

Slate Mountain Avalanche Incident

March 15, 2023

Report by Lee Lazzara

Incident Summary

On Wednesday, March 15, two backcountry tourers (1 skier, 1 snowboarder) departed from Heather Meadows near the Mt Baker Ski Area planning to descend runs on both Herman and Slate mountains. They climbed the south side of Mt Herman to 6000 feet and then descended an east aspect. The snowboarder triggered a shallow D1.5 slab avalanche lower on the run atop a short, steep rollover just above the traverse to Slate Mt.

The pair then climbed the east side of Slate Mt to the summit without incident. At around 1300 hrs, they began the descent down a series of connected chute and ramp features on the southeast face. The skier descended first, triggering a size D2.5 slab avalanche at the very top of the run. He was caught and quickly carried out of sight. The avalanche pushed him through very steep, rugged terrain and over a 200-250 ft terraced cliff including rocks, trees and snow. He came to rest on a low-angle slope below the face.

The snowboarder called for the skier on the radio, and then searched the path visually and with his avalanche transceiver. He found his partner on the snow surface, verbally responsive but not alert to person, place, time, or events. The skier sustained significant traumatic injuries including a deep head wound with an associated concussion, an open femur fracture, and a pelvis fracture.

The snowboarder used his cell phone to initiate rescue efforts within 10-12 minutes of the avalanche. He assessed and stabilized the skier as best as possible given the location, available resources, and extent of injuries. A rescue helicopter from Naval Air Station Whidbey Island arrived on the scene at about 1530 hrs; both the skier and snowboarder were evacuated by around 1600 hrs. Members of the Mt. Baker Ski Patrol, Bellingham Mountain Rescue Council, and Whatcom County Sheriff's Department were on stand-by if weather conditions prevented evacuation by helicopter.

Occurrence Time and Date:	Approx: 1300 on March 15, 2023
Time First Reported to SAR:	1312
Rescue Time:	1602
Lat/Lon:	
Start Zone:	48.87120, -121.70364
Subject Location:	48.86976, -121.70160
Location:	Slate Mountain, Whatcom County, Mt Baker-Snoqualmie NF, WA

Number in Party:	2
Number Caught:	1
Number Buried:	0
Number Injured:	1

Avalanche Type: HS-ASu-R4-D2.5-U
Trigger: AS
Size: R4/D2.5
Start Zone Aspect: SSE
Start Zone Angle: Est: 40 degrees
Start Zone Elevation: 6100 feet

Height of Crown Face: Est: 1.5-2.0 feet
Width of Fracture: Approx: 50 feet at start zone, 150-200 feet mid-slope (triggered by snow from above)
Vertical Fall: Approx: 800 feet to toe of the debris

Slab: Unconfirmed (representative profile in attached photo)
Weak Layer: Unconfirmed (representative profile in attached photo)
Bed Surface: Melt-freeze crust (est. buried 3/10/23)

Burial involved a terrain trap: No burial
Number of people that crossed start zone before avalanche: 0
Avalanche occurred during: Descent
Location of group in relation to start zone during avalanche: Above

Avalanche Safety Gear Carried: Each backcountry tourer carried an avalanche transceiver, shovel, probe, and radio

Avalanche Training and Experience at Activity: Both had taken a Level 1 or similar level avalanche course

Signs of Instability Noted by Group: A small avalanche was triggered earlier in the day. No other signs of instability were noted.

Extent of Injuries: The skier, who was wearing a helmet, suffered a head injury and concussion, open femur fracture, pelvis fracture, and other lower limb fractures.

NWAC Forecast Zone: West North

Avalanche Danger Rating:

ATL: Moderate

NTL: Moderate

BTL: Moderate

Terrain

The southeast face of Slate Mt. consists of rocky, sparsely treed terrain broken by numerous cliffs. There are few continuous lines from the summit to the narrow basin below the face. All lines of descent require extensive travel on 35-45 degree terrain, in addition to navigation around rock buttresses and large cliffs.

The intended line is locally known as the "Dog Leg" or "Z Couloir." After the initial 200 feet down the upper chute, the route requires a descending traverse on a steep ramp to connect with the lower slopes. Directly

below the initial chute and the ramp, the face abruptly transitions to a cliff estimated at 200 to 250 feet in height. (Photo 1)

Weather

The month prior to the avalanche was marked by extended periods of snowfall at cold temperatures alternating with high pressure. March 6-9th brought sun, near-freezing midday temperatures, and light winds. This combination allowed for surface warming on southerly aspects. Rollerballs and other signs of warming were observed during this time period.

Weak storms on March 10th and 11th brought 0.99 inches of precipitation falling as approximately 14 inches of new snow at Heather Meadows (4210 feet). This period was followed by a stronger, warmer storm on March 12-14th that produced 3.80 inches of precipitation/27 inches of new snow.

Weather conditions on March 14th consisted of gradually clearing skies and mild temperatures. March 15th brought a few inches of new snow in the early morning hours. Weather conditions transitioned to partly cloudy skies and mild temperatures by mid-morning. (Figure 1)

Snowpack

A snow profile was not performed at the avalanche crown due to safety concerns. The snowpack observations below were gathered on March 15th from a representative site with a similar aspect (SE), elevation (5750 feet vs. 6100 feet), and position in the terrain (just below the ridgeline).

A sun crust formed during high-pressure March 6-9th. It was buried by 2-3 feet of new snow that fell between March 10-14th. The new snow was observed as a slab increasing in hardness from one-finger to pencil. A slightly weaker, one-finger layer was found between the pencil hard slab and the crust. Beneath the crust was a thick layer of rounded grains.

The avalanche bed surface is believed to be the crust buried on March 10th. An extended column test at the representative site resulted in propagation within the one-finger layer just above the crust (ECTP-22). (Photo 4)

Supporting Material

Photo 1: Overview of the southeast face of Slate Mountain including the planned descent, where the avalanche was initially triggered and where the skier was carried over the cliff.

Photo 2: View looking up the path from lower angle terrain below. Gear items were found inline with the center portion of the cliff.

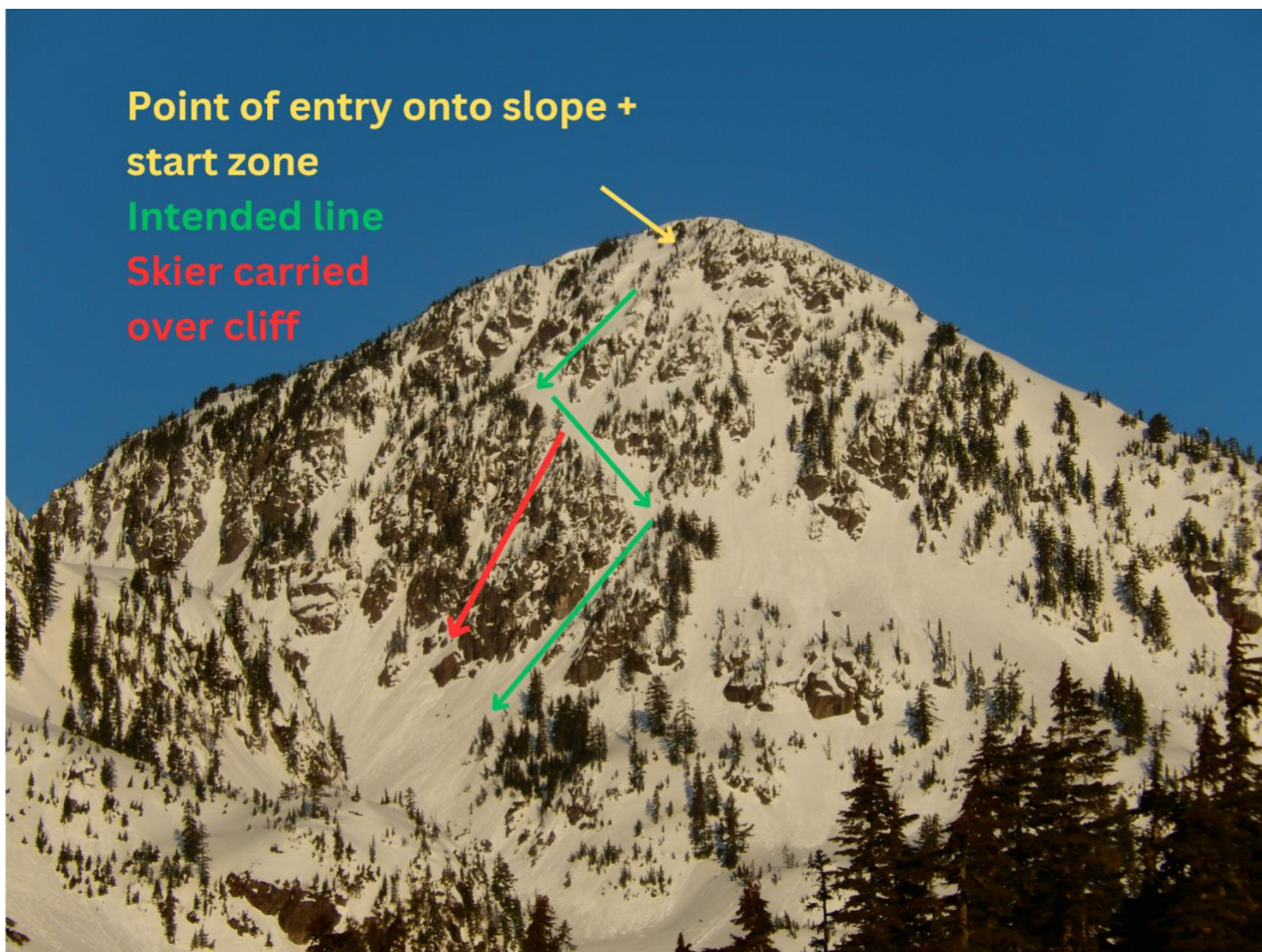
Photo 3: Looking up the path from the skier's final position in the avalanche debris.

Photo 4: Snow profile at a representative site about 1/3rd of a mile north of the avalanche site. This site was considered the best option in lieu of visiting the avalanche crown.

Figure 1: Graph highlighting the key weather elements suspected as contributing to bed surface, weak layer and slab formation.

Map 1: Topo map showing Slate Mountain and the avalanche site in relation to Heather Meadows.

Public Observation from involved party



**Point of entry onto slope +
start zone**

Intended line

**Skier carried
over cliff**

Photo 1

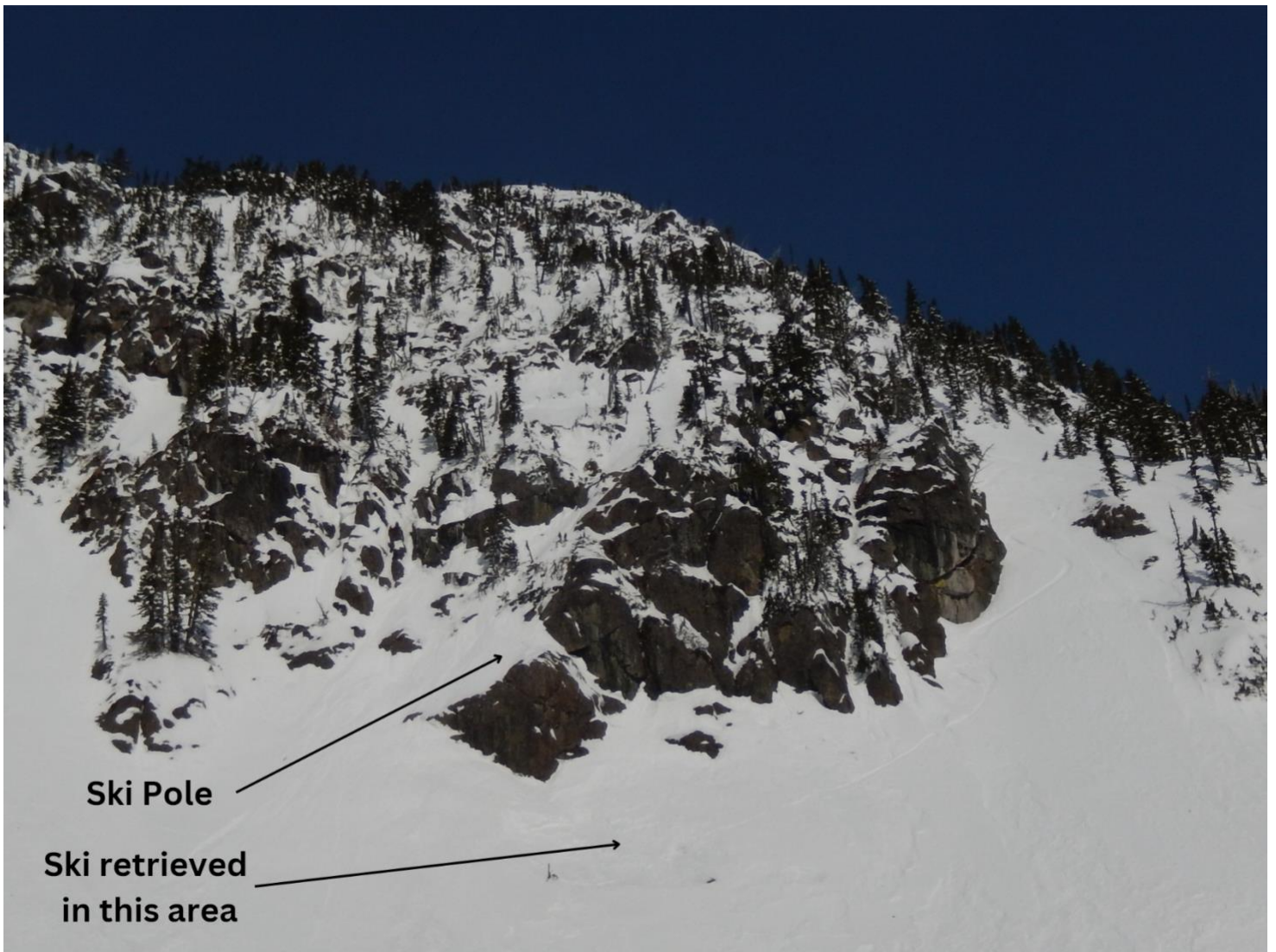


Photo 2



Photo 3

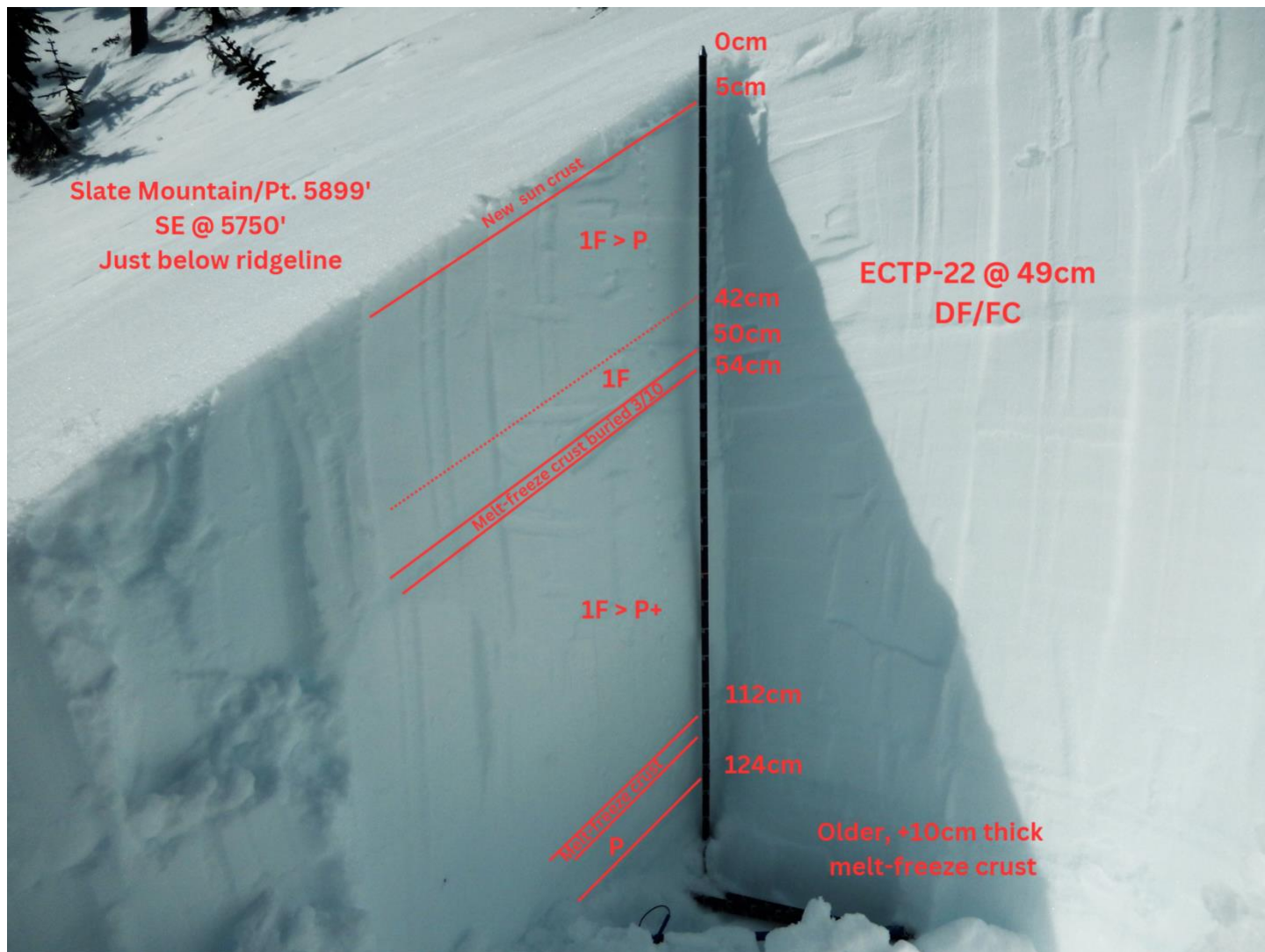
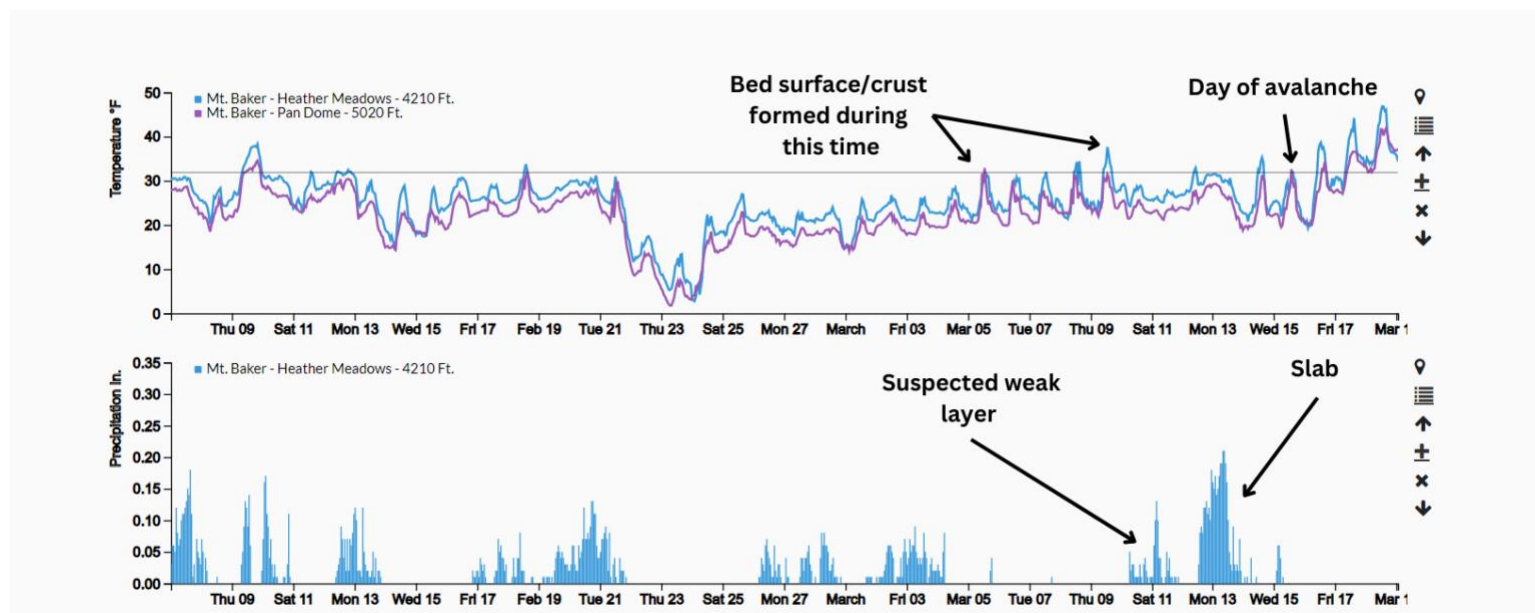
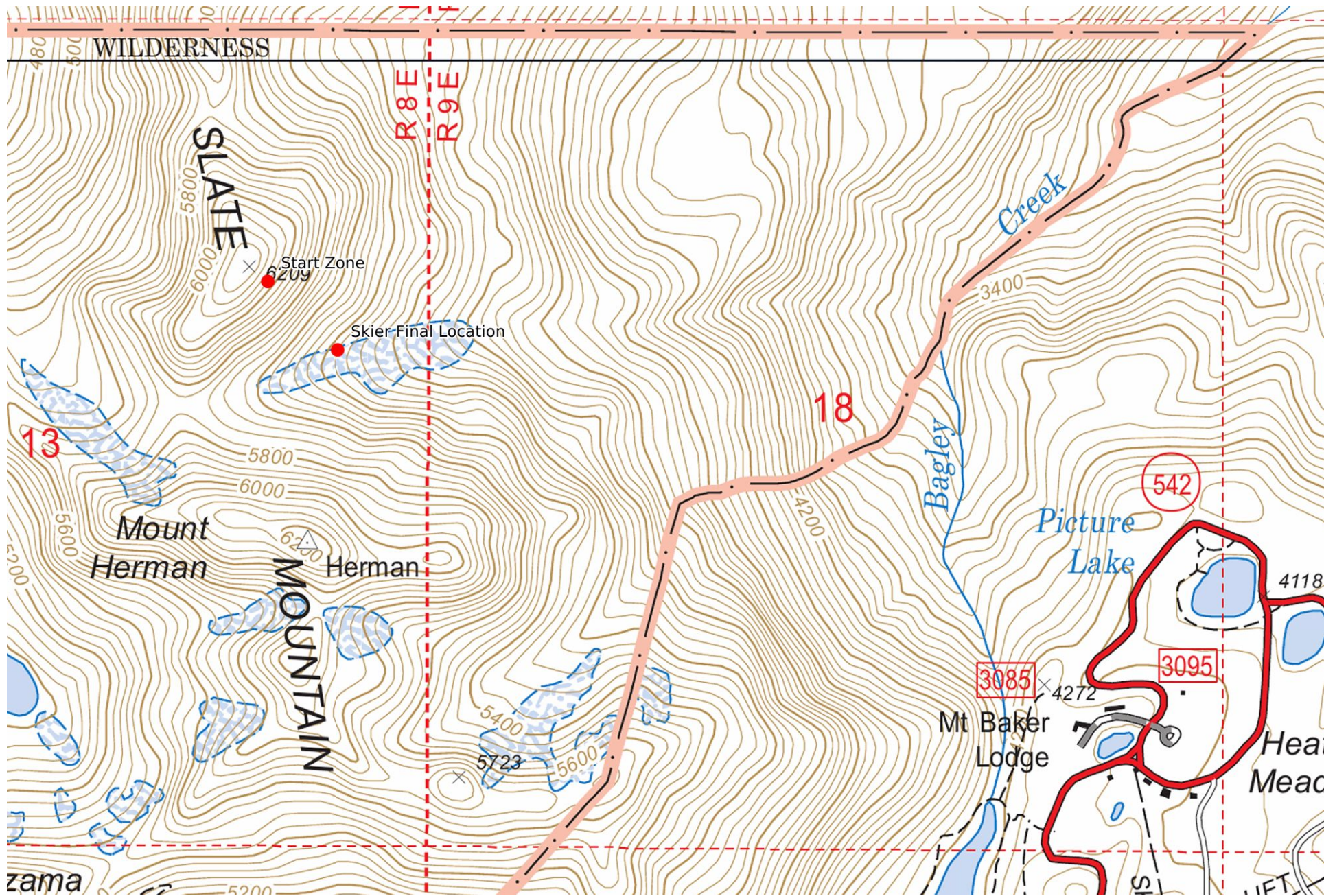
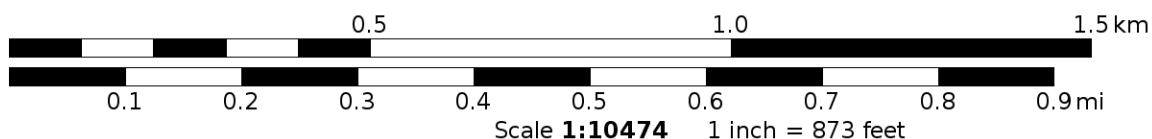


Photo 4 above, Figure 1 below





Mercator Projection
WGS84
UTM Zone 10U



Northwest
Avalanche
Center



(<https://nwac.us/>)

Observation: Public

All Observations (/observations/#/obs)

Observation Details

Name:

Anonymus

Observation Date:

March 15, 2023

Submitted:

March 15, 2023

Zone or Region:

West North

Activity:

Skiing/Snowboarding

Location:

South aspect Slate Mountain

Triggered Avalanches

Did you trigger any avalanches? Yes

Was it intentional? No

Avalanche Type:

Soft Slab

Size:

Size 3: Could bury and destroy a car, damage a truck, destroy a wood frame house, or break a few trees

Elevation:

6,000 ft

Aspect:

S

Comments:

Unmeasured, estimated 24-36" depth. Estimates 40- 200ft width

Signs of Unstable Snow

Did you see shooting cracks? Yes, Widespread

Did you experience collapsing or whumpfing? Yes, Widespread

Observations

On initial ski turn, fracture started and face spider webbing. Skier lost control and was swept to bottom of run. Rescue prioritized avalanche notes

Media

BACKCOUNTRY AVALANCHE FORECAST

WEST SLOPES NORTH



ISSUED

Tuesday, March 14, 2023 - 6:30PM

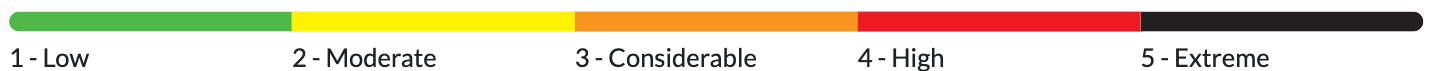
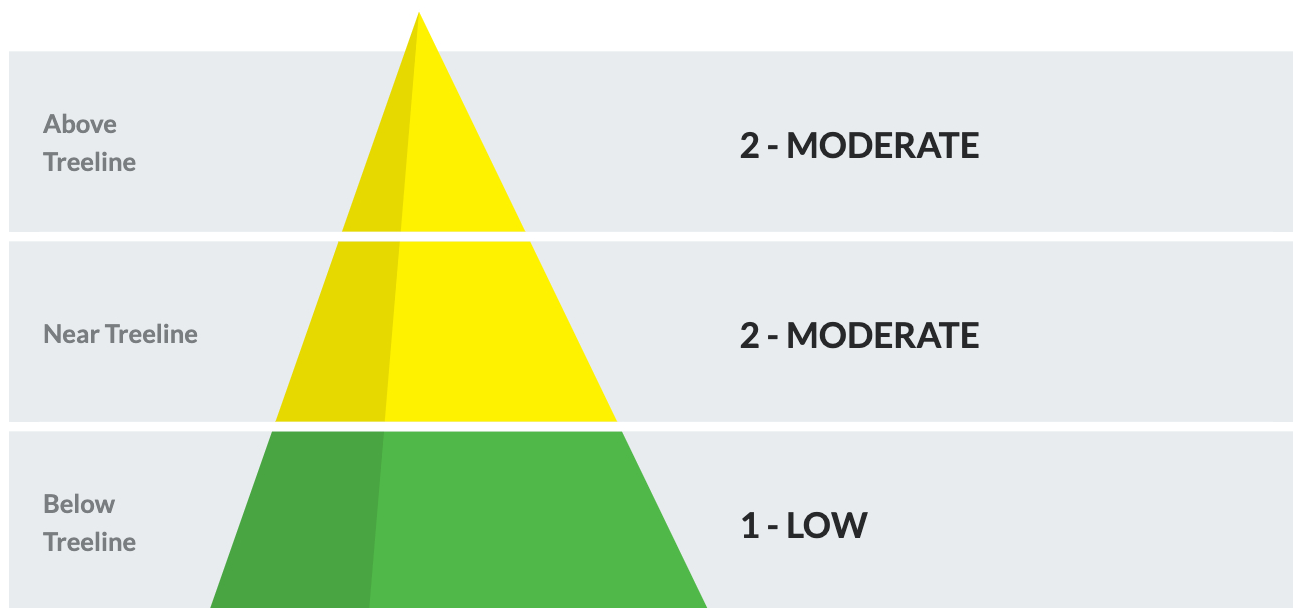
AUTHOR

Lee Lazzara

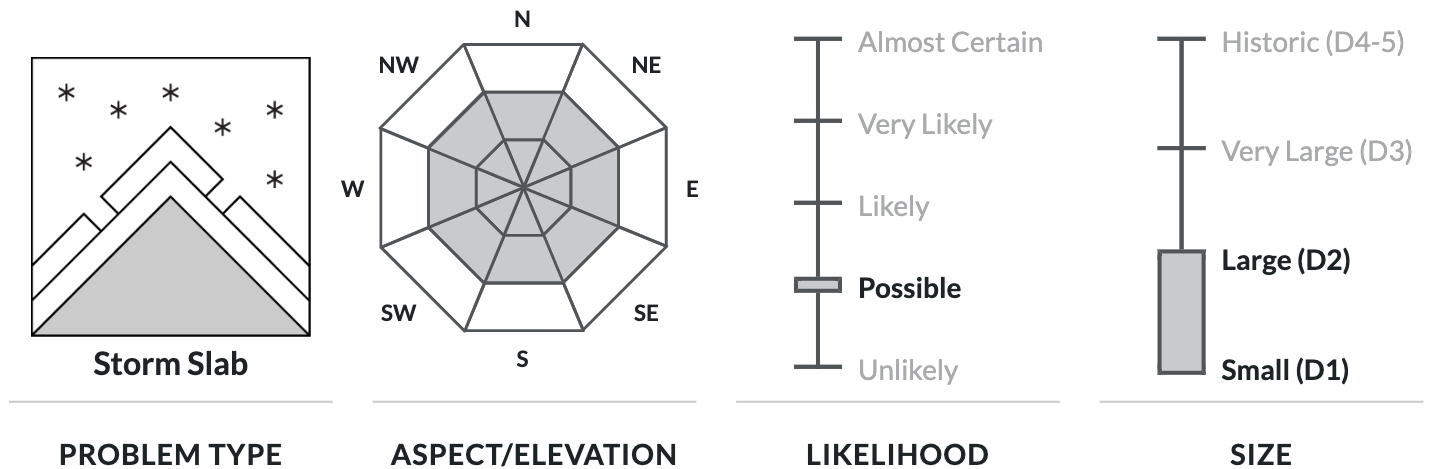
THE BOTTOM LINE

You can still trigger slab avalanches in steep terrain. Stick to moderately angled slopes and navigate around trigger points like convex rolls, unsupported terrain above or around cliffs, or wind loaded slopes just below ridgeline. Look out for wet avalanches if the sun makes an appearance. Give large and looming cornices plenty of space as it warms up through the week.

AVALANCHE DANGER



AVALANCHE PROBLEM #1



Avalanche activity and stability in general varied widely Tuesday. For the most part, the new snow has set up well with lots of people enjoying the snow in steep terrain with few issues. Most of the dozen or so slab avalanches backcountry travelers triggered were:

1) Small and 6-12" deep 2) In terrain around or greater than 40 degrees 3) On slopes where a shallow slab developed near the surface from either warming or wind transport

But a few slab avalanches were outside of this pattern. One was a very large, deep slab in extremely steep, unsupported terrain. It was triggered during avalanche mitigation work (photo 5 in the gallery). The other is in the attached photo for this problem. With this information, it's pretty hard to say slab avalanches Wednesday will be of a certain kind that you find in a certain place. The likelihood is lowering but the new snow still presents some danger on all aspects, wind loaded to not.

If you want to reduce the risk of triggering a slab then stick to moderately angled terrain with no unsupported features like convex rolls. Westerly winds could create new wind slabs as well. You might also want to avoid terrain where you observe recent or active wind loading.

If pushing into bigger terrain the best you can do is pick slopes with no consequence in the runout. There are still some question marks out there and it might take a day or two to figure out the answers.

FORECAST DISCUSSION

In addition to the slab avalanche activity listed above, numerous wet loose avalanches to D2 were reported by Tuesday afternoon. They were mostly found on southerly aspects but at all elevations from down in the trees to way up in the alpine. Less sun, a bit more wind, and similar or lower temperatures are forecast for Wednesday. It's less likely we will see the same level of wet loose avalanche activity - but it doesn't take much sun this time of year to warm things up. If the sun does come back for Round #2 look for the usual signs of instability like wet, unsupportable snow surfaces, rollerballs, or small avalanches. Stay off and away from steep and sunny slopes where you observe any of the above.

Signs of avalanches that released during the peak of the storm were visible everywhere if you looked close enough. Debris piles covered with snow, filled-in crowns, and avalanche paths full of wet, frozen chunks were found throughout the zone on all aspects and at all elevations. New snow amounts range from 2-3' in many areas across the zone. The new snow is settling but steeping off your floatation resulted in a bit of wallowing in many areas. Southerly aspects should have a breakable crust topping the snow surface while shaded aspects hold cold dry snow and excellent riding conditions.