Date: 4 January 2014

Location: Chair Peak, near Snoqualmie Pass, WA.

Accident: 1 climber caught, partly buried, not injured.

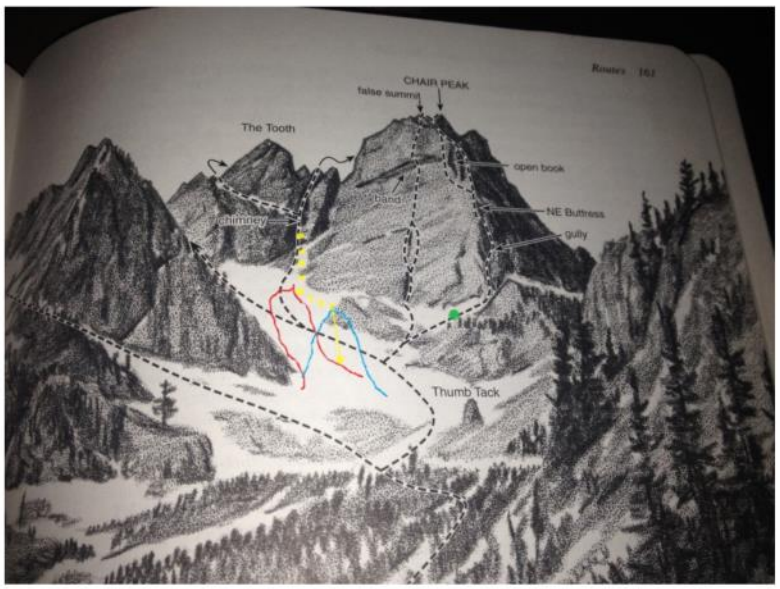
Submitted by: Donald Preiss and Garth Ferber (Northwest Avalanche Center).

Comments from Donald Preiss: This was a solo climb of the north face and the summit was reached at 10:30 am. At 11:00 am I started my descent and the avalanches were triggered by walking (not skis).

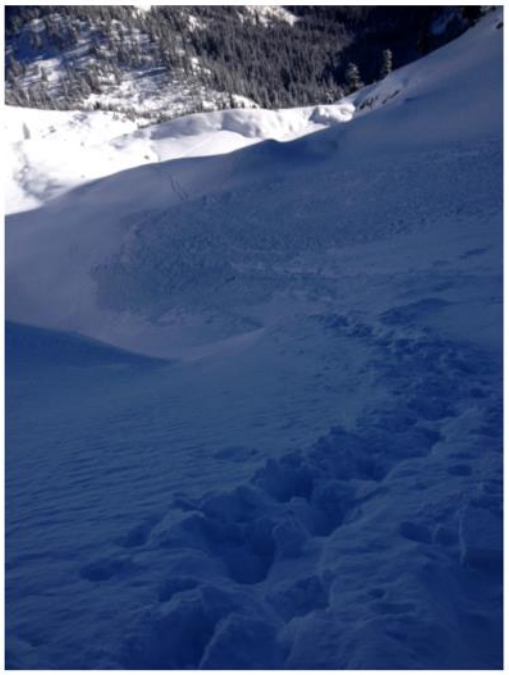
On the descent and upon exiting the chimney below the east face a 1 foot thick slab was activated by myself on my right side. The point of activation was near the top of the slide. I watched the slide widen to 100 feet and then come to a stop some 1/8 of a mile down slope.

I had a cache to get across the slope and up from where I was so instead of walking down the slide debris path I choose a high line to my left and along the base of the east face of Chair peak. Then some 2 minutes later near the ½ way point of the 200 foot traverse I activated another 1 foot by 200 feet wide slab but this time was caught in it. I was carried 150 feet down slope with the debris. I stayed on top by swimming and when the snow came to rest I was head downhill but on top. I gathered my gear, took pictures, re-ascended to my cache and left the area at 11:30AM.

Chair Peak East Face



The red line indicates the 1st triggered avalanche. The blue line indicates the 2nd triggered avalanche that I was caught in. The yellow line is my path of descent. The green indicates my cache.



Debris of the 1st avalanche which was triggered on my right while I descended. The 2nd slab avalanche cut loose to the left of here while descending high and left.

Looking up slope at the top edge of 2nd triggered slab.

Comments from Garth Ferber (Northwest Avalanche Center): Fairly strong west winds, a cooling trend and about a foot of snow were seen 2-3 December at the top of nearby Alpental and Denny Mountain (elevations 5470' and 5520' respectively). It seems very plausible that a storm or wind slab was created in the east facing bowl below Chair Peak at a similar elevation – see data below.

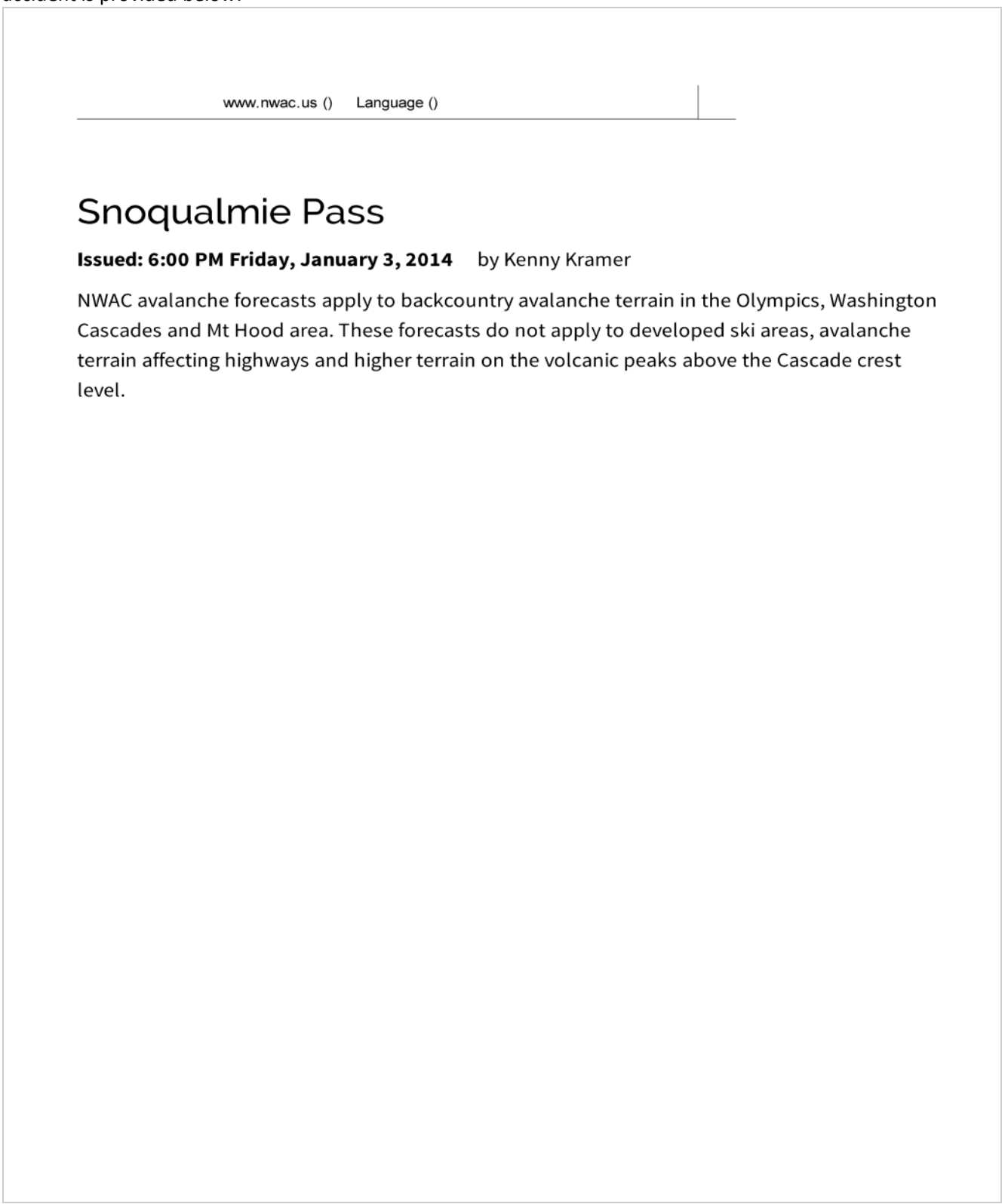
Northwest Avalanche Center
Alpental Ski Area, Washington
Wind gages unheated and may rime

MM/DD	Hour PST	Temp F 5470'	Temp F 4350'	Temp F 3100'	RH % 3100'	RH % 5470'	Wind Avg 5520'	Wind Max 5520'	Wind Dir. 5520'	Hour Prec. 3100'	Total Prec. 3100'	24 Hr Snow 3100'	Total Snow 3100'	24 Hr Snow 5470'
1 2	500	36		32	99	99	12	22	228	.04	.04	0	21	0
1 2	600	33		33	100	100	12	23	240	.05	.09	0	21	0
1 2	700	34		33	99	99	17	31	234	.07	.16	0	21	0
1 2	800	36		34	100	97	13	24	237	0	.16	0	21	0
1 2	900	36		35	99	96	19	33	239	0	.16	0	22	0
1 2	1000	37		36	99	93	15	31	245	0	.16	0	21	0
1 2	1100	37		37	99	88	14	33	231	0	.16	0	21	0
1 2	1200	37		38	99	87	19	47	250	0	.16	0	21	0
1 2	1300	36		39	97	87	25	42	247	0	.16	0	21	0
1 2	1400	36		39	97	86	29	55	245	0	.16	0	22	0
1 2	1500	36		40	92	77	30	52	244	0	.16	0	21	0
1 2	1600	35		40	85	74	34	58	245	0	.16	0	20	0
1 2	1700	32		42	72	79	34	65	247	.01	.17	0	21	0
1 2	1800	29		38	91	99	30	65	240	.04	.21	0	21	0
1 2	1900	29		36	98	99	29	54	238	.08	.29	0	20	1
1 2	2000	29		35	99	99	24	49	234	.1	.39	0	21	2
1 2	2100	28		34	99	99	26	56	237	.14	.53	0	14	4
1 2	2200	27		33	99	100	26	46	248	.12	.65	0	22	6
1 2	2300	27		32	100	99	25	40	262	.14	.79	1	19	8
1 3	0	27		32	100	99	25	44	268	.15	.94	2	22	9
1 3	100	25		33	98	97	22	43	299	.08	1.02	2	22	10
1 3	200	21		31	95	96	17	28	337	.01	1.03	2	22	10
1 3	300	21		31	98	97	18	31	306	.01	1.04	2	22	10
1 3	400	21		31	89	97	24	39	296	0	1.04	2	22	11
1 3	500	21		30	96	97	25	45	279	0	1.04	2	23	12
1 3	600	21		29	97	96	21	38	279	.01	1.05	2	22	11
1 3	700	21		30	98	96	15	25	255	0	1.05	2	22	11
1 3	800	21		30	98	97	15	26	268	0	1.05	0	22	12
1 3	900	21		30	96	96	13	21	269	0	1.05	0	22	12
1 3	1000	21		31	95	97	8	15	285	0	1.05	0	22	11
1 3	1100	23		31	96	96	8	16	270	0	1.05	0	36	44
1 3	1200	22		31	94	97	8	14	269	.01	1.06	0	22	12
1 3	1300	24		31	92	97	7	14	247	.01	1.07	0	20	0
1 3	1400	20		31	93	97	9	16	274	0	1.07	0	23	0
1 3	1500	20		31	93	95	11	18	282	0	1.07	0	21	0
1 3	1600	20		30	89	96	11	23	284	0	1.07	0	21	0
1 3	1700	19		29	89	96	15	26	343	.01	1.08	0	22	0
1 3	1800	18		27	92	95	11	21	356	0	1.08	1	22	1
1 3	1900	18		26	96	96	9	18	354	0	1.08	0	22	1
1 3	2000	17		26	95	94	9	13	353	0	1.08	0	22	1
1 3	2100	16		24	93	96	10	13	346	0	1.08	0	22	1
1 3	2200	16		23	93	95	10	13	345	0	1.08	1	23	0
1 3	2300	16		22	94	96	12	15	351	0	1.08	1	23	0
1 4	0	16		22	94	94	12	16	348	0	1.08	1	17	0
1 4	100	16		22	94	94	10	16	341	0	1.08	0	23	0
1 4	200	16		21	96	95	14	17	350	0	1.08	0	23	0
1 4	300	16		20	95	96	15	18	352	0	1.08	0	23	0
1 4	400	16		20	94	96	16	21	336	0	1.08	0	23	1
1 4	500	16		20	95	95	20	25	348	0	1.08	0	23	0
1 4	600	16		20	95	95	22	26	353	0	1.08	1	17	1
1 4	700	16		20	94	94	24	30	352	0	1.08	0	38	1
1 4	800	16		20	93	95	23	36	4	0	1.08	0	17	1
1 4	900	19		21	93	94	20	23	358	0	1.08	0	23	0
1 4	1000	20		25	89	94	17	21	355	0	1.08	0	23	1
1 4	1100	22		26	88	94	13	18	7	0	1.08	0	23	0
1 4	1200	23		26	86	93	14	17	351	0	1.08	0	16	0

It is interesting that this slope also caught 2 climbers on 15 January 2013; that report can be found here:

http://www.nwac.us/media/filer_public/33/73/33735d46-4a66-4e49-b9dd-88124d8157c2/chair_peak_15_jan_2013_report.pdf

The NWAC avalanche forecast issued the day prior to the accident and valid the day of the accident is provided below:



www.nwac.us () Language ()

Snoqualmie Pass

Issued: 6:00 PM Friday, January 3, 2014 by Kenny Kramer

NWAC avalanche forecasts apply to backcountry avalanche terrain in the Olympics, Washington Cascades and Mt Hood area. These forecasts do not apply to developed ski areas, avalanche terrain affecting highways and higher terrain on the volcanic peaks above the Cascade crest level.

Elevation	Saturday	Sunday
 Above Treeline	 **Moderate** Heightened avalanche conditions on specific terrain features. Evaluate snow and terrain carefully; identify features of concern.	
 Near Treeline	 **Moderate** Heightened avalanche conditions on specific terrain features. Evaluate snow and terrain carefully; identify features of concern.	
 Below Treeline	 **Low** Generally safe, watch for unstable snow on isolated terrain features.	

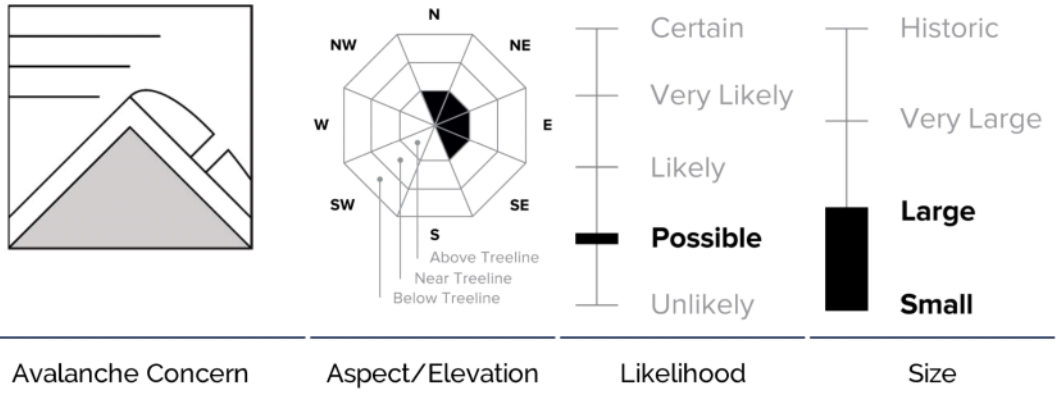
Danger Scale

Issued: 6:00 PM Friday, January 3, 2014 by Kenny Kramer

Avalanche Concerns

Wind Slab

Wind slabs can take up to a week to stabilize. They are confined to lee and cross-loaded terrain features and can be avoided by sticking to sheltered or wind scoured areas.



Snowpack Analysis:

The front that cross the area Thursday through Thursday night began quite warm and cooled with precipitation and continued to cool throughout. This initially produced rain or heavy wet snow that gradually turned to snow, eventually reaching lower elevations. This caused a favorable profile of new snow with very good bonding of new snow to the old wet snow surface. New snow amount ranges are based mainly from north to south but also with elevations. Upper elevations and most areas in the north received 20-30 cm (8-12 inches) new snow with lower elevations and areas in the south getting 10-20 cm (4-8 inches). The new snow has formed a good bond to the newly forming crust as reported by several professionals from Mt Baker, Stevens Pass back country, Snoqualmie, Crystal Mountain and Paradise on Mt Rainier. To see the video click here (https://dl.dropboxusercontent.com/u/10546524/20140103_Stevens%20Skyline%20Dallas%20Glass.MOV).

The older snowpack consists mainly of a mixture of crust layers and consolidated old snow layers. Recent, mostly dry periods as well as warm temperatures and periods of sunshine have all combined to form a mostly stable old snowpack, void of distinctive weak layers per numerous recent field tests. There are some

older faceted layers both above and below a mid December melt-freeze crust in some areas, however multiple bridging crusts are mostly present in the upper snowpack and the weaker grains are showing some rounding.

The biggest current concern would be for any newly formed wind slab layers as Thursday's front was accompanied by very strong ridge top winds, initially southwesterly, shifting to northwesterly. While winds were strong with wind transport evident in many areas, multiple tests have all indicated an overall good stability and any stiffer surface snow has been non-reactive to ski tests, stability tests and most explosive tests as well.

Snowdepths remain well below normal, generally ranging from 1-2 meters in the alpine regions to less than 1 meter near and below treeline with significantly lower snowdepths below about 3000 feet.

The avalanche danger will continue to be low at the lower elevations due to the low snowpack.

Detailed Forecast for Saturday:

Mostly sunny weather is expected along with gradually diminishing northwest ridgetop winds. Temperatures should begin Saturday very cool and gradually warm through the afternoon, especially at mid and upper elevations. This weather will help to slowly stabilize any previously formed wind slab layers near ridges leading to an overall decreasing danger.

Continue to watch for evidence of recent wind transport as there may be heightened avalanche conditions on specific terrain features, such as steep rollovers below ridges. Continue to evaluate snow and terrain carefully.