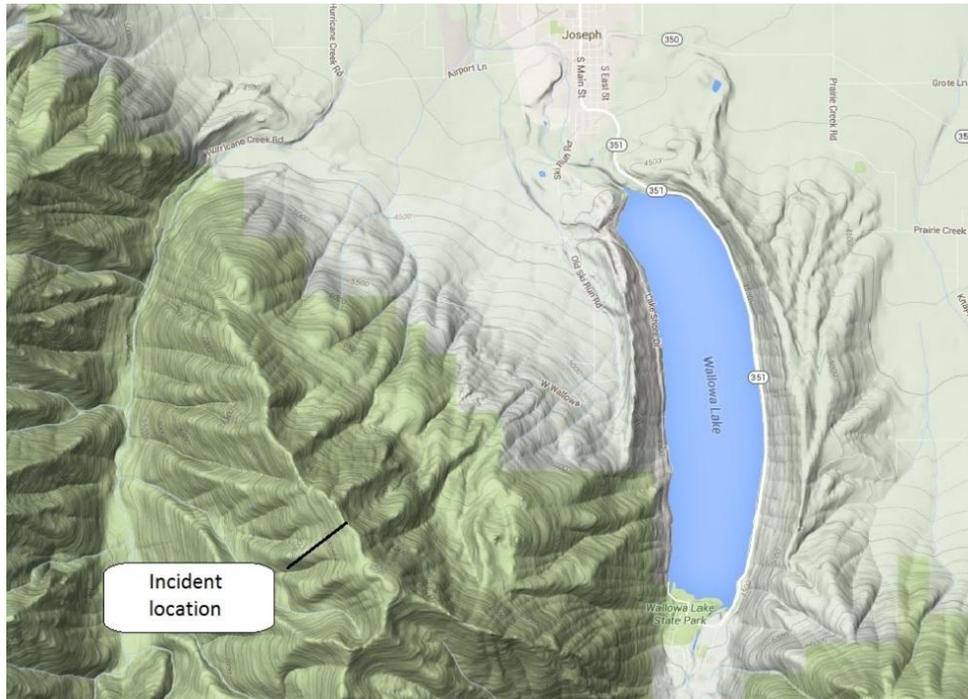


Figure 1. Overview of the incident location. Chief Joseph Mountain is the peak and prominent ridgeline west of Wallowa Lake and southwest of Joseph, OR.



Figure 2. The Central Couloir is a prominent chute off the corniced ridgeline of Chief Joseph Mountain.
Photo Mike Hamman, March 9, 2016.

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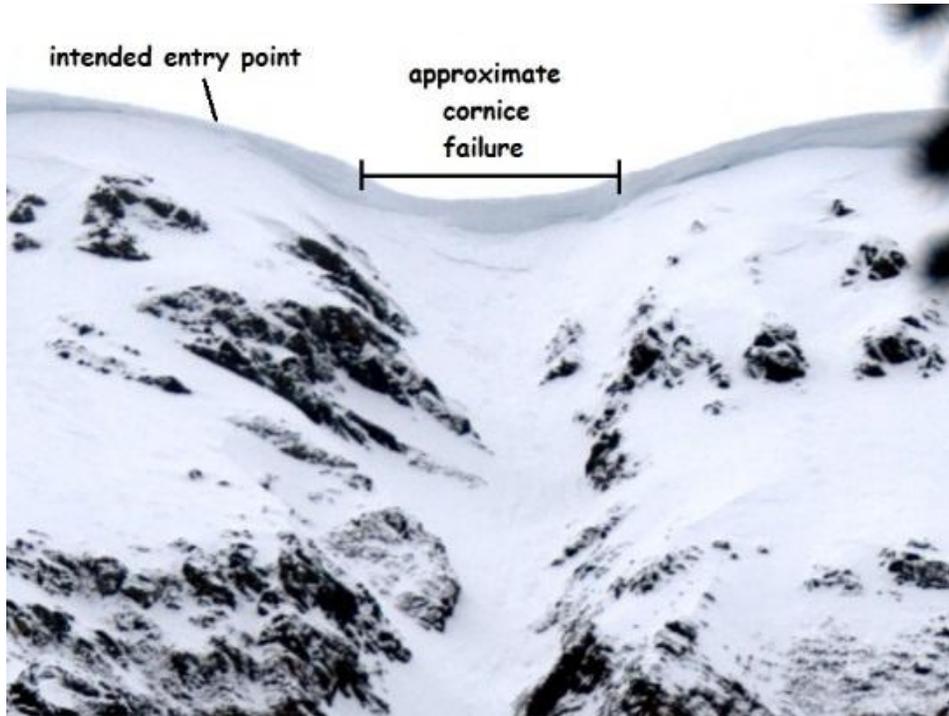


Figure 3. Post-incident photo of the top of the Central Couloir. Avalanche crowns occurred during the March 5th storm. Photo Mike Hamman, March 9, 2016.

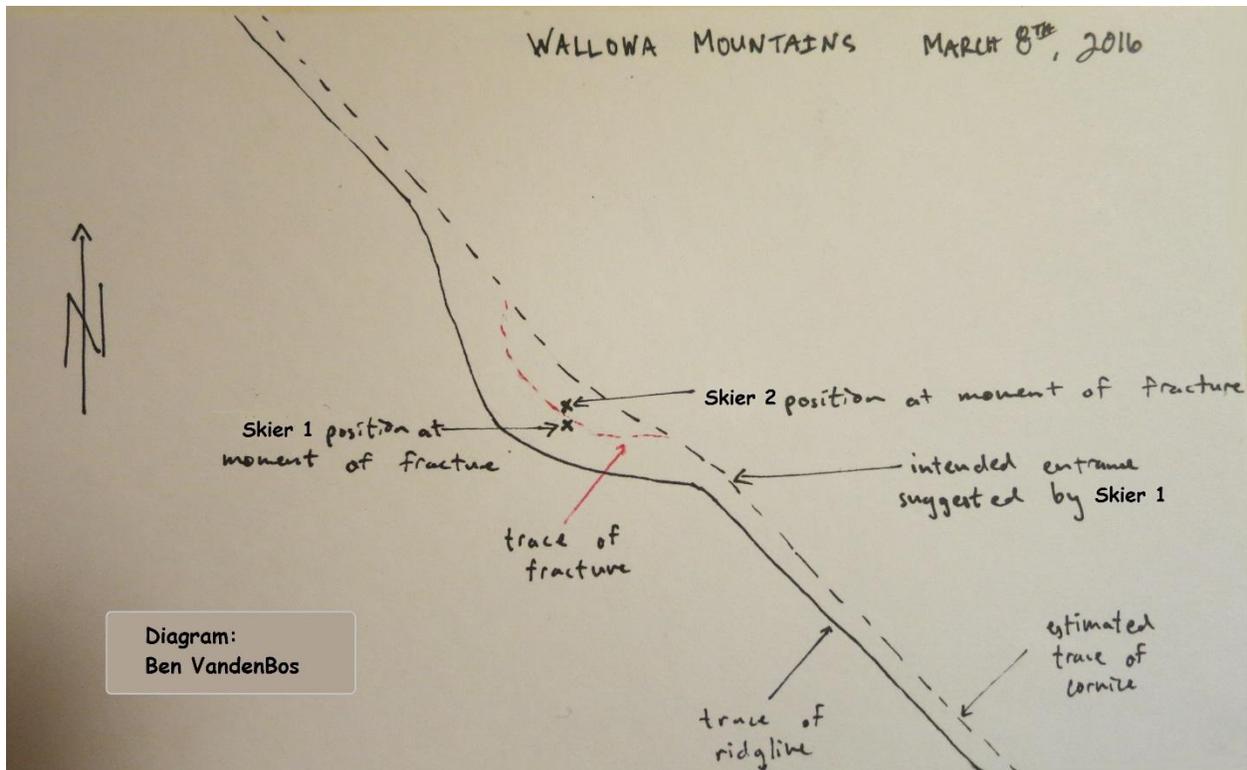


Figure 4. Diagram showing skiers' locations on the ridge. Ben VandenBos drawing.

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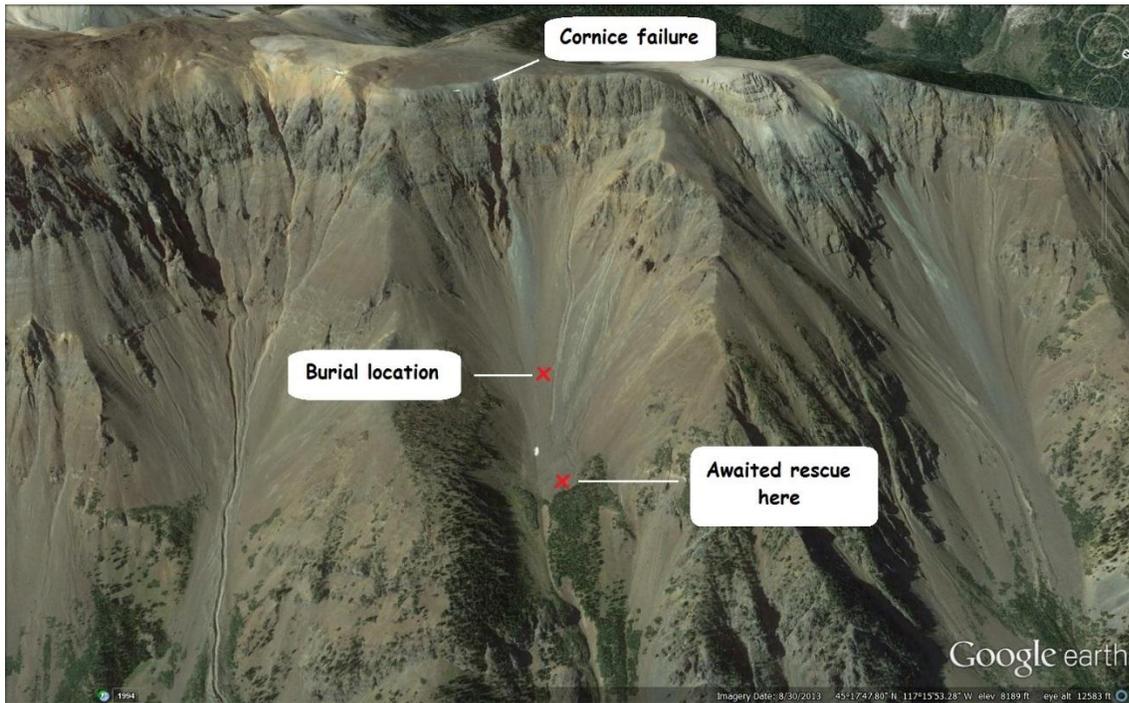


Figure 5. Google Earth diagram showing terrain and key locations during the incident.

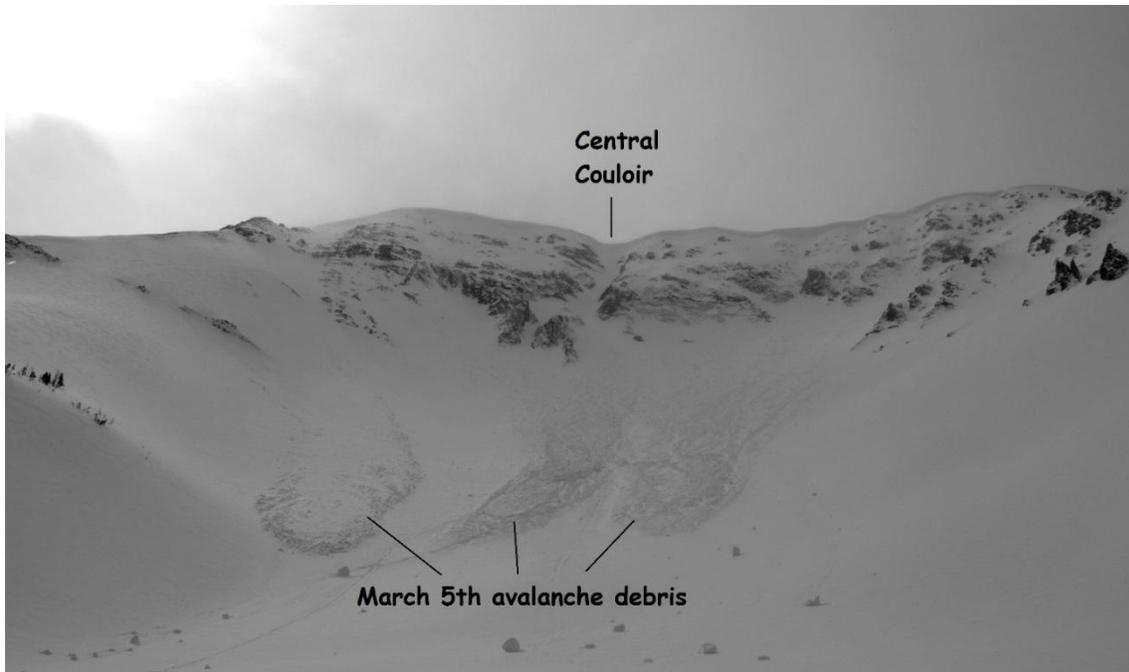


Figure 6. The three larger debris piles that stopped at nearly the same elevation resulted from natural slab avalanches that released during the storm on March 5th, three days prior to the cornice failure. The cornice release created the smaller debris pile on top of the preexisting debris in the Central Couloir path. Photo Mike Hamman, March 9, 2016.