Crescent Lake – Accident Report
Kenai Mountains, Alaska

Location: Crescent Lake, North Aspect Madson Mountain
Lat/Lon: 60.44720N, -149.48770E

Date: March 9, 2019, Time: 15:25
Report by: Chugach National Forest Avalanche Center Staff
Contact: staff@chugachavalanche.org, website: cnfaic.org

Synopsis: At 3:25 pm on March 9th, 2019 two skiers and a snowboarder on a multi-day cabin trip were involved in an avalanche on a treed slope just east of the Crescent Saddle Cabin. Two skiers were caught, Skier 1 was pushed against a tree immediately but not buried, Skier 2 was carried downslope and buried ~6 ft. deep. Skier 2 was located and had an airway established within 10 minutes but was found unresponsive. CPR was performed for over 30 minutes unsuccessfully. The snowboarder traveled toward the trailhead to call for help via cell phone while Skier 1 stayed with the victim. U.S. Forest Service Law Enforcement officers, Alaska State Troopers and Moose Pass Emergency Services were able to respond to the accident site with snowmachines later that evening and transport the deceased to the Carter Lake trailhead, MP 34 of the Seward Highway.

Avalanche Details: CNFAIC staff visited the site on Tuesday March 12th with the two survivors during a break in the weather. The crown was completely blown in by the time of the site visit. Due to continued avalanche hazard, traveling to the top of the slope was determined to be unsafe. Snowpack and likely weak layer information was gathered from a snowpit dug adjacent to the avalanche path at a lower elevation (~1,800’). Many dimensions are estimated from the description of the group involved and Google Earth imagery.

*Photos of avalanche and snowpack profile are at the end of this report*

Avalanche Code: SS-ASu-R3-D2.5-O
Trigger – ASu
Aspect – NW
Angle – 35 degrees
Elevation - 2500’
Crown Depth – 2’- 3’ estimate by the party involved
Width – 700’
Vertical Fall – 850’
Length of Path Run – 1650’
*Weak Layer – near surface facets

*Likely weak layer though CNFAIC staff were unable to conduct crown profile given that crown was blown in before site visit.*

Accident Summary: On Friday March 8th, 2019 two skiers and a snowboarder on a two-night ski/ cabin trip skinned 7 miles up from the Carter Lake trailhead to the Crescent Saddle Cabin. They spent Friday night in the cabin and around 1:00 pm on Saturday March 9th headed out for an afternoon ski tour. Due to stormy weather and known avalanche danger, the group chose to only travel in low angle terrain. They decided to take their
plan A (skiing bigger lines) off the table. They ascended a Northwest facing aspect off the shoulder of Madson Mountain above Crescent Lake, east of the Crescent Saddle Cabin. The group of three climbed to around 2,100' (close to treeline) and skied a lap on a slope between 25 and 35 degrees. Observing no red flags on the first lap, they ascended again for a second lap and transitioned to ski mode together at a small clump of trees just slightly higher than their first transition point. On the second lap, Skier 1 skied down 50’ or so to another small clump of trees. Skier 2 then skied to spot skier’s right of Skier 1, stopping on the slope also near trees. All three were spaced out across the slope when the Snowboarder saw a crack propagate next to him as the whole slope released to his right. The Snowboarder described the open slope cracking higher into the peppered trees above his partners. The Snowboarder yelled ‘slide’ and watched Skier 2 (who was stationary at time of avalanche) get washed down the slope. Skier 1 was immediately pushed into a tree and held on. His skis were pulled off and subsequently broken as 3 waves of debris washed over his head. Skier 1 was convinced he was in the avalanche, moving downslope but as the debris passed, Skier 1 was still holding onto the same tree, unburied. The Snowboarder rode to Skier 1 to ensure he was okay and they both started yelling for Skier 2 with no response. The Snowboarder immediately descended the bed surface and started a beacon search but did not yet have a signal. He spotted a ski pole ~500’ below and moved directly toward it. From the ski pole, the Snowboarder quickly found a signal from Skier 2’s beacon and was able to get a reading of 2.1 meters at the lowest point. At this point the Snowboarder began digging and within 10 minutes of the avalanche Skier 2’s face/airway was clear though he was unresponsive. Skier 1 ran/rolled down the slope due to skis being destroyed and assisted digging Skier 2 out completely. Skier 2 was totally extracted in about 20 minutes. They then performed CPR for around 30 minutes with no life signs. The Snowboarder attempted to make a cell phone call but had no cell service at the accident site and decided to skin back toward the trailhead to call for help. It took 2.5 hours in the blizzard to find a cellular signal closer to the trailhead and call 911. Skier 1 moved Skier 2’s body down to the edge of the lake and marked it with a probe before walking out on foot to the trailhead. U.S. Forest Service Law Enforcement officers, Moose Pass EMS and Alaska State Troopers rode snowmachines in to the site to retrieve Skier 2’s body that night.

All three of the group members had avalanche rescue gear (beacon, shovel and probe), two had formal avalanche training (one with Level 1 and one with Level 2), and all were regular ski partners with multiple days in the backcountry together. Skier 2 and the Snowboarder had practiced avalanche rescue skills together a month before. They had discussed bringing avalanche airbags but decided that they did not have enough space to carry all the supplies and equipment in airbag packs for a multi-day cabin trip. The group had read the Friday Avalanche Forecast for Turnagain Pass (CNFAIC.org) and discussed the avalanche hazard and incoming weather with the plan to avoid steep terrain due to the storm/hazard. They did not observe any signs of instability while skinning up to the cabin or on their first ski lap. While breaking trail on their first lap they described localized cracking on their skin track with small 3-4 inch slabs breaking at the kick turns. They did note the winds increased significantly between lap 1 and lap 2.

**Snowpack and Weather History:** *This is a data sparse area.*

The avalanche occurred following two weeks of high pressure. The winter to date had lower than normal precipitation and periods of cold temperatures. A storm began to impact the region in three waves, the first starting overnight on March 7th, though Crescent Lake saw minimal snowfall. The group skinning in on the evening of the 8th noted a trace of new snow over the snowmachine tracks on the road and lake. They awoke on the morning of Saturday March 9th to 2-4” inches of new snow near the cabin, just enough to cover their tracks from the night before. During the day no additional precipitation fell but wind gusts were transporting snow as they skied. The wind continued to increase through the day. The group estimated 6-8” of new storm snow (from overnight) in the trees as they were skiing. The Cooper Lake Snotel (south of the accident site) at 1200’ recorded 4” of snow at .4 SWE on March 8th and 5” of snow at .7 SWE on March 10th. The group involved and the recovery team noted blizzard conditions due to blowing snow in the evening of March 9th.
Skier 1 noted:

*Winds were building throughout the day but I think we really noticed how strong the gusts were getting as we neared the top of our second lap. At the top of lap one there had been one large gust but then it seemed to die back down. Could have just been less windy as we descended. Gusts were strong; had to brace against it while standing. Visibility was fairly constant throughout the day and could see to both ends of the lake most of the day except for occasional clouds that would pass through.*

The closest ridgetop weather station is the Sterling Wye MP 37 at 3700’. Note the winds building on March 9th. The speeds here do not necessarily reflect the actual intensity with this event. The topography of Crescent Lake is prone to channeling winds through the valley and the pass toward Kenai Lake. The Sunburst weather station in Turnagain Pass was recording wind speeds in the 40s and gusts into the 80s around the time of the accident.

Adjacent to the avalanche where the CNFAIC staff dug at 1,800’, the snowpack was just over a meter deep. Surface hoar, 6mm in size, was found 20 cm below the surface (this included snow from March 8th-10th). This was at the new/old snow interface from the beginning of the storm on March 8th. Further below the surface, 35 cm down, we found what we believe to be the Valentine’s Day facets (a layer that was being tracked in the Summit Lake and Turnagain zones) and the layer that likely failed in the avalanche. The crown was completely covered up by wind blown snow, preventing us to complete a crown profile. Therefore, we cannot know definitively what layer the avalanche released on. However, given depth of the debris, small amount of new
snow prior, and the forces exerted on vegetation in the path, we believe the avalanche stepped into this lower layer of facets about 35cm below the surface. No powder cloud was observed during the avalanche but the visibility was poor due to blowing snow. During the site visit we observed a number of 2-3” diameter hemlocks in the avalanche path that had tops (8-10’ above surface of debris) broken off and blown to the flanks of the avalanche. It’s suspect this avalanche produced a powerful powder cloud. The Valentine’s day facet layer was also the only layer that showed any signs of sensitivity in our snowpit, failing in Compression Tests and Extended Column Tests (CT17,24 and ECTN17 all 35cm down on Valentine’s Day facets).

Note: CNFAIC staff experienced two large whumpfs at 1,800’ as we stepped off of the debris onto undisturbed snow adjacent to the avalanche path.

**Avalanche Danger**

This area does not have an avalanche advisory. Geographically it is closest to Summit Lake, an area that the CNFAIC gathers snowpack observations and often includes in the Bottom Line portion of the Turnagain Area Advisory. The CNFAIC staff visiting the accident site found the snowpack structure to be very similar to what has been observed in the Summit Lake area this season. All three members of the group read the Friday March 8th CNFAIC Turnagain Area Advisory prior to going into the cabin. There is no cell service near the cabin so they were not able to get the forecast for Saturday March 9th (day of accident) but were all aware that the weather was generally deteriorating with an incoming storm over the weekend.

*See attached diagram of location in relation to the Summit Lake region and the Turnagain Advisory area.

**Friday, March 8th 2019:**

The avalanche danger has risen to **CONSIDERABLE** for Turnagain Pass, Girdwood, Placer Valley and the Seward zone due to strong winds and a mix of rain and snow. Above 1000’ triggering storm slabs up to 1’ thick is likely on slopes steeper than 35 degrees today. Below 1000’ loose-wet avalanches are possible. Careful snowpack evaluation, conservative decision-making, and cautious route-finding are essential.

**PORTAGE VALLEY:** Natural avalanches are possible today in steep channeled terrain and could entrain wet snow in the lower elevations. Avoid places with significant avalanche terrain above like Byron Glacier Trail. In addition Portage Lake could be pretty dangerous this weekend due to thin ice, above freezing temperatures and rain.

**JOHNSON PASS/SUMMIT LAKE ZONE:** There is a shallow snowpack with a generally poor structure. Strong winds and new snow will be adding stress to the snowpack. In addition to storm slabs more uncertainty exists for triggering a deeper avalanche in an older layer of the snowpack.

From the Storm Slab Primary Concern:

**South of Turnagain in the Summit Lake and Silvertip zones:** Similar surface conditions to Turnagain Pass exist and any new snow that falls today is not expected to bond well. In addition a variety of old weak layers (facets and buried surface hoar) sit in the mid and base of the snowpack and wind loading and new snow will be adding more stress to these layers. Although less snow is expected to fall in this zone today keep in mind uncertainty exists for triggering a deeper more dangerous avalanche.


**Saturday, March 9th 2019:**

The avalanche danger is **CONSIDERABLE** this morning due to 1-2 feet of new snow in the past 24-hours. The danger is expected to rise to **HIGH** this evening as another round of snow and wind moves in. Human triggered slab avalanches, up to 2+ feet thick, will be likely. Natural avalanches will be possible. The new snow is falling on a very weak base and expected to slide easily on steep slopes. We are entering spring break with a dangerous avalanche situation and restraint will be required as travel in avalanche terrain is not recommended.

**PORTAGE VALLEY:** Natural avalanches are possible today that could send debris to valley floors. Areas with steep slopes and avalanche terrain above you, such as the Byron Glacier Trail, should be avoided.
**SUMMIT LAKE:** Despite little new snow, this area has a very shallow snowpack with multiple weak layers. Strong winds and the potential for a few inches of new snow today could overload buried weak layers, producing an unexpected slab avalanche. Caution is advised if heading to this area.

**LOST LAKE:** Dangerous avalanche conditions are expected in the Lost Lake and Seward regions as well due to 1-2 feet of new snow and strong winds.


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**Forecaster Note:** The individuals involved wanted very much to share their story and thoughtfully reflect on how they ended up being involved in a fatal avalanche accident. They hope others will learn from this tragedy by reviewing their own human factors in addition to recognizing how rapidly changing weather can lead to a change in avalanche conditions over a very short period of time. The overarching theme they reflected on was the ‘commitment’ of going on a cabin trip, specifically a trip in which skiing was an objective and how that led them onto this slope.

Going back months, the group was ‘committed’ to this weekend as they had the Crescent Saddle Cabin reserved. Their decision was made to go on the trip regardless of weather or avalanche conditions and if it was too dangerous to ski, it’d still be a fun weekend of camaraderie and an excuse to get out of town. Plan A was to ski some bigger lines above Crescent Lake but they quickly realized that wasn’t going to happen given snowpack and weather conditions. Still committed to the idea of skiing this weekend and salvaging some turns, their attention focused to mellower treed terrain just East of the Crescent Saddle Cabin.
In the words of Skier 1:

As I've been thinking about this over the past few days, in addition to what I was telling you about 'commitment' and being there in the first place, I hope you can convey the importance of paying attention to the wind and giving it the utmost respect. In hindsight it seems like a long shot to have thought we could accurately interpret what the wind was doing to the snow. I know we were seeing subtle red flags but the speed in which the situation turned and ended was unfathomably quick. In general we were conservative partners and felt comfortable on Saturday. I would just urge others to realize how difficult it is to understand the power and speed with which the wind changes conditions in the mountains. By the time we realized, we had also stepped a little closer to steep terrain (which was difficult to see in the flat light) and then it was too late.

Images

Crescent Saddle avalanche details
- 9- March 2019
- One skier caught, carried and killed
- Type: Soft slab
- Avalanche problem: Persistent slab
- Crown thickness: 2-3’ (estimate)
- Width: ~700’
- Vertical run: ~850’
- Trigger: Skier
- Weak layer: Valentine’s day facets (likely)
- Aspect: 326* (Northwest)
- Slope angle: 35*
- Start zone elevation: ~2500’
- Path character: Channeled
- Debris: 3-7’ deep
- Avalanche code: SS-AS-R2D2.5-O
Snowboarder photo taken as fracture propagated, looking downslope.

Transition point of group. Location of Snowboarder when avalanche released.

Approximate location of Skier 2 as avalanche released.

Skier 1 held onto a tree as debris flowed over him.

Looking up the main debris flow. Horizon line is the SW ridge of Madson Mountain.

Skier 2 buried ~ 6 feet deep.
Several 2-3" Hemlock tree tops were found broken and blasted 30-50’ to the side of the main debris. Indicative of a fast moving, dry snow avalanche/powder blast.

Crescent Saddle avalanche fatality
- Snowpit at 1,800’ Lookers right of main debris flow
- 325° (northwest aspect)
- 20° slope
- Height of snow: 110cm
- Test scores on V-day facets:
  - CT17, 24
  - ECTN17
- Observers: A. Johnston Bloom, G. Predeger

Storm snow from March 10th (post-avalanche)

Buried surface hoar (4-6mm)

Valentine’s Day facets (1-3mm)
Down 35cm Likely weak layer

MLK day buried surface hoar/facets over melt-freeze crust

Moist facets at the ground