Applying the Avalanche Terrain Exposure Scale –

What is ATES?

ATES is the avalanche terrain exposures scale. It is independent of stability. The terrain class remains the same no matter what the snow stability is.

ATES was developed in Canada by Parks Canada and the Canadian Avalanche Association. It is designed to give users information on the level of exposure to avalanche hazard when they go into uncontrolled avalanche terrain.

ATES has been adopted in New Zealand by the Mountain Safety Council and the Department of Conservation.

ATES can be applied to:

1. a fixed feature such as a track or marked route
2. an unmarked route
3. to parts of catchments or ranges
4. entire catchments or ranges

It is important to be clear about what it is applied to, because the scale at which it is applied could affect the category outcome. When an ATES assessment is done of a catchment or mountain range it is likely that the area has in it a mixture of simple, challenging and complex. The finer the scale used, the more definite things will be.

When assessing a large area you should think about what sort of user goes there and the degree of use. If a lot of people use a specific place then this should be looked at separately.

As an example a mountain range may generally be 'challenging' but contain areas of 'complex'. It still meets the definition of 'challenging' because people have options for avoiding avalanche paths. If people are using a particular valley in the range where there is no option for avoiding avalanche terrain then that place is 'complex'.

ATES assessments of the New Zealand back country will occur over a period of time. The initial places done for visitor information should be popular DOC tracks in avalanche terrain and the more heavily used back country areas. Initially many of these assessments will be done as larger scale assessments of catchments and ranges in order to give visitors a general indication of the likely ATES class contained in that area. If other groups and organisations have a need for more detailed analysis to work out where they wish to operate, they will need to take these larger areas and split them into smaller blocks. This information can then be incorporated into information that DOC and the MSC supply to visitors. As guidebooks are written or revised it would be good if they could include the ATES classifications of the routes and trips in them.

New Zealand Government

Department of Conservation
Te Papa Atawhai

Assessing the terrain

ATES assessments should be done by a small group of people who are familiar with the terrain. At least one person in that group needs to have the stage 2 avalanche qualification. When the assessment is done an assessment form needs to be filled in for each area being assessed.

Displaying the results

An ATES assessment can be displayed either through marking the classifications onto a map or by the use of a list. When putting ATES assessments onto maps this should be done in a GIS system with the simple terrain in green, challenging in blue and complex in black. Attributes for ATES shape files need to have name of the shape and Class in them. Class data needs to be 1 or 2 or 3.

If the ATES assessment is being done as a text list then the colours should be used if possible either through the lists of each terrain class being in the appropriate colour or through the use of a coloured header bar.

Simple	Challenging	Complex
Aoraki Mount Cook Village	Upper Tasman Glacier	Grand Plateau
Tasman Valley Floor	Mueller Glacier	Track to Mueller Hut

When preparing pamphlets the appropriate terrain class should be used in the text and reference made to the ATES system and where to get more information on it. The use of the terrain class on warning signs should also be encouraged.

Public Information model

The following table is the public information model. This information will need to go into any web sites giving information on ATES and into ATES pamphlets and visitor centre information along with the accompanying advice on the amount of experience needed.

Description	Class	Terrain Criteria
Simple	1	Exposure to low angle or primarily forested terrain. Some forest openings may involve the run-out zones of infrequent avalanches. Many options to reduce or eliminate exposure. No glacier travel.
Challenging	2	Exposure to well defined avalanche paths, starting zones or terrain traps; options exist to reduce or eliminate exposure with careful route-finding. Glacier travel is straightforward but crevasse hazards may exist.
Complex	3	Exposure to multiple overlapping avalanche paths or large expanses of steep, open terrain; multiple avalanche starting zones and terrain traps below; minimal options to reduce exposure. Complicated glacier travel with extensive crevasse bands or icefalls.

How much experience is needed for these trips?

An important part of ATES is providing advice to the public on how much experience is needed. Note that the experience level goes up for places with no avalanche advisories.

Simple (Class 1) terrain requires common sense, proper equipment, first aid skills, and the discipline to respect avalanche warnings. Simple terrain is usually low avalanche risk, ideal for people gaining backcountry experience. These trips may not be entirely free from avalanche hazards, and on days when the Backcountry Avalanche Advisory is rated Considerable or higher, you may want to re-think any backcountry travel that has exposure to avalanches – stay within the boundaries of a ski area. If there is no advisory you or someone in your group should have done an avalanche awareness course.

Challenging (Class 2) terrain requires skills to recognize and avoid avalanche prone terrain – big slopes exist on these trips. You must also know how to understand avalanche advisories, perform avalanche self rescue, basic first aid, and be confident in your route finding skills. In places with an avalanche advisory exists you should take an avalanche course prior to travelling in this type of terrain. If there is no advisory you or someone in your group should have done the 4 day backcountry avalanche course. If you are unsure of your own, or your group's ability to navigate through avalanche terrain - consider hiring a professional guide, normally an NZMGA qualified guide.

Complex (Class 3) terrain demands a strong group with years of critical decision-making experience in avalanche terrain. There can be no safe options on these trips, forcing exposure to big slopes. A recommended minimum is that you or someone in your group should have taken a 4 day backcountry avalanche course and has several years of backcountry experience. Be prepared! Check the avalanche advisory regularly, and ensure everyone in your group is up for the task and aware of the risk. If there is no advisory then it is recommended that everyone in the group has done the 4 day backcountry course. This is serious country - not a place to consider unless you're confident in the skills of your group. If you are uncertain, hiring a professional NZMGA qualified guide is recommended

Technical Model

The technical model is used to define each class and utilises the model being used by Parks Canada as at May 2010. (version 1.04) The following link http://www.pc.gc.ca/pn-np/ab/banff/visit/visit7a1_e.asp takes you to the Parks Canada avalanche web page.

The technical model should be available on websites but should not be used in pamphlets or visitor centre displays.

One change has been made to the technical model from the one currently shown on the Parks Canada website. That is with route options, it needs assessing in combination with avalanche frequency. It only defaults to challenging or complex if the frequency assessment fits the challenging or complex criteria. This situation is most likely to occur where walking tracks go through the run outs of infrequent avalanche paths in places where it is not possible to avoid the runout area. Although avoidance is not possible exposure is low.

Technical Model as at June 2011

	1 – Simple	2 – Challenging	3 – Complex
Slope angle	Angles generally < 30°	***Mostly low angle, isolated slopes > 35°***	***Variable with large % >35°***
Slope shape	Uniform	Some convexities	Convoluted
Forest density	Primarily treed with some forest openings	Mixed trees and open terrain	Large expanses of open terrain. Isolated tree bands
Terrain traps	Minimal, some creek slopes or cutbanks	Some depressions, gullies and/or overhead avalanche terrain	***Many depressions, gullies. Cliffs, hidden slopes above gullies, cornices***
Avalanche frequency (events:years)	1:30 ≥ size 2	1:1 for < size 2 ***1:3 for ≥ size 2***	1:1 < size 3 ***1:1 ≥ size 3***
Start zone density	Limited open terrain	Some open terrain. Isolated avalanche paths leading to valley bottom	Large expanses of open terrain. Multiple avalanche paths leading to valley bottom
Runout zone characteristics	Solitary, well defined areas smooth transitions, spread deposits	Abrupt transitions or depressions with deep deposits	Multiple converging runout zones, confined deposition area, steep tracks overhead.
Interaction with avalanche paths	Runout zones only	Single path or paths with separation	***Numerous and overlapping paths***
Route options	Numerous, terrain allows multiple choices	A selection of choices of varying exposure, options to avoid avalanche paths	***Limited chances to reduce exposure, avoidance not possible****
Exposure time	None, or limited exposure crossing runouts only	***Isolated exposure to start zones and tracks***	***Frequent exposure to start zones and tracks***
Glaciation	None	***Generally smooth with isolated bands of crevasses***	***Broken or steep sections of crevasses, icefalls or serac exposure***

Using this scale:
Any given piece of mountain terrain may have elements that will fit into multiple classes. Applying a terrain exposure rating involves considering all of the variables described above, with some default priorities. Terrain that qualifies under an ***italicized*** descriptor automatically defaults into that or a higher terrain class. Non-italicized descriptors carry less weight and will not trigger a default, but must be considered in a combination with the other factors. * Route Options needs assessing in combination with Avalanche frequency. It only defaults to complex if the frequency assessment fits the challenging or complex criteria.