






## North American Public Avalanche Danger Scale

Avalanche danger is determined by the likelihood, size and distribution of avalanches.

Danger Level		Travel Advice	Likelihood of Avalanches	Avalanche Size and Distribution
<b>5 Extreme</b>		Avoid all avalanche terrain.	Natural and human-triggered avalanches certain.	Large to very large avalanches in many areas.
<b>4 High</b>		Very dangerous avalanche conditions. Travel in avalanche terrain <u>not</u> recommended.	Natural avalanches likely; human-triggered avalanches very likely.	Large avalanches in many areas; or very large avalanches in specific areas.
<b>3 Considerable</b>		Dangerous avalanche conditions. Careful snowpack evaluation, cautious route-finding and conservative decision-making essential.	Natural avalanches possible; human-triggered avalanches likely.	Small avalanches in many areas; or large avalanches in specific areas; or very large avalanches in isolated areas.
<b>2 Moderate</b>		Heightened avalanche conditions on specific terrain features. Evaluate snow and terrain carefully; identify features of concern.	Natural avalanches unlikely; human-triggered avalanches possible.	Small avalanches in specific areas; or large avalanches in isolated areas.
<b>1 Low</b>		Generally safe avalanche conditions. Watch for unstable snow on isolated terrain features.	Natural and human-triggered avalanches unlikely.	Small avalanches in isolated areas or extreme terrain.

Safe backcountry travel requires training and experience. You control your own risk by choosing where, when and how you travel.

## Avalanche Danger Scale

International co-operation has resulted in the standardization (almost) of Avalanche Danger Scales used in North America and Europe. The danger scale uses five progressively decreasing danger levels. Extreme (Very High in Europe), High, Considerable, Moderate and Low. The new scale, implemented for the 2010/11 season now gives travel advice in the form of recommended actions in the backcountry, the likelihood of an avalanche occurring, how avalanches might be triggered and their potential size and distribution. It is a compromise between those who wanted a minimalist scale for the general public and others who felt that it should give more experienced backcountry users more specific information.

However, the wording accompanying the danger scales is still very brief and some explanation of each level is warranted. In particular the transitions between levels; signs of instability at each level and the implications of slope angle, aspect and elevation need discussing.

### Extreme

Extreme danger levels are rare and usually the result of unusually large amounts of new snow. The snowpack is weakly bonded and unstable. Numerous large avalanches are

likely. The weight of the new snow can trigger avalanches on layers buried deep in the snowpack. Natural avalanches can release on slopes of less than 30°.

Backcountry touring is not recommended and often impossible. Avoid all avalanche terrain and keep well away from avalanche path runouts.

### High

Conditions have become dangerous, most often as a result of significant amounts of new snow, snowfall accompanied by wind or the snowpack becoming isothermal and threatening wet-snow avalanches. The snowpack is poorly bonded over large areas and human triggering is likely on steep slopes (steeper than 30°). Remote triggering is likely and large natural avalanches are to be expected.

Stay on slopes that are flatter than 30° for any part of the slope and be aware of the potential for avalanches from slopes above. If you do decide to ski or board on less steep slopes, be very aware of the surrounding terrain to avoid inadvertently crossing the bottom of steeper slopes or cutting down a steep convex rollover.

Usually this level of hazard is only present for a few days at a time. The smart backcountry traveller will stay in simple terrain until conditions improve. If you are

caught out on a multi-day trip you may have to dig in and wait for travel conditions to improve and the avalanche danger to lessen.

### **Considerable**

Conditions have become much less favourable. The snowpack is only moderately or poorly bonded over a much larger area of the terrain. Human triggering is possible by a single skier on steep slopes and aspects mentioned in the Avalanche Bulletin. Remote triggering of avalanches is possible, so the maximum steepness of the slope you are on should be used when deciding if you want to continue.

Instability indicators mentioned in Moderate danger below will likely be present. Backcountry touring at this danger level requires good routefinding skills, and experience in recognizing dangerous terrain and evaluating slope stability.

Keep to slopes of less than 35°, especially slopes at the altitude and aspect indicated in the Avalanche Bulletin. Remember that remote triggering is possible. Typically the talus fans at the bottom of gullies starts out at around 30° and the slope steepens as it gets higher. Keep off such slopes at this hazard level.

The remarks about **persistent weak layers** in the next section on Moderate danger level also apply to this danger level.

### **Moderate**

This is the most difficult danger level for backcountry skiers and boarders to assess snow stability. Many of the usual indicators such as cracks, settling, whumpfung and signs of recent avalanche are absent, especially at the lower end of the moderate level. Key indicators are any recent snowfall, and wind deposition. Snowpack tests may help assess stability.

Conditions are generally favourable for travel providing routes are chosen carefully. The snowpack is only moderately bonded on some steep slopes. Areas of danger are usually restricted to certain types of terrain such as bowls and gullies. The altitude, aspect

and type of terrain where danger can be expected are usually detailed in the Avalanche Forecast. Remote triggering is unlikely, so you only need to be concerned about the steepness of nearby terrain features.

Human-triggered avalanches are possible. Ski or board carefully, one by one, in suspect terrain and avoid high loading of the snowpack by spreading people out on the uphill track. Carefully evaluate the stability of very steep slopes (steeper than 35°) and aspects identified as potentially dangerous in the Avalanche Forecast.

Be especially careful if the higher elevation band in the forecast, or the danger on other aspects, is Considerable. There is a significant difference in instability between Moderate and Considerable. Don't get sucked onto higher, steeper and more dangerous slopes.

Although naturally triggered avalanches are not expected, ice climbers should watch out for the sun warming steep collection zones above their climbs.

If **deep-slab instability** due to a persistent weak layer is mentioned in the Avalanche Forecast, you need to pay careful attention to the terrain. Avalanches from such a layer are not only likely to be large and extensive, they are completely unpredictable. Unless you have specific local knowledge, keep off large open slopes at this danger level.

### **Low**

Travel is generally safe. The snowpack is well bonded and natural avalanches will not be seen except for small sluffs on extremely steep slopes. Human-triggered avalanches are unlikely except in isolated locations in extreme terrain. The danger will usually be from wind-driven snow in gullies and chutes or deposited across very steep open slopes near ridgelines. Ski or board one by one as smoothly as possible without falling if you suspect the formation of wind slab. Be aware of shaded, north to east aspects where the danger may be transitioning to Moderate. There are few fatalities at this danger level.

# Stability Assessment Checklist

This is a fairly meaty checklist, but if you are going to ski or board steep slopes you need all the information you can get to reduce your risk. Put the list on your Blackberry or iPhone and review it while you take a breather on the approach.

## Is the Weather Forecast Correct?

- New snow in the past 48 hours?
- Has it rained?
- Signs of recent wind deposition?
- Significant change in temperature?

## Review the Avalanche Forecast

- Are you in an elevation zone or on an aspect specifically mentioned in the forecast?
- Were potentially dangerous conditions such as persistent instabilities mentioned?
- Is the hazard increasing or decreasing?

## Do your snowcraft observations support the forecast?

- Recent slab avalanches?
- Whumpfs, cracking or collapsing?
- Signs of melting?
- Results of Hand Shear Test?

## Look for signs of stability

- Settlement around trees or rocks.
- Snow sluffed off rocks above steep slopes.

## Local Knowledge

- Review what you or your companions know about the area.

## Slope Steepness

- Is the slope steepness appropriate for the Danger Level?

## Terrain

- Are there steeper slopes above your descent line?
- Where would you end up if the slope avalanched?

## Snow Stability

- Should we dig a snowpit?
- Which stability test should we do?

## Snowpit Tests

- **Compression Test:** Is a stability test used find weak layers and gives an indication of their strength.
- **Shovel Tilt Test:** Used to identify weak layers in soft new snow near the surface of the snowpack.
- **Shovel Shear Test:** Best used to identify buried surface hoar layers.
- **Rutschblock Test:** Used to identify weak layers under a cohesive slab and as an indication of the likelihood of human triggering.

## Decision Time

- What is your conclusion about stability. Keep it simple. It will be 'stable', 'unstable' or you are 'not sure'.

If you are 'not sure', then there are some more questions to ask":

- Is your group prepared for the possibility of an avalanche both mentally and equipment wise?
- What are the consequences of an avalanche. How deep could you be buried? What are the possibility of injury?

## If you Decide to Go

- Make a plan for managing your party and discuss with your companions how you will ski or board the area.