Date: 13 April 2013
Location: Granite Mountain, near Snoqualmie Pass, WA
Accident: 3 caught, 2 survirors suffered bruises, dislocated shoulder, 1 fatality
Submitted by: Garth Ferber and Dennis D'Amico (Northwest Avalanche Center)

Comments from Garth Ferber and Dennis D'Amico, (Northwest Avalanche Center - NWAC): Personnel from the NWAC communicated with Search and Rescue personnel for this report and did not have communication with the victims. Apparently the party of 3 were on foot and intended to climb Granite Mtn. They were caught in the avalanche at about 1240 pm (unknown if PST or PDT) at about 4668 feet according to data from a GPS carried by one of the survivors. The GPS data also indicates that the survivor reached a speed of 53 mph as he was carried down the mountain. After the avalanche the 2 survivors were on the surface or partly buried but able to self extricate at about 3200 feet and the party leader was missing. The 2 survivors then summoned help, via cell phone. Further information is given below as communicated to the NWAC.

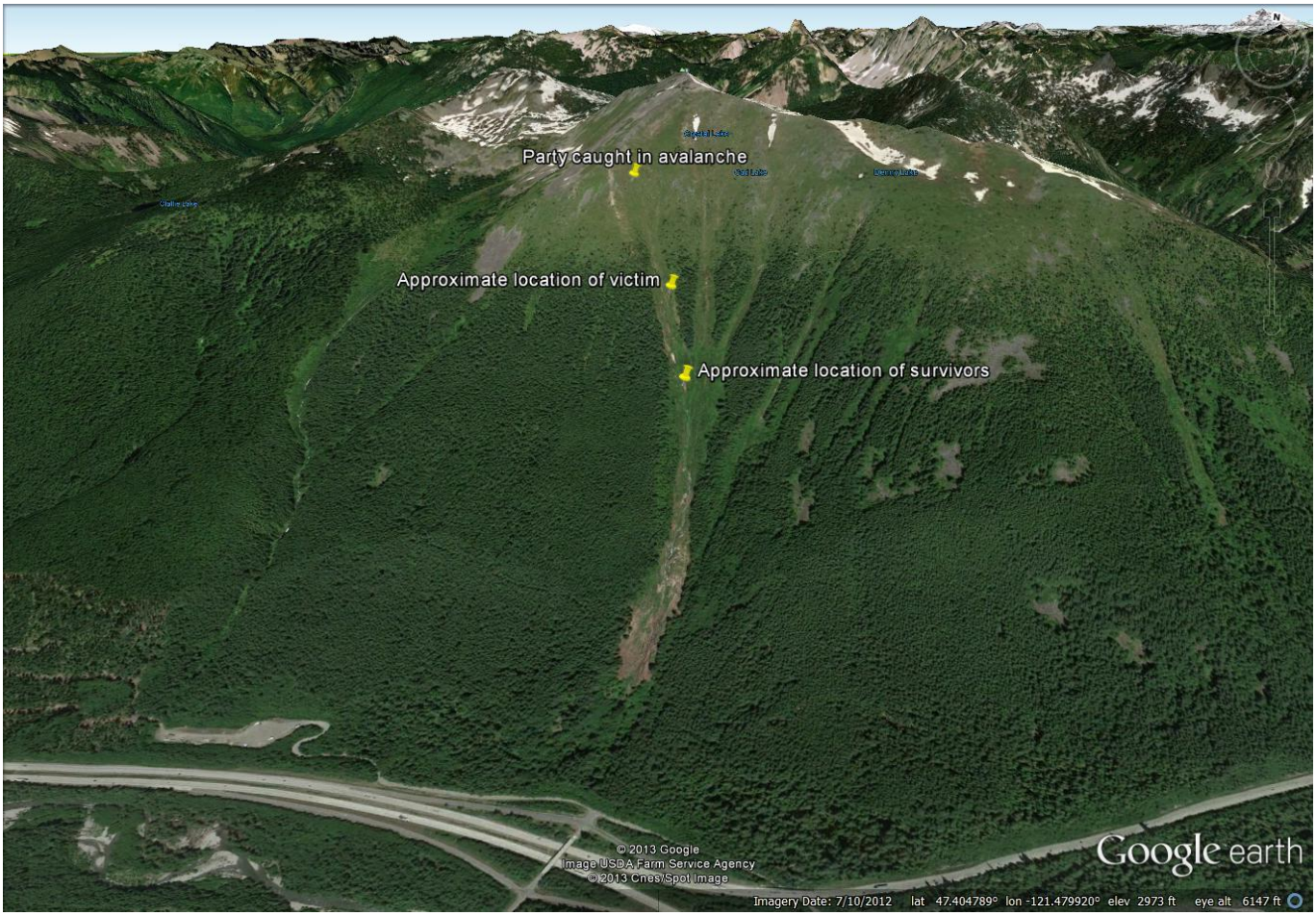
Paraphrased comments from Detective Edward Christian (King County Search and Rescue Coordinator): The survivors said they were climbing about 5 feet apart (at 4668 feet according to the GPS data) and that they believed the snow released under and near the party. They could not breath while in the avalanche and rode the avalanche down to about 3200 feet sustaining bruises and a dislocated shoulder by one survivor. The survivors said that the victim had lent them equipment for the climb. There was no avalanche rescue gear (beacon, shovel, probe) in the party.

The victim eventually became uncovered by melting snow but was intially buried by more than 10 feet of snow since organized probing was unsuccessful. The area was kept closed as a crime scene until the vicitm was recovered on the 8th of May. The victim died of asphixiation by compression.

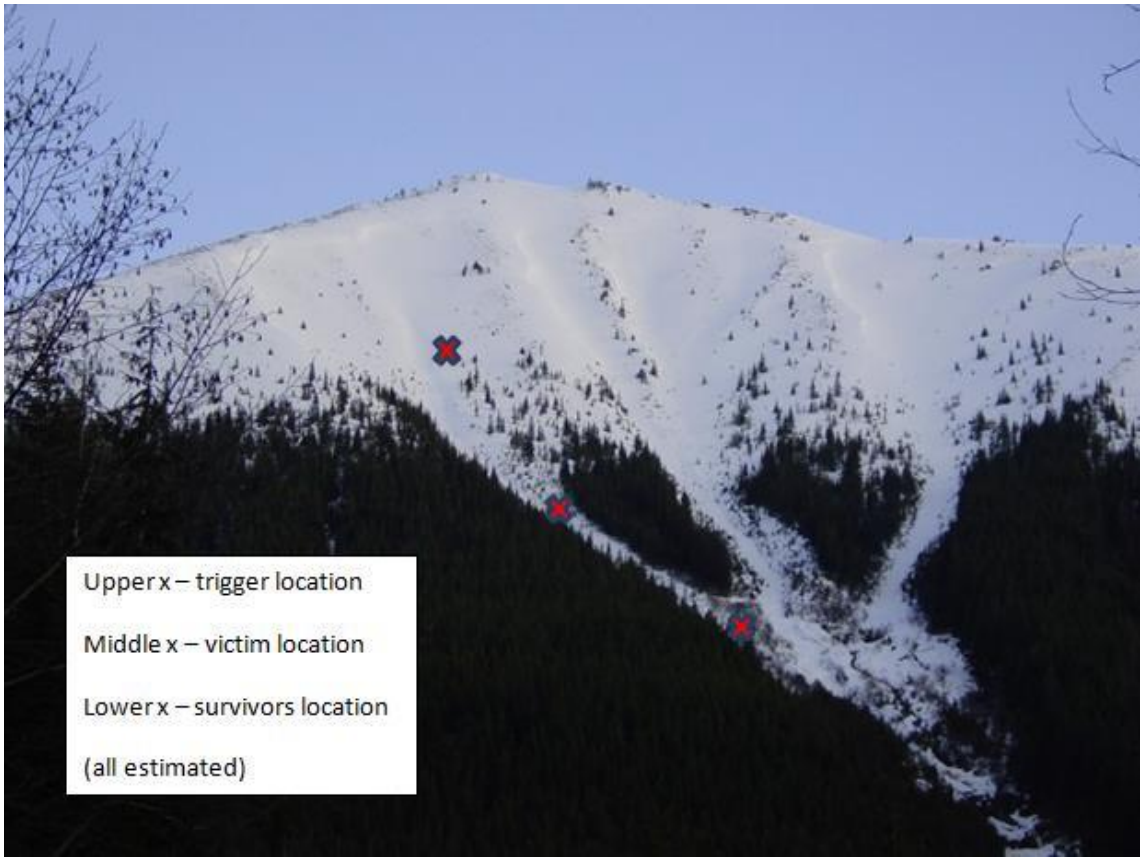
Paraphrased comments from Bram Thrift (Alpental Ski Patrol): The Alpental ski patrol received calls regarding the accident in the early afternoon. Bram and 2 other patrollers arrived at the Granite Mtn trailhead about 330-400 pm. One survivor departed from the parking lot on their arrival. They went up the trail and met the other survivor coming down the trail. One of the survivors said the group was hiking up the gully and intended to reach the summit. He also mentioned that he thought the avalanche might have started from above at he felt "slammed" by the snow.

A search for the victim including quick spot probing was made from about 2900-3800' without success. Further dog search teams and Search and Rescue personnel arrived around dusk and another quick search was performed. Most personnel departed shortly after due to further avalanche concern. On what I believe was the Wednesday after the accident an extensive organized probing search was performed without success.

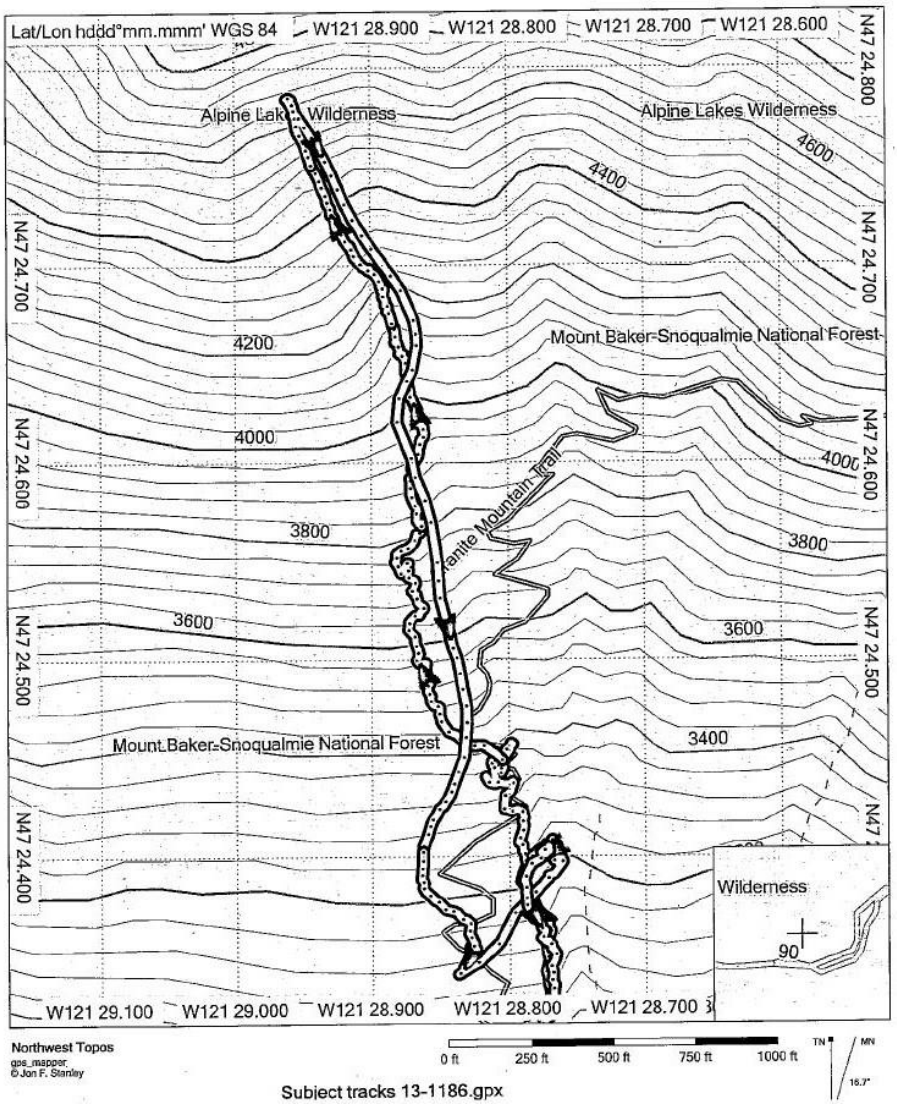
The recovery of the victim was finally made on 8 May 2013 about 710 am by Alpental ski patrol personnel, Backcountry Avalanche Rescue K9s (BARK), King County SAR Ski Partol Rescue (SPART) after an advance assessement of avalanche danger. The victim was found at 3720', partly exposed due to melting, head downhill on his right side on the skiers left side of the gully, about 300' above where the summer trail crosses the gully. His pack with 2 ice axes attached was still on him.



Google Earth image with locations based on elevation information and information from King County Search and Rescue.



Photograph with locations estimated by Bram Thrift, Alpental Ski Patrol.



Route information from victims GPS provided by King County Search and Rescue.

Further comments from Garth Ferber and Dennis D'Amico, (Northwest Avalanche Center - NWAC): This storm arrived somewhat stronger than expected. However, expected avalanche and weather conditions were fairly well described in the avalanche forecast that was available via the NWAC web site the prior evening. Rapid loading and warming seen in the weather station data undoubtedly contributed to unstable snow conditions that day (see weather station data and avalanche and mountain weather forecasts below). Shooting cracks and a few triggered avalanches from the Snoqualmie Pass area were reported via the local Turns All Year web site later that day:

http://www.turns-all-year.com/skiing_snowboarding/trip_reports/index.php?topic=28266.0
http://www.turns-all-year.com/skiing_snowboarding/trip_reports/index.php?topic=28274.0
http://www.turns-all-year.com/skiing_snowboarding/trip_reports/index.php?topic=28271.0
http://www.turns-all-year.com/skiing_snowboarding/trip_reports/index.php?topic=28264.0

Our best guess based on the available and somewhat limited information is that it was a soft storm slab that may have been human triggered or naturally triggered above or by the group. We do not know if anyone in the group had any avalanche education or had seen a recent avalanche forecast.

4-13-2013
Northwest Weather and Avalanche Center
Alpental Ski Area, Washington

Wind gages unheated and may rime
24 hr snow 5470' may be wind affected

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'
4 12	500	24	27	30	99	92	8	16	239	0	0	0	92	-0
4 12	600	24	28	29	98	92	11	16	226	0	0	0	91	-0
4 12	700	27	28	31	98	87	10	17	207	0	0	0	93	-0
4 12	800	30	29	33	97	87	7	16	236	0	0	0	91	-1
4 12	900	31	32	36	90	81	7	16	23	0	0	0	92	-1
4 12	1000	32	34	41	80	84	9	16	92	0	0	0	92	-1
4 12	1100	32	34	41	69	91	9	16	282	0	0	0	91	-2
4 12	1200	30	34	41	78	77	12	32	35	0	0	0	90	-2
4 12	1300	27	31	36	86	95	17	33	89	.01	.01	0	91	-1
4 12	1400	28	31	34	93	92	12	19	70	.04	.05	0	91	-1
4 12	1500	27	31	34	95	97	15	33	9	.04	.09	0	91	1
4 12	1600	26	31	33	98	98	19	33	28	.04	.13	1	92	2
4 12	1700	26	30	33	98	99	21	36	223	.06	.19	1	87	3
4 12	1800	26	30	32	99	98	22	48	221	.04	.23	2	95	3
4 12	1900	26	30	32	99	99	23	47	236	.07	.3	2	93	4
4 12	2000	26	30	32	100	99	27	49	217	.05	.35	2	93	4
4 12	2100	27	30	32	100	98	29	58	234	.04	.39	2	94	4
4 12	2200	26	30	33	99	98	21	46	229	.05	.44	2	94	4
4 12	2300	22	27	33	89	97	24	50	3	.01	.45	2	94	5
4 13	0	20	25	30	88	96	25	52	134	0	.45	2	96	5
4 13	100	20	25	30	94	97	34	64	283	.05	.5	1	95	31
4 13	200	19	24	29	97	96	32	72	283	.08	.58	3	95	7
4 13	300	19	23	28	97	97	32	59	228	.06	.64	4	95	31
4 13	400	18	23	28	98	97	24	40	227	.11	.75	5	97	11

Total Prec. 3100'
.75

Alpental weather station data for the 24 hours ending 4 AM PST, 13 April 2013.

4-14-2013
Northwest Weather and Avalanche Center
Alpental Ski Area, Washington

Wind gages unheated and may rime
24 hr snow 5470' may be wind affected

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'
4 13	500	18	23	27	98	96	26	46	204	.05	.05	0	100	32
4 13	600	18	23	27	98	97	21	36	214	.03	.08	0	98	32
4 13	700	19	23	27	97	96	20	35	209	.02	.1	1	99	13
4 13	800	20	23	28	96	97	19	30	218	.04	.14	1	99	15
4 13	900	21	24	29	95	97	19	35	203	.06	.2	2	99	-1
4 13	1000	23	24	30	95	98	20	39	209	.11	.31	4	101	1
4 13	1100	23	25	30	95	96	25	46	219	.1	.41	5	100	2
4 13	1200	23	25	31	96	97	24	40	230	.12	.53	5	103	3
4 13	1300	25	26	32	95	97	24	43	201	.11	.64	7	104	5
4 13	1400	25	27	32	94	98	21	39	277	.11	.75	8	99	6
4 13	1500	24	27	32	96	97	22	45	54	.09	.84	9	105	7
4 13	1600	24	27	32	96	98	21	43	41	.11	.95	11	107	9
4 13	1700	24	27	32	97	98	22	43	133	.09	1.04	12	108	11
4 13	1800	23	27	31	98	97	18	39	98	.16	1.2	12	110	13
4 13	1900	23	27	31	98	97	15	31	276	.24	1.44	16	114	16
4 13	2000	23	27	31	98	98	14	31	173	.04	1.48	15	114	16
4 13	2100	23	27	30	98	98	8	19	218	.01	1.49	16	114	16
4 13	2200	23	27	31	98	98	8	14	200	.01	1.5	16	114	31
4 13	2300	22	27	30	98	98	14	24	214	.05	1.55	14	114	16
4 14	0	22	26	30	98	98	16	31	175	.01	1.56	15	114	16
			26											
			26											
			26											
			26											

Total Prec. 3100'
1.56

Alpental weather station data for the 24 hours ending 4 AM PST 14 April 2013. Time of the accident was roughly 1240 PM (unknown if PST or PDT). The data tables are in PST.

4-13-2013
Northwest Weather and Avalanche Center
Washington Department of Transportation
Snoqualmie Pass, Washington

3770' temp above Lake Keechelus snow shed

MM/DD	Hour PST	Temp F 3760'	Temp F 3770'	Temp F 3010'	RH % 3010'	Wind Avg 3760'	Wind Max 3760'	Wind Dir 3760'	Hour Prec. 3010'	Total Prec. 3010'	24 Hr Snow 3010'	Total Snow 3010'	Press mb 3010'
4 12	500	30	30	29	98	6	13	103	0	0	0	67	1017
4 12	600	28	29	29	98	5	10	123	0	0	0	66	1016
4 12	700	28	29	31	97	9	12	122	0	0	0	66	1016
4 12	800	31	31	38	82	10	16	151	0	0	0	66	1015
4 12	900	35	33	43	69	8	14	139	0	0	-0	65	1015
4 12	1000	38	38	47	59	5	8	109	0	0	-0	64	1014
4 12	1100	38	40	45	62	2	5	137	0	0	-0	65	1013
4 12	1200	37	38	43	57	3	12	263	0	0	0	65	1013
4 12	1300	32	33	37	84	9	22	202	0	0	0	66	1012
4 12	1400	32	31	35	88	3	7	174	.06	.06	0	66	1011
4 12	1500	33	31	33	93	1	6	237	.06	.12	0	66	1010
4 12	1600	31	31	33	93	4	12	238	.06	.18	0	65	1009
4 12	1700	30	31	32	95	5	7	268	.07	.25	1	67	1008
4 12	1800	30	31	32	96	9	23	266	.06	.31	1	68	1008
4 12	1900	31	31	32	97	11	23	247	.04	.35	1	68	1007
4 12	2000	31	31	32	98	7	12	225	.06	.41	2	68	1007
4 12	2100	34	32	33	97	14	38	249	.09	.5	2	69	1006
4 12	2200	31	32	32	96	22	36	284	.1	.6	2	68	1006
4 12	2300	29	30	32	88	23	39	229	.03	.63	2	68	1007
4 13	0	29	27	30	81	27	48	260	.01	.64	2	68	1007
4 13	100	26	26	29	94	22	44	251	.02	.66	2	69	1007
4 13	200	24	26	29	86	31	56	263	.04	.7	1	69	1007
4 13	300	24	25	27	91	26	48	282	.04	.74	2	66	1008
4 13	400	26	25	27	95	21	50	277	.1	.84	4	71	1008

Total Prec. 3010'
.84

Snoqualmie weather station data for the 24 hours ending 4 AM PST 13 April 2013.

4-14-2013
Northwest Weather and Avalanche Center
Washington Department of Transportation
Snoqualmie Pass, Washington

3770' temp above Lake Keechelus snow shed

MM/DD	Hour PST	Temp F 3760'	Temp F 3770'	Temp F 3010'	RH % 3010'	Wind Avg 3760'	Wind Max 3760'	Wind Dir 3760'	Hour Prec. 3010'	Total Prec. 3010'	24 Hr Snow 3010'	Total Snow 3010'	Press mb 3010'
4 13	500	24	24	27	94	25	44	247	.05	.05	0	71	1009
4 13	600	22	24	27	94	18	28	259	.06	.11	1	70	1009
4 13	700	24	24	28	94	17	25	247	.03	.14	1	72	1010
4 13	800	25	25	29	92	17	30	263	.06	.2	2	72	1010
4 13	900	25	26	31	91	14	25	231	.08	.28	2	72	1010
4 13	1000	26	27	30	90	11	18	267	.1	.38	4	74	1010
4 13	1100	27	28	30	91	15	26	285	.09	.47	3	75	1010
4 13	1200	26	29	32	91	14	22	269	.08	.55	5	76	1010
4 13	1300	28	30	34	87	11	18	263	.11	.66	6	76	1011
4 13	1400	29	30	32	92	11	20	232	.14	.8	7	77	1011
4 13	1500	28	30	33	92	17	31	267	.09	.89	7	77	1011
4 13	1600	30	30	32	93	12	24	300	.14	1.03	8	79	1011
4 13	1700	32	30	32	95	12	27	262	.11	1.14	9	80	1011
4 13	1800	28	29	31	97	12	22	350	.12	1.26	9	81	1012
4 13	1900	28	28	31	97	7	20	264	.2	1.46	11	85	1012
4 13	2000	27	28	30	97	7	14	244	.15	1.61	12	212	1013
4 13	2100	27	28	30	97	8	15	239	.06	1.67	13	86	1013
4 13	2200	27	29	30	97	8	12	243	.03	1.7	12	84	1013
4 13	2300	27	28	30	97	7	12	236	.05	1.75	12	85	1013
4 14	0	27	28	29	97	6	12	250	.02	1.77	11	86	1014
4 14	100	27	28	29	97	11	17	249	0	1.77	12	84	1014
4 14	200	27	28	30	97	10	13	241	.04	1.81	12	85	1014
4 14	300	26	27	29	96	15	28	260	.07	1.88	14	85	1013
4 14	400	26	27	29	96	4	10	224	.02	1.9	15	87	1013

Total Prec. 3010'
1.9

Snoqualmie weather station data for the 24 hours ending 4 AM PST 14 April 2013.

Detailed Avalanche Forecast

Northwest Weather and Avalanche Center Seattle Washington

1800 PM PDT Fri Apr 12 2013

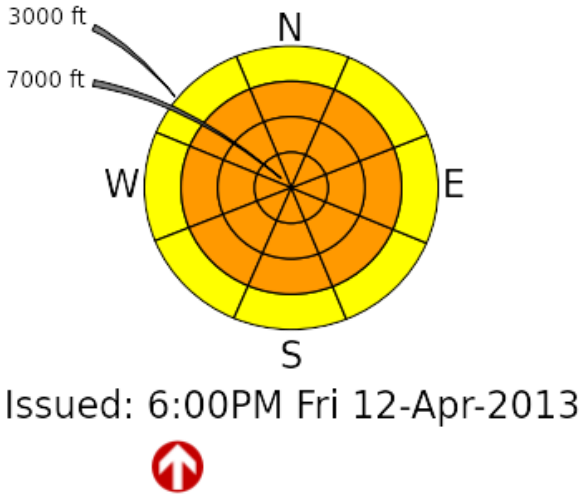
This forecast applies to back country avalanche terrain below 7000 feet and does not apply to developed ski areas or highways.

Please note: The NWAC will end regularly scheduled mountain weather and avalanche forecasting on Sunday 14 April and change to spring operations which is normal at this time of year. Staff at the NWAC will continue to monitor weather and snow conditions in the Olympics and Cascades during the spring and issue special avalanche statements after this date when conditions warrant.

Zone Avalanche Forecasts

Forecast for: **Olympics, Stevens Pass, Snoqualmie Pass, White Pass, WA Cascades near and west of crest - north of Stevens Pass, WA Cascades near and west of crest - between Stevens and Snoqualmie Pass, WA Cascades near and west of crest - between Snoqualmie and White Pass, WA Cascades near and west of crest - south of White Pass**

Summary Danger Forecast For Saturday



Overall Danger Trend

Saturday: Considerable avalanche danger above 4000 feet and moderate below increasing strongly in the afternoon. Avalanche danger decreasing late Saturday night.

Concerns

Concern	Aspect	Size	Trend

Storm slab avalanche

All

Initially shallow but increasing in depth

Increasing strongly in the afternoon

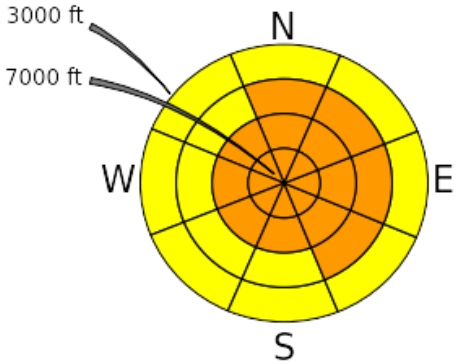
Wind Slab Avalanche

Lee N thru SE aspects of higher terrain

Isolated larger slabs possible higher lee slopes

Increasing Slightly

Summary Danger Forecast For Sunday



Issued: 6:00PM Fri 12-Apr-2013

Overall Danger Trend

Sunday: Considerable avalanche danger above 4000 feet and moderate below decreasing slightly. Avalanche danger slightly decreasing further Sunday night.

Concerns

Concern	Aspect	Size	Trend

Wind Slab Avalanche

Lee N thru SE aspects of higher terrain

Isolated larger slabs possible higher lee slopes

Decreasing Slightly

Loose-wet Snow Avalanche

Solar aspects, especially steeper slopes of lower terrain

Generally shallow

Increasing Slightly

Snowpack Discussion

A storm cycle returned last Thursday to Sunday with a series of frontal systems and a low pressure system crossing the Northwest. Snow levels started out at about 5000 feet in the north and 6000 feet in the south on Friday and fell roughly a thousand feet a day to about 3000 feet in the north and 4000 feet in the south by Sunday. Storm water equivalents ending Monday ranged from about 3-5.5 inches at NWAC stations near and west of the crest with storm snowfall totals at higher elevations of 2-3 feet. Reports of sensitive 6-12 inch storm slab were received from the ski areas and in one back country report via TAY from Mt. Baker on Sunday.

A transitory ridge caused mostly dry conditions with a moderate warming trend Monday and Tuesday. A front crossed the Northwest on Wednesday morning with rain below about 6000 feet in the north and 7000 feet in the south. Crystal mountain plus the WSDOT avalanche control near Washington Pass reported size-able wet-loose slides with the warming and rain on Wednesday. Wet loose releases continued into Thursday for Alpental where a convergence zone cause light rain at lower elevations.

Ski area and DOT reports from Friday morning indicated that clear skies and good cooling Thursday night formed a stout melt-freeze crust. This crust may briefly weaken Friday afternoon with rain initially at lower elevations, but dropping temperatures Friday night should reform the crust and help keep the upper snowpack locked down. The mid and lower snow pack are considered stable and fairly consolidated.

Detailed Forecasts

Saturday

Another winter-like weekend is in store for the PNW...

After a strong front passes through Friday night, light to moderate snow showers Saturday morning will likely become moderate to occasionally heavy Saturday afternoon for the west slopes as an upper level shortwave enhances precipitation over the PNW. Pronounced cooling early Saturday should help new snow bond well to Friday night's snowfall. However, periods of high snowfall rates and strong crest level

westerlies and NW flow aloft should lead to quickly escalating avalanche danger Saturday afternoon and evening.

Showers and windy conditions should eventually ease Saturday night and lead to a slight decrease in the avalanche danger.

Concerns:

Storm slab avalanches should become more widespread and easier to trigger on all aspects in the afternoon due instabilities within the new storm snow Saturday, but avalanches should be contained to the new storm snow.

New **wind slab** should build on the usual N thru SE lee slopes of higher terrain. Due to winter-like temperatures, new snow should be easier to transport and thus build thicker wind slabs especially up high.

The **bottom line** is don't let your avalanche guard down just because the calendar says it's mid-April. Use the same cautious route-finding and terrain selection techniques you would use mid-winter during a storm cycle. Look for the warning signs like shooting cracks indicating instability propagation of a slab and for obvious indicators like recent natural avalanche activity as a message that it's time to pull back.

Sunday

Sunday should be a post-storm day as a cool upper level trough resides over the PNW. A variable amount of cloudiness including some sunbreaks along with slight warming and generally light convective afternoon showers should allow the avalanche danger to decrease Sunday.

Wind slabs that formed below ridges on mainly lee easterly aspects Friday night through Saturday should become less sensitive on Sunday. However, due to the cold temperatures aloft, new wind slab instabilities will be slow to settle and deserve another day of caution. Practice safe route-finding by traveling along the windward side of ridges and watch for shooting cracks on the approach as a warning sign lingering instability.

Since it is mid-April, sunbreaks and above freezing temperatures at low or even mid elevations should allow **wet-loose** avalanches to occur mainly on steeper solar aspects in the late morning or afternoon. Watch for softening of the surface snow beyond the top few inches and natural pinwheeling as signs of increasing instability. Wet-loose avalanches should begin shallow but may be able to entrain the most recent storm snow and quickly become difficult to manage.

Storm slab instabilities should have mainly settled out by Sunday, but be aware that localized areas of heavy snow that extend into Saturday evening may still be sensitive on Sunday.

Mountain Weather Forecast

Northwest Weather and Avalanche Center Seattle Washington

704 AM PDT Sat Apr 13 2013

The NWAC program is administered by the USDA-Forest Service and operates out of the National Weather Service Forecast Office in Seattle. NWAC services are made possible by important collaboration and support from a wide variety of federal, state and private cooperators.

Please note: The NWAC will end regularly scheduled mountain weather and avalanche forecasting on Sunday 14 April and change to spring operations which is normal at this time of year. Staff at the NWAC will continue to monitor weather and snow conditions in the Olympics and Cascades during the spring and issue special avalanche statements after this date when conditions warrant.

Weather Synopsis for Saturday and Sunday

A cold deep upper low pressure system began to dig southeast over BC on Friday. A strong jet reminiscent of winter became aimed at Washington. A front moved rapidly over the area late on Friday. An initial convergence zone moved east over the central Cascades Saturday early morning. New snow amounts at NWAC sites near and west of the crest from Mt Baker to Mt Hood range from 2 to 11 inches Saturday early morning with the most at Stevens and the upper Alpental station.

The cold upper low will sink from BC to the north Rockies on Saturday. A cool unstable west northwest flow will be seen over the Northwest. A secondary short wave should rotate over the area Saturday afternoon. After a lull in showers Saturday morning, orographic showers should increase in the afternoon. More convergence zone(s) are likely in the Stevens to Snoqualmie area by Saturday afternoon and evening.

Winds and orographic showers should decrease Saturday night.

A broad cold weak upper trough should generally sink south from southwest Canada to over the northwest US on Sunday. Northwest flow will greatly weaken over the Northwest. With the cold slightly unstable air mass and April daytime heating some light showers should bubble up again by afternoon. Showers should diminish in the evening as the sun sets.

Weather Forecast for Saturday and Sunday

Olympics

Time	Weather
Saturday morning	Windy. Light to moderate snow showers.
Saturday afternoon	Increasing light to moderate snow showers.
Saturday night	Decreasing mostly light snow showers.
Sunday	Increasing mostly light snow showers.
Sunday night	Mostly cloudy with decreasing light snow showers.

Washington Cascades near and west of the crest

Stevens, Snoqualmie and White Passes

Time	Weather
Saturday morning	Windy. Light to moderate snow showers.
Saturday afternoon	Increasing light to moderate snow showers except moderate to heavy in convergence shifting from near Stevens to near Snoqualmie by the afternoon and evening.
Saturday night	Decreasing mostly light snow showers.
Sunday	Increasing mostly light snow showers.
Sunday night	Mostly cloudy with decreasing light snow showers.

East slopes Washington Cascades

Time	Weather
Saturday morning	Windy. Light snow showers mainly higher elevations.
Saturday afternoon	Increasing light occasional moderate snow showers mainly higher elevations central part.
Saturday night	Decreasing light snow showers mainly higher elevations.
Sunday	Increasing light snow showers.
Sunday night	Partly cloudy with decreasing light snow showers.

Mt Hood area

Time	Weather
Saturday morning	Windy. Light to moderate snow showers.
Saturday afternoon	Increasing light to moderate snow showers.
Saturday night	Decreasing mostly light snow showers.
Sunday	Increasing mostly light snow showers.
Sunday night	Mostly cloudy with decreasing light snow showers.

Snow Level/Freezing Level Trends in feet

SNOW LEVELS

Olympics, Cascades--Mt Baker (N) to Snoq Pass (C) to Mt Hood (S)

Time	Olympics	North	Central	South
Sat morn	2000	2000	2000	2500
Sat aft	3000	3000	3000	3500
Sat night and Sun morn	2000	2000	2000	2500
Sun aft	3000	3000	3000	3500
Sun night	2000	2000	2000	2500

Cascade Snow / Freezing Levels noted above refer to the north (approximately Mt Baker and Washington Pass), central (approximately Stevens and Snoqualmie Pass) and south (near Mt Hood). Note that surface snow levels are common near the passes during easterly pass flow and may result in multiple snow / freezing levels.

Quantitative Precipitation

24 hour forecast of precipitation in inches of water (rain) equivalent (WE) ending at 4AM of indicated day

Location W.E. for 24 hours ending at 4AM on...	**Sunday**	**Monday**
Hurricane Ridge	.25-.5	LT .25
Mt Baker Ski Area	.5	LT .25
Washington Pass	.25	LT .25
Stevens Pass	.75	LT .25
Snoqualmie Pass	1	LT .25
Mission Ridge	LT .25	LT .25
Crystal Mt	.25-.5	LT .25
Paradise	.75	LT .25
White Pass	.5-.75	LT .25
Mt Hood Meadows	.5-.75	LT .25
Timberline	.5-.75	LT .25

LT = less than; WE or Water equivalent is the liquid water equivalent of melted snow in hundredths of inches. As a rough approximation 1 inch of snow = about .10 inches WE, or 10 inches of snow = about 1 inch WE.

Winds in Miles per Hour (MPH) "Cascade Pass Level Winds"

Time	**Direction - Speed**
Sat morn	W 20-30
Sat aft	W 15-25
Sat night	W 10-20
Sun and Sun night	W 5-10

Directions above indicate the direction the wind blows from on the 16-point cardinal scale. Winds near the passes tend to be highly channeled by the topography and normally blow either easterly or westerly depending on the surface pressure gradients that drive such winds.

Free Winds at 5000 FT (in Miles per Hour (MPH))

Time	**Olympics**	**Cascades North**	**Cascades Central**	**Cascades South**

Sat early morn	W 25-35	W 20-30	W 25-35	W 30-40
Sat late morn and aft	W 25-35	W 10-20	W 25-35	W 25-35
Sat night	W 10-20	W 5-15	W 10-20	W 15-25
Sun morn and aft	W 5-15	W 5-15	W 5-15	W 10-20
Sun night	N 5-15	N 5-15	N 5-15	N 5-15

Directions above indicate the direction the wind blows from on the 16-point cardinal scale. These winds and the 9000 ft winds below also indicate "free" winds, or those winds in the atmosphere not influenced by terrain. Topographical effects may produce greater or lower wind speeds in certain locations as well as significant variations in direction.

Free Winds at 9000 FT (in Miles per Hour (MPH))

Time	Olympics	Cascades North	Cascades Central	Cascades South
Sat early morn	WNW 35-45	WNW 35-45	WNW 45-60	WNW 50-70
Sat late morn	WNW 35-45	WNW 30-40	WNW 40-50	WNW 40-50
Sat aft	WNW 35-45	WNW 25-35	WNW 40-50	WNW 40-50
Sat night	WNW 10-20	WNW 10-20	WNW 20-30	WNW 30-40
Sun morn	NW 5-15	NW 5-15	NW 10-20	NW 15-25
Sun aft	NW 5-15	NW 5-15	NW 5-15	NW 10-20
Sun night	NE 5-15	NE 5-15	NE 5-15	NE 5-15

Directions above indicate the direction the wind blows from on the 16-point cardinal scale. These winds indicate "free" winds, or those winds in the atmosphere not influenced by terrain. Topographical effects may produce greater or lower wind speeds in certain locations as well as significant variations in direction.

Extended Weather Synopsis for Monday through Wednesday

A cool weak northwest flow should be seen over the area on Monday. A weak short wave is indicated by the GFS to rotate around the departing low and mainly affect the Cascade east slopes.

An upper ridge will gradually build over the Northwest coastal waters on Tuesday and Wednesday. A little moisture is indicated to move over the ridge and mainly affect the Olympics and north Cascades on Wednesday.

Extended Weather Forecast for Monday through Wednesday

Olympics, Washington Cascades & Mt Hood Area

Time	Weather
Monday	Mostly cloudy with light snow showers heaviest Cascade east slopes.
Tuesday	A mix of sun and clouds with chance of light snow showers.

Wednesday	Mostly cloudy Olympics and north Cascades with chance of light rain or snow. Partly cloudy south and east of the crest.

Extended Forecast for Monday through Wednesday ("Snow Levels")

SNOW LEVELS

Olympics and Cascades--Mt Baker (N) to Mt Hood (S)

Time	Olympics	North Cascades	Central Cascades	South Cascades
Monday	2-3000	2-3000	2-3000	25-3500
Tuesday	3-4000	3-4000	3-4000	4-5000
Wednesday	4-5000	35-4500	4-5000	45-6000

NWAC weather data and forecasts are available by visiting our Web site at www.nwac.us.

Ferber/Northwest Weather and Avalanche Center Seattle Washington