

# Cashmere Mountain Avalanche Accident

March 5, 2011

**Summary report prepared by Chris Hunter, photos by Mike Miller; ancillary snowpack and weather information provided by NWAC**

**Date:** 3/5/2011, 1530 PST

**Location:** East slopes central WA Cascades near Mt Cashmere;  
Hooky Bowl on Trout Creek drainage

**State:** WA, USA—Chelan County, Okanogan-Wenatchee National Forest

**Fatalities:** 1 (BC skier)

**Summary:** 1 skier triggered ~3 ft. slab (85cm average, 100 cm max), subsequently caught and swept through trees, fatally injured and found on the surface by party members; death from trauma.

## Avalanche Path and Event Information:

**Slope/avalanche specifics:** W aspect, 6430 feet / 1963 meters, 38 degree slope at point of initiation, avalanche track approx. 40-45 degrees.

**Slab specifics:** SS-AS-R3D3-O (released on old facet/crust layer); Slab dimensions approx. 3ft. x 200 ft. (1 m x 65 m.) with an average vertical fall of 800 feet (244 m) and a maximum of 1200 feet (365 m).

**Path Description:** The Starting Zone was a double convex roll into sparse trees and a gully. The slab depth where it was triggered was 18cm, and depth to ground was 45cm. The slab depth increased in both directions up to 100cm, the crown often releasing at the standing burned trees.

## Group Information:

Subject	Age	Gender	Activity	Experience	Education
1. Skier	28	Male	BC Skier	10 years	None
2. Skier	28	Female	BC Skier	5 years	Level II
3. Skier	32	Male	BC Skier	10 years	Level II
4. Skier	55	Male	BC Skier	20 years	Unknown
5. Skier	45	Male	BC Skier	2-3 years	None

## Accident Summary:

On the morning of Saturday, March 5<sup>th</sup> a group of 5 skiers planned to ski relatively supported slopes below tree line on generally E aspects of relatively moderate avalanche hazard. The group reached Picnic

Point via known safe ascent routes in the mid/late morning and performed hasty pits on a nearby slope representative of intended ski descents, generally E/NE aspect.

From Picnic Point, evidence of recent avalanche activity could be seen in the adjacent Bob Bowls area. The natural avalanche cycle was believed to have occurred between Monday, February 28<sup>th</sup> and Wednesday, March 2<sup>nd</sup>. The group adhered to their plan and decided not to ski the higher elevation paths with greater exposure.

After two runs in the Prince Chutes, the group made their final ascent to the top of Hooky Bowl, where they would descend to their snowmobiles. At this time contact was made with one of many backcountry groups, whose members were acquainted with the main party. The second group was slower on the ascent and was not present when slide was initiated. Hasty hand pits were done on the ascent or near the top of the path on W aspects similar to planned descent route. Two tracks from the previous day or two were present on adjacent slopes but not on the exact slope of accident.

Four of the five members of the group decided they would ski a more conservative descent to skiers left of the path the injured decided to ski. The four skied to a safe spot on a rocky knob approx. 50-75 feet from the trigger point and approx. 25-30 feet from the top of the left flank to observe the descent of the injured party. Skier 1 skied onto the convex slope, triggering the slide at a shallow point in the slab and the overall snowpack. He was seen trying to self-arrest on some small trees but did not succeed. Skier 1 was then carried through several groups of trees and funneled down a steep gully/chute.

Skier 1 was found alive on the surface of the snow but succumbed shortly. Fatal injuries were suffered from the slide through sparse trees, much of which were old standing burned trees. One leg was dismembered and unable to be located, along with one ski. One ski was found at the approximate point of rest of the injured party with the bindings ripped from the skis. The other leg appeared to have suffered significant fractures, as well.

### ***Rescue Summary:***

Two members of the party (Skiers 2 and 3) were on site with the injured within two minutes. The next member of the party (Skier 4) was on site a minute or two later, with the remaining party member arriving shortly thereafter. Two members of the party (Skier 3 and 4) left scene immediately to report accident via cell phone. This required skiing to the snowmobiles and traveling down Icicle Valley and up Mountaineer's Creek to reach a known point of cell phone coverage. Approximate time from time of accident to 911 call was 30 minutes. Additionally, the reporting party encountered a local skier on Icicle Road which started a local community response to the accident. At this time, two groups of rescuers were beginning to mobilize, Chelan County Search and Rescue and the local backcountry skier community.

At the accident site, another group of 3, mentioned above, heard the avalanche and were on scene within a few minutes, while only one member of the party stayed at the site to assist with first aid and the subsequent rescue. Lifesaving measures were attempted but the bleeding from injuries was uncontrollable. Patient was alert for 1-3 minutes and lost pulse in approximately 15 minutes. CPR was performed for approximately two hours until rescue attempts were called off due to darkness and existing avalanche hazard.

During these early hours of the rescue, the reporting party (subject 3) and two other local skiers encountered on Icicle Road, were able to meet with medical helicopter at a landing site well below the accident site. Upon an evaluation of the terrain and the existing avalanche hazard, the helicopter was unable to land at the accident site. Chelan County SAR and local backcountry users and residents met at the landing to formulate a rescue plan. It was determined at the time to call off the rescue until the following morning due to impending darkness and existing avalanche hazard.

On the morning of Sunday, March 6th, Chelan County SAR and a local group of back country skiers and residents met to formulate a rescue plan. It was determined the more experienced group of local skiers would perform the rescue. Approximately 15 people pulled rescue equipment to the scene. The rescue group reached the site in late morning and packaged injured for transport. Extrication of the injured to the aid car took approximately 5 hours.

## ***Weather and Snowpack***

Weather and snowpack information was compiled by a combination of weather observations from the Stevens Pass ski patrol, 15 miles northeast of the accident site, field weather and snowpack observations from Jeff Ward closer to the site, and snowpit information post-accident from Mike Miller.

In mid-January there was a substantial rain event that affected the Cascades. This created a strong, thick rain crust which was referred to as the MLK crust. At the time of the rain event the average snow depth at 6,500' in the Mt. Cashmere area was 125 to 140 cms.

The weather from mid-January until mid-February could be characterized as mild temperatures, modest amounts of new snow with several notable wind events. These wind events were generally from the west or southwest.

From mid-February to the end of February temperatures were much colder. Towards the end of the month overnight lows were below zero Fahrenheit at 4,000'. These cold temperatures produced near surface faceting in the upper snowpack. There was also a significant wind event on February 22 and 23<sup>rd</sup>, once again blowing from the W and SW.

On February 28<sup>th</sup> a large storm hit the cascades, dropping over a meter of new snow by the time it ended on March 4<sup>th</sup>. By March 1<sup>st</sup> there was 70 cms of new snow at 4000' near Mt. Cashmere. Test results were showing easy, quality 1 results on the storm snow old snow interface. There was a large natural cycle during this storm in the Mt. Cashmere area. This cycle was noted throughout the state with large natural and human triggered avalanches reported during the Feb. 28 to March 4<sup>th</sup> storm. The majority of this precipitation happened towards the beginning of the storm. Towards the end of the storm natural activity tapered off and skier triggered avalanches were becoming rarer.

On March 5<sup>th</sup> the snow stopped falling, winds were light and the skies were overcast. Temperatures were similar to the previous days, with a low of 10 and a high of 27. The avalanche was triggered in the afternoon on a west aspect. The avalanche ran on the mid-February near surface facets sitting on top of the MLK crust. The most notable aspect of the trigger point was how shallow the snowpack was. The average height of snow in the Mt. Cashmere area at this elevation was over 250 cms. The height of snow at the trigger point was only 45 cms. This lack of snow was most likely due to the orientation to the prevailing winds and possibly frequent frequent avalanching throughout the season. The depth of the slab at the

trigger point was only 18 cms but the crown depth was 85 to 100 cms deep within 5 to 10 meters of the trigger point.

## ***Accident Photos:***

Photographer's Name: Mike Miller

Date Photos Taken: March 7, 2011

Digital Photo Report Completed by: Chris Hunter on April 9, 2011



Photo of trigger point with arrow marking track of injured skier.



Photo looking back up at crown with arrow marking track of injured skier.





Photo looking at skier's left flank with upper arrow marking safe spot where the rest of the party were when the slide occurred. Lower arrow marks the tracks of the party entering the path after the avalanche occurred.



Photo looking down at right flank.



Looking down slide path.



Looking back up at skier's left flank.



Looking back up at skier's left flank.



Overview of path from the runout.





Overview of slide path with arrow marking approximate point of entry and trigger point.

### ***Ancillary Snowpack and Weather Information:***

In reviewing recent avalanche accidents, it is often helpful to read the detailed avalanche forecasts issued by the Northwest Weather and Avalanche Center ([www.nwac.us](http://www.nwac.us)) in order to understand the layering which contributed to the event. The March 4<sup>th</sup> NWAC forecast issued for the time of the trip indicated that east slope locations were “*more likely to have persistent weak layers than near and west of the crest.*” ...and it rated the danger as considerable on west exposures at the elevation of the incident. It also indicated that: “*Buried hoar frost layers from mid to late February are more likely to be persisting in this area. A back country skier near Leavenworth last Tuesday reported snow pack collapsing due to these layers. Snow pits to check for this layer should be especially worthwhile east of the crest.*”

As is evident from the second forecast shown below, the forecast issued on the day of the incident continued to rate the danger as “considerable” (human triggered slides likely) and further noted that: “*dangerous avalanche conditions still remain at higher elevations, especially previously wind loaded slopes making conservative decision making essential.*”

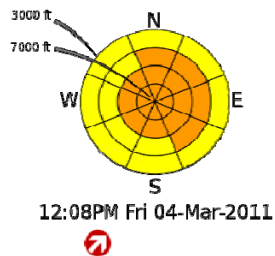
While NWAC forecasts are indeed regional in nature and by no means path specific, this was certainly a relatively dangerous snowpack that required conservative decision making and cautious routefinding.



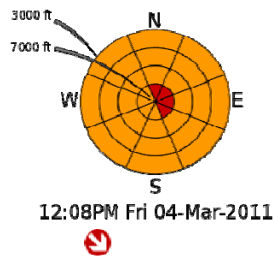
## **NWAC Avalanche Forecast issued on Friday, March 4, 2011**

East slopes WA Cascades - between Stevens and Snoqualmie Pass

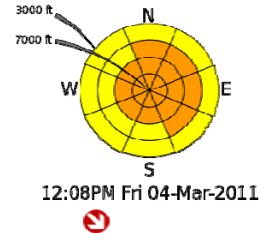
Danger Rose for Friday



Danger Rose for Saturday



Danger Rose for Sunday



Click [here](#) for complete definitions of the avalanche danger scale.

### **Forecast**

**Friday:** Considerable avalanche danger above 5000 feet and moderate below. Danger significantly increasing by Friday night.

**Saturday:** High avalanche danger above 6000 feet and considerable below gradually decreasing. Danger further gradually decreasing Saturday night.

**Sunday:** Considerable avalanche danger above 5000 feet and moderate below further gradually decreasing. Danger further gradually decreasing Sunday night.

### **Snowpack Analysis**

The latest weather and avalanche cycle began last weekend. Strong southwest winds and warmer denser snowfall were seen Sunday-Monday. Strong southeast to southwest winds and warmer denser snowfall were seen again on Wednesday. Total snowfall since last weekend is in the 2-3 foot range at sites east of the Cascade crest.

The winds and the periods of warmer denser snowfall helped build wind and soft slab layers and cause many natural and triggered avalanches during this period. Periods of lower density snowfall and graupel showers between the storms provided temporary weak layers.

Generally decreasing winds, decreasing snow and cooler temperatures were seen Thursday. This should have begun to allow recent layers to partly stabilize.

Note that areas east of the crest are more likely to have persistent weak layers than near and west of the crest. Buried hoar frost layers from mid to late February are more likely to be persisting in this area. A back country skier near Leavenworth last Tuesday reported snow pack collapsing

due to these layers. Snow pits to check for this layer should be especially worthwhile east of the crest.

## **Detailed Forecasts**

### **Friday**

A front should approach the Northwest on Friday. This should cause increasing southwest winds, increasing clouds, and warmer temperatures. Some light snow should be seen by the afternoon. But this should not cause great change in snow conditions. Previous soft or wind slab layers are most likely to linger on lee slopes. This should be north to southeast slopes at higher elevations.

The front should cross the Cascades on Friday night. This should cause further increasing southwest winds and heavier snowfall with warmer temperatures. Several inches of snow should be common by Saturday morning with deeper wind transported accumulations on lee slopes. This should build significant new soft or wind slab layers on lee slopes by Saturday morning. This should also be mainly north to southeast slopes at higher elevations.

### **Saturday**

Southwest winds and snow showers should decrease on Saturday with cooler temperatures. But wind transport may further slightly build new soft or wind slab layers for awhile on Saturday morning on lee slopes. This should continue to be mainly north to southeast slopes at higher elevations but is possible on other aspects. Travel in avalanche terrain at higher elevations is not recommended Saturday morning.

Light snow showers mainly near and west of the crest or at higher elevations should mostly end by Saturday afternoon. New and recent layers should partly stabilize by Saturday afternoon. This should cause a lower avalanche danger by Saturday afternoon and night.

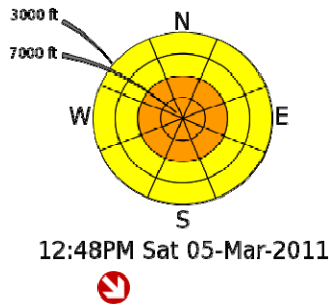
### **Sunday**

A cool day with few if any snow shower and fairly light winds is indicated for Sunday. This should allow new and recent soft or wind slab layers to further partly stabilize. Careful snow pack evaluation and cautious route finding should still be essential on Sunday. Remember that snow pits to check for persistent weak layers such as the buried hoar frost from mid to late February should be especially worth while east of the crest. Good snow conditions seem likely on lower or sheltered slopes.

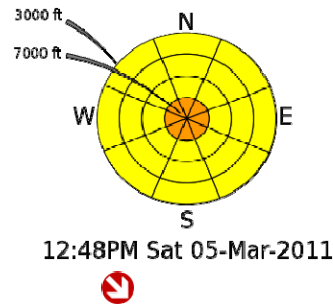
## ***Forecast issued on Saturday morning, March 5, 2011***

East slopes WA Cascades - between Stevens and Snoqualmie Pass

Danger Rose for Saturday



Danger Rose for Sunday



Click [here](#) for complete definitions of the avalanche danger scale.

## **Forecast**

**Saturday:** Considerable avalanche danger above 5000 feet and moderate below gradually decreasing. Danger further gradually decreasing Saturday night.

**Sunday:** Considerable avalanche danger above 6000 feet and moderate below further gradually decreasing. Danger further gradually decreasing Sunday night.

## **Snowpack Analysis**

Yet another front passed the area Friday night depositing between 4 to 8 inches along the east slopes with greater snowfall received near the crest. Temperatures were moderate and gradually rising during the storm producing some unstable surface layers.

Over the past week the east slope areas have received 2 to 4 feet or more of snow!

Multiple storm related avalanche cycles have occurred throughout this past week with some relatively large avalanches reported, including an accident that happened early yesterday afternoon on the northwest slopes of Mt Baker. A snowboarder triggered a large slide with an estimated crown height of 5 to 6 feet on an open, north exposure slope near 5500 feet. He was carried through trees, suffered multiple serious injuries and was buried about 6 feet. A group of well trained partners were able to locate and get to his airway within 7 minutes! The victim has successfully transported to the awaiting ambulance, with this avalanche incident having a fortunate outcome.

The earlier storm layers have been gradually settling and consolidating over the past few days but triggered slides are still likely on steep open slopes at higher elevations.

Snow pack condition reports early today from the Mission Ridge patrol indicate that earlier storm layers have been gradually settling with the only controlled slides Saturday morning on isolated wind loaded slopes, involving the most recent snow. These are indications of improving avalanche conditions but these reports from within a ski area likely are not indicative of back country conditions.

Continue to assess local snow pack conditions in your area of travel, looking especially for any signs of buried surface hoar layers that were active in these recent storm cycles.

## **Detailed Forecasts**

### **Saturday and Saturday night**

Winds and snow showers should diminish through the day Saturday with some sun breaks at times and cooling temperatures. This should help recent weak layers to slowly gain strength through the settlement process. However, dangerous avalanche conditions still remain at higher elevations, especially previously wind loaded slopes making conservative decision making essential.

A further slowly decreasing danger is expected overnight with partly cloudy, cool weather with light winds.

### **Sunday and Sunday night**

A cool day with partly cloudy conditions, sun breaks and light winds. This should continue to allow for slow stabilization of unstable wind layers in the recent storm snow. Careful snow pack evaluation and cautious route finding in higher terrain should still be essential on Sunday. Good snow conditions are likely on lower elevation sheltered slopes.