ASG

Activity Safety Guideline

Heli-Skiing

July 2015 Version 1.1

SupportAdventure.co.nz

SAFETY SYSTEMS DRIVEN BY SAFETY CULTURE

The Activity Safety Guideline project is managed by the Tourism Industry Association New Zealand (TIA) with support from the Ministry of Business, Innovation and Employment (MBIE). The guideline was developed in association with heli-skiing and other relevant experts. More information about the guideline development process can be found at www.supportadventure.co.nz/activity-specific-good-practice-information/activity-safety-guidelines.

The Heli-skiing Activity Safety Guideline is a web-based document and will be reviewed and updated from time to time. The current version is available at www.supportadventure.co.nz/activity-specific-good-practice-information/activity-safety-guidelines. Users should periodically check the date and version number of the current online document to ensure their printed copies are up-to-date.

Activity Safety Guidelines are the result of a recommendation from the final report of the 2009/10 government review of risk management and safety in the adventure and outdoor commercial sector in New Zealand. The variety of activities provided by these sectors are referred to broadly as adventure activities, and include activities provided by adventure tourism operators and outdoor education centres. More information about the government review can be found at www.supportadventure.co.nz/about-site-and-government-safety-review

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Changes from version 1	Where
Supervision definition brought to qualifications section for improved clarity	Staff
On-call guide recommendations clarified regarding leading runs	Staff – on call guides
Client briefings - turning off digital devices	Section 7.2 and 8.1

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Other publications

This guideline was largely informed by, and contains information from, the Heliski Operators Group Code of Practice – version 6 2012.

This guideline contains adventure tourism and outdoor commercial sector information published on the SupportAdventure website.

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Consultation

The guideline was developed in consultation with the heli-skiing sector and other relevant experts. The following experts comprised the heli-skiing activity safety guideline working group and are acknowledged for their advice and support:

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New Zealand Heli-Ski Operators Group; New Zealand Mountain Guides Association; New Zealand Mountain Safety Council; New Zealand Outdoor Instructors Association; Outdoors New Zealand; Outdoor Safety Auditors; ServiceIQ Industry Training Association; the Tourism Industry Association New Zealand; Water Safety New Zealand.

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Definitions

This guideline assumes the reader has technical knowledge of this activity; it defines only those terms that may be unique to this guideline, are used in a specific way or that would otherwise be open to interpretation.

For the purposes of this document the following definitions apply:

Competent person (at a specific task)

A person who can correctly perform the task. They have usually acquired the knowledge and skills to do this through a combination of training, qualification and experience.

Client

A person (participant) who takes an active role in an adventure activity but is not in a leadership or supervisory role.

Direct Supervision

Is when the person supervising is in a position to be able to physically intervene and manage anticipated hazards.

Good practice

The range of actions currently accepted within the adventure and outdoor sector to manage the risk of harm to staff, participants and visitors.

Guide

A person who is responsible for guiding clients.

Health and safety – explanation of terms

See Appendix 1 for an explanation of the terms 'all practicable steps', 'serious harm', 'hazard' and 'significant hazard'.

Incident

An event that caused or could have caused harm to any person.

Indirect supervision

Is when the person supervising is able to communicate with the person being supervised, but may not be able to physically intervene to manage hazards should they develop. There are two types of indirect supervision – proactive and reactive:

- Proactive indirect supervision is where the supervising staff member is actively monitoring the client and is in a position to provide verbal assistance to intervene and manage hazards should they develop
- Reactive indirect supervision is where the supervising staff member is in a position to communicate verbally and provide assistance to a participant when sought, but may not be actively monitoring the client or provide pre-emptive assistance.

Operator

Person or other legal entity (whether an employer, principal, or self-employed person) that provides an adventure activity to a client (participant).

Qualified

A person who holds a current nationally recognised qualification.

Risk

Effect of uncertainty on objectives.

Risk assessment

A process undertaken by a competent person to identify risks and assess the risks according to their significance — potential severity of impact and probability of occurrence.

Run plan

The plan used by guides when choosing which ski or board runs to use within an operational area — it is colour coded to reflect run restrictions and requirements for safe use.

Safety management plan (SMP)

The written plan outlining the systems an operator will use to manage safety.

Safety management system (SMS)

The overarching management system for directing and controlling an operation in regard to safety.

Sector

New Zealand adventure tourism and outdoor education providers, support organisations and associations. A specific part of the sector may be referenced, for example the heli-skiing sector.

Staff

Employees, contractors or volunteers who work for an operator and are responsible for the safety of clients undertaking heli-skiing activities.

Standard operating procedures (SOPs)

Written guidance that provides health and safety information about a particular activity or task — such as how it should be conducted.

Technical expert

A person that has professional credentials such as a high level nationally recognised qualification, or extensive knowledge, skills and experience to assist an operator with various technical tasks, including advising and reviewing the policies, procedures and practices of an activity.

Section 1
Introduction, Purpose, Scope and Application

This is an Activity Safety Guideline for heli-skiing. It is made up of two main parts. In the first part you will find:

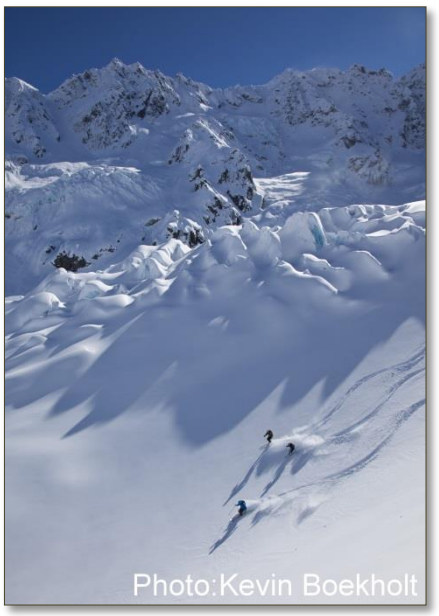
- a description of the New Zealand heli-skiing sector
- an introduction to the legislative context for heli-skiing activities in New Zealand
- an explanation of the purpose of this guideline and how it relates to the laws around health and safety
- an explanation of the scope and application of this guideline: what it covers, and how to use it to build your standard operational procedures and pass safety audits
- an outline of industry good practice for establishing your hazard management process.

The second part includes sections 2 through 9 which provide heli-skiing specific safety recommendations, and section 10 that gives recommendations about reviewing your safety systems.

1.1 A description of the New Zealand heli-skiing sector

Commercial heli-skiing in New Zealand occurs in adventure tourism operations and almost exclusively in the South Island.

New Zealand heli-skiing began in the Ben Ohau range near Mount Cook in the 1970s. Until the 1990s the industry was dominated by two main companies – Alpine Guides in Mount Cook, and Methven and Harris Mountain Heli-skiing in Wanaka. The modern heli-skiing sector has several operators and developed from early 2000 when the Southern Lakes Region became a popular heli-skiing destination.



There are strong links within the heli-skiing sector. There are still a relatively small number of operators, most of whom are part of a group called the New Zealand Heli-ski Operators Group (NZHOG). NZHOG began in 2008 with a focus on sharing safety information and sustainable use and access to the heli-ski environment. In 2010 following two separate heli-ski incidents involving fatalities, the group took action to standardise good practice and developed an operational code of practice. The code has been regularly reviewed and version 6 formed the basis of this Activity Safety Guideline. Operators are encouraged to join the NZHOG and take part in the group's regular meetings. For more information contact Kevin Boekholt kevin@heliskiing.co.nz

The heli-ski sector is strongly connected with the New Zealand Mountain Guides Association (NZMGA) and generally uses guides qualified under the NZMGA qualification system. The NZMGA worked with the heli-ski sector, the Mountain Safety Council, and other organisations to develop the New Zealand Avalanche Safety Information Exchange (Info-ex) —

a system modelled on a Canadian avalanche information exchange network. This service provides avalanche information for both professional and recreational back-country users.

New Zealand heli-ski guides are held in high regard internationally, and the sector has strong links with the international heli-ski, cat-ski and back-country ski guiding communities. Many guides used in New Zealand work as mountain climbing or ski guides in a number of different countries around the world.

1.2 The legislative context for heli-skiing activities in New Zealand

Commercial heli-skiing operations, as are all workplaces, are subject to health and safety legislation.

Health and safety legislation that applies to commercial heli-skiing operations includes:

- the Health and Safety in Employment Act 1992 — this guideline refers to this as 'the Act'
- the Health and Safety in Employment (Adventure Activities) Regulations 2011 — this guideline refers to this as 'the Adventure Activities Regulations'.

The health and safety legislation uses both 'operators' and 'providers' to refer to people or organisations who provide activities such as heli-skiing. This guideline uses 'operators' throughout.

The Adventure Activities Regulations

Heli-skiing activities expose the participant to risks of the kind defined in the Adventure Activities Regulations. The Adventure Activities Regulations cover activities where:

- the recreational or educational experience the participants have is the main purpose
- the participants are guided, taught, or otherwise assisted to participate in the activities
- the design of the activities deliberately exposes the participants to a risk of serious harm that must be managed by the operator of the activity
- failure of the operator's management systems (such as failure of operational procedures or failure to provide reliable equipment) is likely to result in serious harm to participants, or participants are deliberately exposed to dangerous terrain or dangerous waters.

The regulations require operations providing these activities to be registered and undergo an external safety audit.

For more information go to the SupportAdventure website:
http://www.supportadventure.co.nz/registration-and-audits#Regulation

Local council permits and land use concessions or permissions

Commercial heli-skiing operations require land use concessions or permissions from landowners—these may also be required for helicopter staging operations. Operators should ensure that the correct permits, concessions and permissions are in place and that they abide by their conditions. Note that although the helicopter operators may hold the permits for their aspects of the operation, it remains the heli-ski operators' responsibility to check that they are in place.

1.3 The purpose of this guideline and the SupportAdventure website

This Heli-skiing Activity Safety Guideline (referred to as 'the guideline') aims to provide practical guidance for commercial heli-skiing operators in New Zealand to actively manage the safety of the heli-skiing activities they provide.

The SupportAdventure website (www.SupportAdventure.co.nz) provides practical guidance for adventure activity operators on developing good practice safety management systems. It includes information and examples for developing a safety management plan.

This guideline and the SupportAdventure website act as companions to the health and safety legislation. They are not part of the health and safety legislation, but following their recommendations will help operators to meet legal requirements to take all practicable steps to identify and manage hazards.

An investigation into an accident may look at how well an operator followed this guideline. Hazards can be identified and managed by following this guideline directly, or in other ways that achieve the same level of safety (or better). Before departing from the recommendations given here, seek advice from a heli-skiing technical expert or other competent person. An operator will need to be able to justify why they use a different method from the guideline.

The responsibility for making safe decisions remains with the operator.

1.4 Scope and application: what this guideline covers and how to use it

This guideline defines heli-skiing as:
An activity that involves guiding clients skiing or snowboarding on day trips in an uncontrolled mountain environment, and that utilises helicopters for initial access and continued support.***

**An uncontrolled environment refers to areas that are outside the boundaries of designated and controlled ski areas.*
***Continued support includes providing transport to and from the area and for emergency procedures, and usually for multiple runs.*

This guideline covers activities that meet this definition, whether or not they are advertised specifically as heli-skiing.

This guideline is written for commercial heli-skiing operators and also for safety auditors as a benchmark for current good practice. It describes what heli-skiing operators and technical experts consider to be good practice for actively managing safety in providing commercial heli-skiing activities in New Zealand.

It will also be useful for:

- activities other than heli-skiing that involve similar hazards, risks and techniques — such as those that involve other forms of mechanised access including fixed wing aircraft, snowcats and snow mobiles, and those that arrive by mechanised access and use other forms of travelling on snow such as snowshoeing
- other people involved in heli-skiing, such as trainers and people involved with providing non-commercial heli-skiing activities.

This guideline focuses on preventing death or other serious harm. It identifies common significant hazards that clients, and the guides who lead them, may be exposed to during heli-skiing trips. It makes recommendations for managing these hazards.

Activities associated with taking clients to and from heli-skiing activities, such as driving, are outside the scope of this guideline. Operators who provide these activities need to manage the associated hazards.

> *"Safety Management Systems are made of a safety management plan underpinned and driven by a positive safety culture."* www.SupportAdventure.co.nz
>
> For information on building a safety management system go to
>
> www.SupportAdventure.co.nz

1.5 Use this guideline to build safety into your SOPs

As an operator, you should have an overall safety management plan that you use to manage health and safety in everything you do. Your plan should contain standard operating procedures (SOPs) for each activity you provide.

This guideline outlines good practice safety recommendations that are specific to heli-skiing. Conduct operation and site specific hazard management processes, consider the recommendations in this guideline, and add the relevant procedures to your SOPs.

This guideline gives examples to explain hazards and other concepts. The examples are not exhaustive — think of other examples that could apply to your operation.

It is essential that, alongside site specific assessments and the use of this guideline, guides conduct on-going dynamic hazard assessment and management.

1.6 Use this guideline to help you pass independent safety audits

The Adventure Activities Regulations require heli-skiing operators to obtain and pass independent safety audits. Following this guideline will help operators who provide heli-skiing activities to satisfy these requirements and pass audits.

Safety audit standards specify the standards or requirements that adventure activity operators must comply with to reduce risks when providing adventure activities. Safety audit standards will specify:

- the general standards and requirements for all operators
- that there are relevant technical standards and requirements for each specific adventure activity.

To view the Adventure Activities Regulations safety audit standard go here: http://www.business.govt.nz/healthandsafetygroup/information-guidance/all-guidance-items/safety-audit-standard-for-adventure-activities-2013-requirements-for-a-safety-audit-of-operators-march-2013

This guideline sets out relevant technical standards and recommendations for commercial heli-skiing activities. The guideline will help safety auditors to assess whether an operator is complying with good practice for heli-skiing activities.

Section 2

The Hazard Management Process

This section looks at the following steps in the hazard management process:

- identifying and assessing hazards
- managing hazards
- drugs and alcohol
- using competent persons
- incident reporting and learning.

The hazard management process is a key part of an overall safety management plan. The steps involved enable hazard management to be built into standard operating procedures (SOPs).

Hazard management processes need to be driven by a positive safety culture. Apply hazard management processes to all operational situations including new activities, standard activities and when there are changes to equipment or hazards.

Hazard management involves both a scheduled and dynamic approach to identify, assess, manage, communicate and record hazards in every part of an operation.

For an explanation of the terms 'practicable steps', 'significant hazard' and 'serious harm' see Appendix 1.

2.1 Identifying and assessing hazards

Identify hazards both systematically and dynamically.
Use a variety of methods such as:

- using Info-Ex — access this service at www.avalanche.net.nz
- inspecting sites physically
- studying maps and photographs
- consulting with other users
- reviewing past hazard information, such as snowpack data, and looking for trends
- reviewing standard operating procedures
- reviewing past incident reports and 'lessons learned'.

Assess and rate all hazards to identify which ones are significant. Align assessment and rating systems with current good practice and take into account the nature and context of the activity.

2.2 Managing hazards

Manage significant hazards according to the 'eliminate, isolate, minimise' hierarchy of action. Due to the nature of heli-skiing many hazards cannot be eliminated or isolated, and can only be minimised.

Hazard management should reduce the risk of harm to acceptable levels. What these acceptable levels are will depend on the nature and context of the activity, client ability and on current good practice.

Managing hazards includes monitoring them for changes in their significance. A higher level of management — such as moving from minimising to eliminating — may be necessary if a hazard

increases in significance. For example, a change in snowpack conditions might mean a different part of a run is skied or a different landing area selected.

2.3 Managing the hazard of drugs and alcohol

The Adventure Activity regulations explicitly require operators to manage the drug and alcohol-related risks in their workplaces, starting with a clear drugs and alcohol policy in their safety management plan. Auditors will expect to see a policy suited to the risk within the operator's workplace, and evidence that it is being implemented.

To see the MBIE guidance document on managing drugs and alcohol-related risk in adventure activities go to

http://www.business.govt.nz/healthandsafetygroup/information-guidance/all-guidance-items/guidance-for-managing-drug-and-alcohol-related-risks-in-adventure-activities

2.4 Using competent persons

Use suitably competent people to identify, assess and manage hazards.

Ensure the competent person(s) is familiar with the operator's safety management system, the expected type of client, relevant site specific information, and has access to historical information on site hazards and incidents.

For more information on staff competence see section 6.

2.5 Incident reporting and learning

Report, record and analyse all incidents and concerns that affect safety or have the potential to affect safety. This is done to enable learning and to help stop the incident from happening again.

The New Zealand Mountain Guides Association expects to be informed of incidents involving their members — for guidelines on what type of incident information they expect to receive go to www.nzmga.org.nz.

Act on anything you learn and communicate the learning to other relevant parties, such as other operators, land managers or recreational users.

Incident reporting systems need to be used effectively. Induction and on-going training are vital, but are only a part of ensuring that this happens. The system must be openly and regularly used, particularly by senior staff, to have any chance of success.

To encourage responsible reporting, take care to think of reporting and recording separately from the incidents themselves. Avoid penalising people for reporting incidents. Good reporting and recording should be seen as positive behaviour alongside whatever faults may have led to an incident.

For more information on hazard management processes go to
www.supportadventure.co.nz/safety-management-plans/hazards

For more information on incident reporting go to
www.supportadventure.co.nz/safety-management-plans/incidents

Section 3
The Heli-skiing Environment

The heli-skiing environment is a source of the most likely causes of serious harm while Heli-skiing — impact injuries due to slips or falls associated with hard surface conditions, rocks in the run-out and cliffs or crevasses. It is also a source of avalanches which are the most likely serious harm incident to involve multiple persons when heli-skiing. Focus safety management strategies on preventing these incidents and injuries from occurring.

This section identifies good practice safety management strategies for dealing with five key aspects of the heli-skiing environment:

- the dangers of heli-skiing in an uncontrolled alpine environment
- the dangers of working with helicopters
- the effects of cold temperatures on people
- the difficulty of getting assistance in the heli-ski environment
- protecting the heli-ski environment.


Photo: Tarn Pilkington

The information in this section should not be considered all-inclusive. It is essential to carry out operation and site specific hazard management processes, and for guides to conduct ongoing dynamic hazard identification, assessment and management.

Note: The other most likely serious harm injuries are impact injuries associated with people slipping or falling due to inappropriate skiing or boarding ability. The other serious harm incident likely to involve multiple persons is associated with a helicopter crash. For more information on these and other activity based risks see section 5.

3.1 The dangers of heli-skiing in an uncontrolled alpine environment

Uncontrolled alpine environments are those not actively controlled for avalanche hazards. Avalanches are one of the most likely sources of serious harm incidents involving multiple persons when heli-skiing. Uncontrolled alpine environments also commonly include cliffs, crevasses and other falling hazards which, particularly when combined with slippery or hard surface conditions, present significant hazards.

The range of slope angles suited to heli-skiing and the nature of skiing and boarding activities mean that people are often exposed to avalanche terrain and sliding and falling hazards. Reducing this exposure to acceptable levels relies heavily on robust trip management systems and competent staff. Follow the recommendations made for trip management in section 4 and staff competence in section 6.

3.2 The dangers of working with helicopters

Working with helicopters presents a significant hazard to guides, pilots and clients. Use helicopter operators who understand the alpine environment. Work together and follow the recommendations in sections 5 and 9 to develop safe heli-ski operating and emergency procedures.

3.3 The effects of cold temperature on people

Prolonged exposure to cold air or water temperatures can lead to clients becoming hypothermic, or struggling to safely participate in activities. If this occurs during heli-skiing it is most likely to be during an emergency situation.

Strategies for managing cold temperatures should be based on the associated risk. Options include:

- ensuring that clients are equipped for the expected temperatures
- managing the start times and duration of trips to suit the temperature
- carrying and using extra thermal clothing, food and heat sources
- training guides to manage cold temperature hazards.

3.4 The difficulty of getting assistance in the heli-ski environment

Heli-skiing often occurs in remote areas where emergency assistance relies on the use of a helicopter or occasionally a fixed wing aircraft.

Strategies for managing the difficulties with getting assistance in the heli-ski environment include:

- including the aircraft operators used by the heli-ski operator in planning and training for emergency scenarios
- caching emergency equipment
- considering accessibility when determining aircraft type, guide to client ratios, assessing clients and setting competence requirements for guides.
- ensuring that sufficient equipment is available to manage group safety during a delay in accessing assistance — such as shelter, warm clothing and high-energy food.

3.5 Protecting the heli-ski environment

Heliski environments are often wild and unspoilt areas. Operators should follow the environmental care code, respect other users, and respect the rights of landowners.

Section 4 Trip Management

This section looks at six crucial aspects of good heli-ski trip management:

- the key components of a snow safety programme
- strategies for using new or seldom used runs
- recording and sharing hazard information
- active avalanche control methods
- guide knowledge of the runs
- communication systems
- trip monitoring.

Good trip management is required to minimise heli-skiing's most serious significant hazards – exposure of people to avalanche and to snow surface conditions associated with slipping, sliding or falling on hazardous surfaces, off cliffs or into crevasses.

The primary trip management tool to reduce exposure of people to avalanche and dangerous snow surface conditions is the operator's snow safety programme.

4.1 The key components of a snow safety programme

This section look sat the five key components of a snow safety programme:

- using a competent person to direct the snow safety programme
- developing a run catalogue
- developing and using a run plan
- using field observations to build snow safety information
- post trip – gathering and using the day's safety information

The principle objective of a snow safety programme is to minimise exposure of people to avalanche hazards. Some programmes will include the management of other hazards such as snow surface conditions that could contribute to sliding falls, cornices, crevasses and other under surface conditions.

Ensure there is a snow safety programme in place that is appropriate for the hazards of the runs in use. Make a run plan based on information gathered through the snow safety programme and taking into account avalanche danger, weather and snow conditions.

Using a competent person to direct the snow safety programme

Managing the snow safety programme is one of the most important safety roles within a heli-ski operation. This role is usually called the Snow Safety Officer (SSO) and requires high levels of technical skill. Ensure the SSO is a suitably qualified person. See section 6 for recommended qualifications.

Some operations employ a dedicated SSO, while others rotate the role among suitable senior staff. Ensure there is always a suitable person delegated to fulfil the SSO role — including on days when the normal person is on leave or otherwise unable to fulfil the role. Decisions on who should be the SSO when the normal person is absent should be made by a suitably competent person, such as the existing SSO or the Chief Guide.

Developing a run catalogue

Ensure there is a Run Catalogue that contains maps for each operational area. These are usually defined by drainages and should show operational boundaries and the operation's main runs — they do not usually include variations of the main runs. These maps are usually 1:50,000 scale.

Where practicable, the run catalogue should include additional information to assist with hazard identification, such as oblique photos or satellite images that identify the position of ski runs within their specific drainages.

Update the run catalogue as relevant information becomes available and identify as a hazard new or seldom visited areas or runs that do not have suitably detailed mapping. Develop the run catalogue to include information for these areas as soon as practicable.

Developing and using a run plan

This section looks at developing a run plan during a pre-trip meeting with staff, reviewing the run plan once in the field and ensuring that guides use the run plan.

Pre-trip meetings with key staff

Hold a pre-trip meeting to determine the day's hazard evaluation summary, develop a run plan and to generally review the day's operation.

Develop the run plan based on the information in the hazard evaluation summary. Select and code the runs using a consultative process managed by the designated SSO and involving all guides working the trip.

Ensure the meeting follows a set agenda that focuses on hazard identification and management — particularly weather, and factors that could affect falls, slips and avalanche hazards such as snowpack stability and surface conditions.

The pre-trip meeting agenda should include:

- discussing weather observations and forecasts from local and remote stations including observations from avalanche.net subscribers
- discussing relevant snowpack stability evaluations and forecasts
- discussing relevant avalanche history — including information from Info-Ex
- discussing snow surface conditions
- discussing relevant terrain configuration — including aspect, angle, slots, cliffs and hazards in run-outs such as rocks
- determining likely snowpack information gathering locations and frequency — for more information see the section on using field observations to build snow safety information
- determining an overall hazard evaluation summary for the day that documents and rates hazard concerns based on at least the above factors
- determining the number of clients and levels of supervision — for more information on establishing levels of supervision see section 7.3
- developing a trip run plan based on the hazard evaluation summary.

Document the run plan using the following colour codes to rank the runs according to their expected safety for use that day:

- green – generally safe to ski and board although specific areas may need investigating or avoiding
- orange – requires investigation in the field, often involving meeting a pre-determined set of requirements.
- red – deemed not safe to ski or board.

Reviewing the run plan in the field

Review the run plan once guides are in the field and are able to assess real time hazards — take into account the information from the day's hazard evaluations summary.

The Lead Guide has responsibility for ensuring the run plan is reviewed and updated. Make decisions in consultation with another guide. Note: the decision that an orange run meets the pre-determined set of requirements and is therefore green, does not need to be made in consultation with another guide.

Do not downgrade a red run.

Review the run plan at pre-arranged times during the trip. Examples include:

- when guides first reach the suggested area of use
- after completing client skill checks
- periodically during the day such as during a lunch break
- at other times as indicated by field observations — for more information see the below section on using field observations to build snow safety observations.

Ensure all affected guides and pilots are clear on any changes to the run plan — affected guides include all the guides who came in on the helicopter using that run.

Using the run plan

Use the most current run plan. Use the runs as per the recommendations and restrictions of the plan and do not use runs that are not included in the plan.

Using field observations to build snow safety information

Ensure that guides carry out field observations on every operational day and that the information is available to be considered when developing the next hazard evaluation summary and run plan for that area.


Photo: Kevin Boekholt

Observe and gather information on the following three areas:

- weather
- snowpack — snow surface conditions, snow profiles and stability tests
- avalanche activity.

Gathering snowpack information

Gather snowpack information each day unless there has been a long period of good stability and the designated SSO has determined that it is not necessary.

Establish locations and time of day for gathering snowpack information during the pre-trip meeting. The Lead Guide should review the locations and times once they are in the field and discuss suggested changes with other guides.

Post trip – gathering and using the day's safety information

Ensure that all relevant safety information gathered during the day is available to inform safety planning at the next pre-trip meeting. Safety information includes:

- weather observations including observations from avalanche.net subscribers
- snowpack information including stability and skiing conditions
- avalanche observations
- learning from any incidents that occurred that day

Consider uploading relevant information to national safety information databases such as Info-Ex and the National Incident Database (NID). For more information on the NID go to www.incidentreport.org.nz.

4.2 Strategies for using new or seldom used runs

Generally heli-ski trips are run in areas that are well documented in run catalogues and have extensive historical hazard information. However it is not unusual for clients to request new or seldom used runs and areas, particularly film crews or professional ski and snowboard athletes.

New or seldom used runs may not have much information in the run catalogue, and generally may have limited data to assist with developing a hazard evaluation and run plan. Run plans will necessarily be developed in the field. Identify this as a significant hazard. Hazard management strategies could include:

- making a reconnaissance trip without clients to gather hazard information
- gathering hazard information from other operators who use the run or who operate in adjacent terrain with transferable information
- making conservative weather and snowpack stability decisions
- using more than one guide and ensuring decisions on run use are made together
- using very experienced guides
- increasing client assessment criteria , such as ski or snowboard ability requirements
- limiting client numbers

4.3 Recording and sharing hazard information

Record relevant hazard information such as avalanche observations, weather observations and snow profiles. Ensure that run catalogues are up to date and that relevant hazard information is retained for the use of future staff. Note: the use of historical information does not decrease the importance of using a snow safety programme and qualified staff.

Record hazard information using standard terminology as per the latest edition of the New Zealand Guidelines and Recording Standards for Weather, Snowpack and Avalanche Observations — this is a New Zealand Mountain Safety Council publication.

Records should be accessible and available in either digital or paper form and may include photographs and guides' notes. Keep snow profile records for frequented areas and ensure they are accessible to all staff — wall mounting of representative profiles of each area is advised.

Share relevant hazard information with key staff, other operators and the wider avalanche community – using the New Zealand Avalanche Safety Information Exchange (Info-ex) is advised.
Active avalanche control methods

Avalanche control includes passive and active methods. Passive methods include analysing information to develop run plans that minimise exposure to avalanche hazards. The two main active avalanche control methods are ski or cornice cutting and using explosives. Note: Not all heli-ski operations use active avalanche control methods.

Ski and cornice cutting
Use guides who are experienced at avalanche ski control. Restrict ski control to small isolated terrain features which, where practicable, are isolated from other avalanche hazards.

Using explosives
If the snow safety programme includes avalanche control using explosives ensure that procedures are in accordance with industry good practice for snow blasting, as well as any land manager requirements. For information on industry good practice for snow blasting contact the Ski Area Association of New Zealand www.snow.co.nz.

4.4 Guide knowledge of runs

Ensure that guides are familiar with the known hazards of the runs they are working, as well as the operator's standard operating procedures. The number of trips on a run and amount of training this requires will vary. Factors to consider include:

- the specific hazards associated with the runs and current conditions
- the competence and experience of the guide
- the familiarity of other guides with the runs and current conditions

4.5 Communication systems

Effective communication systems are vital for ensuring rapid emergency response and running a safe heli-ski operation. Ensure the trip communication system enables continual communication wherever practicable between guides in the field, between guides and the aircraft pilot, and with the person(s) providing back-up monitoring of the trip. Communication systems include options such as meetings and radios.

Use a structured communication plan outlining the requirements for contact. Plan content will vary depending on communication options and the size and complexity of the trip. Consider including:

- who should communicate, how often and when
- which communication devices will be used and by whom
- protocols for relaying information, such as the pilot relaying information between guides
- expectations on what type of information should be communicated, such as snow stability, surface conditions, group conditions (clients and guides)
- coverage and non-coverage areas and associated information such as channels and repeaters — including information for the back-up communication system
- strategies for communicating when the helicopter has left the area, e.g. when the helicopter is relaying groups back to base
- the helicopter's flight following procedures.

Communicating between guides, and between guides and the pilot

Communication systems between guides, and between guides and the pilot will usually involve a radio. Ensure that guides and pilots are trained in its use.

Ideally the communication between guides should be direct. However, where this is not practicable the pilot may relay information between guides.

Ensure that guides and pilots are aware of situations and expected length of times when communications with the pilot may not be possible, such as during re-fuelling.

Communicating with other users in the area

Where possible lead guides should communicate and exchange safety information with other users in the area, such as other heli-ski operators.

Ensure the lead guide knows the channels of communication that are best to communicate with other users.

Communicating with external support

Difficulty in communicating with external support is a significant hazard associated with heli-skiing. Heli-skiing trips rely heavily on the helicopter to communicate with external support. Ensure the helicopter operation's flight following system enables two way communications, involves regular position reports and is suited to the operational requirements of the heli-skiing operation and environment. Satellite tracking is advised. Other points to consider include:

- frequency of call ins
- consistency and reliability of helicopter base monitoring the radio — does the base set get turned down to manage phones and clients at the helicopter base?
- training of helicopter base staff in heli-ski specific emergency response — for more information see Section 9 Emergencies.

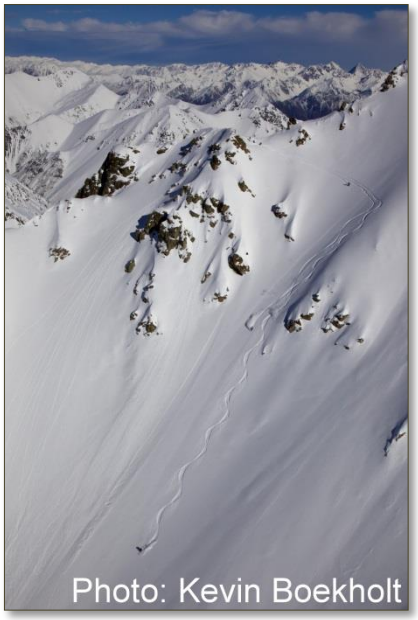


Photo: Kevin Boekholt

Ensure there are strategies for managing group safety for situations where it is not possible to communicate with external support, such as when the helicopter is out of range while relaying groups back to base. Strategies should be based on the associated risk. Options include:

- using runs coded green or with fewer significant hazards
- stopping skiing and boarding and waiting in a safe place
- using runs that are well within the abilities of clients
- using runs that have already been skied

4.6 Trip monitoring

Monitor trip safety with a suitable back up person who is not on the trip, and with a suitable person on the trip itself.

Back up monitoring

The person providing back up monitoring is responsible for initiating emergency response as per the procedures in the operator's safety management plan. This role is generally covered by the helicopter company base staff.

Ensure the backup person is not on the heli-ski trip and is continuously monitoring the communication system — usually a radio.

Ensure that this person is adequately trained and has access to the correct resources to initiate timely and effective emergency response. Correct resources include adequately trained people such as heli-ski guides or alpine rescue teams.

For more information on emergency response see Section 9 Emergencies.

On-trip monitoring

Ensure there is a person on every trip who is responsible for monitoring general trip safety and ensuring the trip follows the operator's standard operating procedures.

This person should be verified as competent in the competencies required for a Lead Guide and be someone whom the operator is confident will exercise good judgement under pressure. See section 6 for information on Lead Guide competency requirements.

Note: This does not remove the responsibility for each individual guide to manage the safety of clients under their supervision.

Section 5 Heli-skiing Activities

This section looks at the two primary heli-skiing activities. It identifies significant hazards they often involve and good practice for managing those hazards. The two activities are:

- skiing and boarding
- being transported by a helicopter

Heli-skiing activities themselves are associated with some of the most likely serious harm injuries, particularly impact injuries related to slides or falls, or avalanches triggered by aircraft or human weight. A heli-ski activity incident likely to involve multiple persons is a helicopter crash. Safety management strategies should focus on preventing these from occurring.

Environment based factors are associated with the other most likely causes of serious harm while heli-skiing. Factors such as hard surface conditions and hazards en route such as rocks, cliffs or crevasses are associated with impact injuries and slips or falls, and a large avalanche is the most likely serious harm incident to involve multiple persons. For information on these environmental factors see section 3.

The information in this section should not be considered all-inclusive. Use it in conjunction with the recommendations in the rest of this guideline. It is essential to carry out site and activity specific hazard management processes, and for guides and pilots to conduct on-going dynamic hazard identification, assessment and management.

5.1 Skiing and boarding

Identifying the hazards

Factors to consider when identifying hazards for skiing or boarding include:

- unstable snowpack and associated hazards such as terrain traps
- clients with insufficient skiing or boarding ability
- obstacles and edges on route or in the run-out such as rocks, cliffs and crevasses
- snow surface conditions — soft, hard, icy or otherwise difficult to navigate
- steep terrain
- clients not following instructions
- losing track of other groups, guides or individual clients
- clients using gear unsuited to the conditions

Managing the hazards

Include strategies for managing hazards in technical systems, group management techniques and client briefings.

Technical systems

Ensure route choice is made following the processes outlined in section 4.

Ensure guides flying to staging areas keep their radios turned on.

Ensure that guides know the location of other groups and the number of people in each group

Group management

Use terrain that is within client ability — follow the assessment process outlined in section 7.3

Ski or board the runs with the guide going first — if choosing to allow a client to go first do so with extreme care and for short distances. The decision to do this should be made by an experienced Guide or the Lead Guide.

Ensure that clients stop above the guide unless they have express permission to do otherwise and that the guide keeps their clients within sight.

Pace the trip to suit client fitness.

Client briefings

Stop in a place where you can see the route to be travelled and instruct clients in where to stop, areas to avoid, expected spacing relative to other people, and where to ski or board — consider using the guide's tracks as a reference point.

Before the trip — recommend to clients that they use gear suited to the conditions, such as wider skis for powder snow, see section 8.1 for more information about clients using their own safety equipment.

5.2 Being transported by a helicopter

Identifying the hazards

Factors to consider when identifying hazards for being transported in a helicopter include:

- rotor blades contacting people or gear
- helicopter landing triggering an avalanche
- flying debris — due to rotor wash
- overloading the helicopter or having an improperly balanced load
- difficult visibility — affecting pilot ability to land
- poor weather — stopping the helicopter from flying and stranding people in the field.

Managing the hazards

Include strategies for managing hazards in technical systems, group management techniques and client briefings.

Technical systems

- It is the responsibility of the Lead Guide to ensure appropriate choice of landing and pick up locations.
- Ensure the pilot does not come to the group until signalled by the guide.
- Ensure the pilot is aware of cornices or surfaces involving a risk of sliding in the landing or take-off zones — take extreme care in helicopter and people management.
- Secure ski and boarding equipment so that it does not come loose during travel or landings.
- In situations with poor visibility assist the pilot to identify the landing. Options include using flags, gear or high visibility spray and choosing sites next to rocks or vegetation.
- Ensure guides and pilots monitor the weather and allow time to evacuate the field before the helicopter can no longer fly. If time frames are tight consider options such as flying guests to intermediate locations below the weather and flying clients out first and guides last — ensure guides have emergency survival gear with them.
- Follow the pilot's direction on safe load size and placement.

Group management

Ensure that clients near the helicopter stay in designated waiting areas, both before and after landing, until the helicopter has left or the rotor blades have stopped turning. Ideally establish these waiting areas in the pilot's field of view.

Do not leave clients unsupervised near the helicopter.

Ensure clients do not operate helicopter doors or lockers.

Client briefings

Ensure clients are instructed in safe helicopter use such as approaching within the pilot's field of view and from the downhill side, and managing themselves and their gear so they do not interfere with the rotors — including securing clothing and not reaching upwards with their arms.

Instruct clients on the location of the designated waiting areas and the importance of staying there until signalled to move.

Instruct clients to take extreme care if disembarking on surfaces that involve a sliding risk.

Section 6 Staff

Using competent staff is one of the mainstays of ensuring safety. This section looks at six key factors of staffing an operation:

- identifying safety responsibilities and competence requirements
- verifying competence
- heli-skiing guide competence recommendations
- helicopter pilot competence recommendations
- on-going staff training
- identifying and dealing with unsafe staff.

6.1 Identifying safety responsibilities and competence requirements

Identify the safety responsibilities of each job within the operation. These jobs should include operations management and guiding. Identify the skills and knowledge required to meet these responsibilities. When identifying a job's required skills and knowledge, factors to consider include:

- levels of experience and judgement
- personal technical skills, including equipment knowledge
- risk management, group management and leadership skills
- ability to operate in accordance with standard operating procedures
- familiarity with and understanding of the operational environment
- ability to communicate safety requirements/directions clearly to the client
- rescue and emergency management skills including first aid.*

*Ensure the number of staff with first aid qualifications, and the type of qualifications they hold are suitable for the likely first aid scenarios of the heli-ski operation. See section 6.3 for competence recommendations.

6.2 Verifying competence

It is the responsibility of the operator to ensure that staff are competent. This section looks at how to use qualifications to verify skills, and how to verify those skills which are not covered by qualifications.

Using qualifications

Operators should ensure they know which skills and knowledge a qualification actually measures. The operator should then check these against those required for the job. Any skills or knowledge not covered by the qualification should be verified by other suitable means (see the information later in this section on skills not covered by qualifications).

Establishing equivalency between qualifications

When establishing equivalency of one qualification with another (or parts thereof) an operator should contact the benchmark qualification provider and enquire as to the process they recommend. The International Federation of Mountain Guide Associations (IFMGA) Guide award is referenced in section 6.3, it is an international award. Contact the NZMGA via www.nzmga.org.nz for more information.

Qualifications currently under review

Several of the qualifications recommended in this guideline include avalanche award components which are part of the New Zealand Qualifications Authority (NZQA) Framework. Qualifications on the NZQA Framework are currently being reviewed. Any results of this review that affect the heli-skiing sectors' recommendations for verifying competence will be included in this guideline as they become available. For more information on the avalanche awards contact www.mountainsafety.org.nz, for more information on the overarching qualification review go to www.skillsactive.org.nz.

Skills not covered by qualifications

Verify competence in all safety skills required for a role. Skills not covered by nationally recognised qualifications should be measured in a way that suits the degree of safety responsibility associated with the skills.

Use a suitable person to verify competence. This person should have a qualification to do so, or be a technical expert in the skill to be verified who also understands national expectations on the standard of competence required.

Keep records of competence verification processes and results.

For more information on verifying staff competence go to www.supportadventure.co.nz/safety-management-plans/staff

6.3 Heli-skiing guide competence recommendations

This section looks at competency recommendations for heli-ski guides.

The heli-ski sector has recognised that heli-skiing involves a particularly high level of inherent risk and relies heavily on staff competence to manage that risk. The sector uses nationally recognised qualifications to verify staff competence.

This guideline identifies five core roles common to most heli-ski operations. For the purposes of this guideline these roles are called Snow Safety Officer, Chief Guide, Lead Guide, Guide and On-call Guide. Ensure that guides operating in these roles hold the qualifications recommended in this guideline, or an equivalent qualification.

The qualifications are administered by the New Zealand Mountain Guides Association (NZMGA), with the avalanche components being managed by the New Zealand Mountain Safety Council (MSC). For more information including more detailed skill breakdowns go to the administering organisation's website www.nzmga.org.nz or www.mountainsafety.org.nz.

Snow Safety Officer

Purpose

To manage the operation's snow safety programme. Note: the snow safety officer often works as a Chief or Lead Guide in the field.

Qualifications
IFMGA Guide or Full NZMGA Ski Guide

Chief Guide

Purpose
To manage overall guiding operations including safety. Note: the Chief Guide generally works as a Lead Guide in the field.

Qualifications
IFMGA Guide or Full NZMGA Ski Guide.

Lead Guide

Purpose
To lead operations in the field and guide clients.

Qualifications
IFMGA Guide or NZMGA Ski Guide , NZMGA Assistant Ski Guide or Aspirant Guide*, Lead Guide as grandfathered under the 2010 grand-parenting scheme**

*The NZMGA Assistant ski or climbing guide and Aspirant IFMGA Guide awards will be phased out of use for the Lead Guide role by March 2015.

** For information on the grand-parenting scheme contact the Heliski Operators Group (NZHOG) via Kevin Boekholt kevin@heliskiing.co.nz

Guide

Purpose
To guide clients under the direct supervision of a Chief Guide, or a Lead Guide with IFMGA or Full NZMGA Ski Guide qualifications.

Qualifications
NZMGA Assistant Ski Guide, NZMGA Assistant Heliski Guide, Guide as grand-parented under the 2010 grand-parenting scheme*

* For information on the grand-parenting scheme contact NZHOG via Kevin Boekholt kevin@heliskiing.co.nz

On-call guide

Purpose
To guide clients under the direct supervision* of a Chief Guide, Lead Guide or Guide. Note: an On-Call Guide is usually used during busy times of the season and does not hold a key position in the company.

* this direct supervision includes situations when the On-Call Guide and the person supervising them arrive on and utilise the same helicopter for multiple runs and emergency support.

Qualifications
MSC Avalanche Stage 1 and Pre-hospital Emergency Care - 40 hour course.

Minimum Experience

Trainee NZMGA Ski Guide or:

- a person who is currently working on call as a heli-ski guide and has completed more than 10 seasons in the last 15 years with more than 125 logged days heli-skiing or
- who is currently working as a ski patroller with at least three years' experience

Recommendations

Competencies required will vary depending on the terrain and tasks to be managed. When using an on-call guide ensure that:

- they are only used when there are at least two other guides (Guide, Lead Guide, or Chief Guide) working the trip — unless they are a Trainee NZMGA Ski Guide in which case they can work with one qualified guide
- tasks to be managed, safety responsibilities and required skills are clearly identified
- they are verified as competent in the required skills
- they only manage the tasks for which they are verified as competent
- the competence of the on-call guide is considered when establishing client supervision levels.
- they do not choose or ski independent lines — the exception being if they are directly instructed to do so by the Lead guide, such as if the lead guide encounters bad conditions on a run and directs the following groups onto a better alternative.

6.4 Heliski pilot competence recommendations

Helicopter pilots are required by law to have a helicopter pilot licence. Additional hours and experience required to operate with a heli-ski operation will usually be decided within the helicopter company.

The helicopter pilot plays a key role in managing safety with heli-ski activities. Ensure the pilot understands the heli-ski operator's safety management plan and has been verified as competent in the skills required to perform their role. See section 6.2 for information on verifying skills not covered by qualifications.

The helicopter pilot's role will often include:

- assisting guides with direct and relayed radio calls – both for communications within the heli-ski operation and with external emergency support
- acting as an aerial vantage point to assist with overseeing and locating people and hazards
- loading injured people and assisting in other emergency procedures.

6.5 On-going staff training

Regularly train all staff involved in safety and emergency procedures, including office staff and external contractors such as pilots and staff at the helicopter base.

Use a structured training plan managed by a person competent to do so — this is often a role of the Chief Guide. Operators should record training to help show verification of staff competence.

Ensure training occurs at least pre-season, covers safe operating and emergency procedures, and pays particular attention to procedures that are new or have changed.

For training recommendations for emergency procedures see section 9 Emergencies.

For more information on staff training go to
www.supportadventure.co.nz/safety-management-plans/staff

6.6 Identifying and dealing with unsafe staff

Do not permit a person to guide or undertake safety related tasks if they are in such a state of impairment that they may be a hazard to themselves or to any person on the trip. Impairment could be due to alcohol, drugs, injury, fatigue or illness.

Identify as a hazard any guide who is unable to perform safety tasks as required to fulfil the responsibilities of their role.

Management strategies should suit the significance of the risk and be outlined in the staff management aspects of the operator's safety management system. The Adventure Activities Regulations require that drug and alcohol hazards are specifically addressed through an explicit drugs and alcohol policy.

Initial hazard management for dealing with unsafe staff should include removing the person from the role requiring performance of safety tasks.

See also section 7.1 for information on managing unsafe clients.

To see the MBIE guidance document on managing drugs and alcohol-related risk in adventure activities go to

http://www.business.govt.nz/healthandsafetygroup/information-guidance/all-guidance-items/guidance-for-managing-drug-and-alcohol-related-risks-in-adventure-activities

Section 7 Clients

This section identifies good practice for four key areas of client safety management:

- ensuring clients are suited to the trip and its activities
- informing clients about safety
- supervising clients
- recommendations for sole guiding

7.1 Ensuring clients are suited to the trip and its activities

Assess clients to check that they are suited to participate in the heli-skiing trip. This should happen before the trip begins and be ongoing during the trip itself. This section looks at assessing clients and identifying and dealing with unsafe clients.

Assessing clients

Use information gathered while assessing clients to inform trip options, client supervision levels and run choice within the trip.

Clearly identify what to assess in the operator's safety management plan. Staff other than guides, such as front of house staff or drivers, may be involved in assessing clients.

Ensure that client assessment is consistent across staff, and reflects the requirements of each trip. Factors to assess include:

- fitness and physical ability
- psychological factors such as the ability and likelihood to follow instructions, confidence in the environments of the heli-skiing trip, and phobias or fears — particularly of heights and flying
- medical issues, particularly pre-existing injuries
- the technical skills required for the trip, such as skiing or boarding ability
- the group's requirements for the day — this can vary hugely from groups wanting a day in moderate terrain to film crews and professional athletes exploring new and extreme runs.

Age restrictions

There are no overarching age recommendations for heli-skiing in New Zealand.

Establish minimum age guidance for each heli-skiing trip. Factors to consider include:

- activities within the heli-ski trip and their specific hazards
- whether the client has their own, or fits company supplied safety equipment
- the ability to access external emergency support — consider a higher minimum age if access to external support is limited
- supervision levels
- experience and skill of guides.

Identifying and dealing with unsafe clients

Do not permit a person to participate in a heli-skiing trip if staff believe they are in such a state of impairment that they may be a hazard to themselves or to any person on the trip. Impairment could be due to alcohol, drugs, injury or fatigue.

Identify as a hazard any client who is unable to perform safety procedures as outlined in the safety instructions. Management strategies should suit the significance of the risk and may include directing the client towards less risky activities, increasing supervision levels or removing them from the trip.

See also section 6.6 for information on managing unsafe staff.

7.2 Informing clients about safety

Managing safety is more effective if clients are well informed, particularly on the risks and requirements of the heli-skiing trip. This section looks at the five key aspects of informing clients about safety:

- delivering safety information and checking for understanding
- pre-trip risk disclosure
- general safety information
- safety information for specific activities or hazards
- using demonstrations and activity progressions.

Delivering safety information and checking for understanding

Safety information should be delivered by a guide who has been verified as competent to do so. Ideally this person would be an experienced guide.

Ensure, as far as practicable, that the client has understood the safety information. A safety information aid should be readily available to any client who has difficulty understanding the initial briefing; examples include videos, pictures and diagrams, practical demonstrations or written instructions in the client's language.

Pre-trip risk disclosure

Before setting off on a trip inform every client of the following information — emphasise the points in accord with their significance for each trip:

- Heli-skiing is an adventure activity involving risk of serious harm or death. Clients should be aware that the commercial heli-skiing operator cannot guarantee the client's safety
- the trip is mentally and physically demanding and requires the client to be comfortable and confident moving over uneven and possibly steep and slippery terrain
- this trip requires the client to be a suitably able skier or boarder – elaborate on the type of skiing or boarding likely to be encountered
- the client should follow the guide's instructions at all times and understand that this is critical to their safety and that of the group.

Mention specific unavoidable significant hazards and any that place extra responsibility on the client. These include the current avalanche danger, exposure to crevasses or drop offs, difficult surface or weather conditions, and sole guided trips.

Inform clients if there are run specific difficulties with escaping the heli-ski environment or with communicating with external emergency support.

General safety information

Instruct clients in general heli-skiing safety awareness and avalanche rescue information.

General factors include:

- Awareness of and warnings about the hazards of the run.
- Awareness of and warnings of the hazard of using a helicopter.
- The importance of listening to the guide.
- Any on-mountain communication systems such as the “OK” or “go” signals.
- Methods for maintaining body temperature — for trips in colder weather conditions.
- General emergency procedures as required by the trip’s identified emergency scenarios, such as staying where they are and waiting for instructions from the guide.

Avalanche rescue information includes:

Ensuring there is a guide demonstration on how to use the trip’s avalanche rescue equipment — include a check of all transceivers.

Checking that clients have the skills to use the avalanche rescue equipment as suited to their role in an emergency, such as the ability to switch from send to receive and follow search instructions.

Briefing clients to ensure that digital devices are off when participating in avalanche rescues — due to the possibility of digital devices interfering with avalanche transceivers.

Safety information for specific activities or hazards

For parts of the run involving a significant hazard, or requiring technical manoeuvring to negotiate, inform clients of:

- the hazard and warn of its dangers
- options for avoiding the hazard such as alternative routes or techniques
- the location of safe zones, such as waiting areas back from dangerous surface types or edges
- the techniques required to negotiate the hazard or complete the manoeuvre. Ensure information suits the ability of the client — for guidance on points to cover for skiing, boarding and operating around helicopters see section 5.2
- applicable emergency procedures or self-rescue techniques.

Note: It is common practice for operators to require children aged under 16 to have guardian consent to participate in adventure activities — New Zealand law does not give clear guidance on this topic.

7.3 Supervising clients

Supervision levels and terrain choice are the two most important tools for ensuring adequate supervision of clients when heli-skiing. This section looks at parameters for indirect supervision, establishing minimum levels of supervision for each run and deciding client specific terrain and supervision levels.

Parameters for indirect supervision

Heli-skiing clients are indirectly supervised. Indirect supervision involves guides scanning for unsafe situations and intervening as need to maintain safety. Unsafe situations include unsafe general behaviour, not following guide’s instructions, unsafe equipment, and client skills being inadequate for the run.

Establishing minimum levels of supervision for each run

There are no recommended guide to client supervision levels for heli-skiing in New Zealand.

Establish a maximum number of allowable clients and minimum client supervision levels for each run. Consider the run's significant hazards and technical difficulty, and likely client abilities.

Establish actual numbers of guides and clients for each trip during the pre-trip meeting. Take into account the run's agreed maximum client numbers and minimum supervision levels, and information in the day's hazard evaluation summary.

Splitting clients into ability groups to inform terrain choice and supervision levels

Assess client technical ability, fitness and likelihood to follow instructions. Often this occurs in two stages — a client's self-assessment via questioning before the trip begins, and an initial guide's assessment in the field.

Ensure the first run is suitable for checking the client's self-assessment — that it is within the expected level of client ability and has a correspondingly manageable run-out allowing for client error.

Use the assessment results to group clients into similar ability groups and to inform what terrain within the run they should be skiing or boarding, and the degree of supervision they require.

Ensure relevant results of the client assessment are communicated to other guides on the run.

Recommendations for increasing supervision levels

Increase supervision levels when operational situations are less than optimal. Examples of these situations include:

- challenging environmental conditions such as difficult surface conditions or dangerous run-out
- less experienced or less confident guides
- clients who are less physically able, younger, less confident or less likely to follow instructions

Techniques for increasing supervision levels include:

- instructing the client to follow directly, or explicitly left or right of, the guide's tracks
- stopping and re-grouping more frequently
- placing a particular client to run first after the guide
- placing a client in a smaller group — higher guide to client ratio
- separating clients into different groups if they are likely to encourage each other to behave un-safely.

For more information on establishing levels of supervision go to
www.supportadventure.co.nz/safety-management-plans/clients

7.4 Parameters for sole guiding

Sole guided trips involve an increased risk of clients being inadequately supervised or spending extended periods of time in the heli-ski area in an emergency scenario.

The risks associated with sole guiding may also apply to situations where a group is first or last in the field. In these situations the group may choose to wait in a safe area for another group to arrive or for the helicopter to come and collect them. If not, consider the recommendations in this section and manage safety based on the associated level of risk.

This section looks at acceptable terrain and environmental conditions for sole guided trips, increasing safety equipment, assessing and informing clients, guide requirements, and recommendations for additional back-up support.

Acceptable terrain and environmental conditions for sole guided trips

Ensure that terrain and environmental conditions allow the trip to be managed safely. Ensure that run and terrain choice are discussed and agreed on with other suitably qualified guides as per section 4.1. Do not sole guide trips in conditions of poor snowpack stability unless run selection is limited to known safe terrain.

Distributing communication equipment

Ensure that either the helicopter is actively watching the group or communication devices such as radios are distributed throughout the group — not carried solely by the guide. If communication devices are carried by clients, ensure they are trained in their use.

Assessing and informing clients on sole guided trips

When establishing parameters for assessing clients for participation in a sole guided trip, factors to consider include:

- increasing minimum age requirements
- increasing technical ability or training requirements, such as skiing or boarding ability or previous training in avalanche rescue techniques
- increasing psychological suitability requirements, such as high confidence in the heli-ski environment and likelihood to follow instructions
- excluding some medical conditions.

Inform clients of the risk that they may be inadequately supervised and spend extended periods of time in the heli-ski area in an emergency scenario. Inform clients how they can assist with managing these risks. Base management strategies on the associated risk, options include:

- emphasising the heightened responsibility sole guiding places on them
- emphasising the importance of following instructions
- training them in radio use as required to assist with communication with the guide, pilot or secondary support
- training them in what to do if the guide becomes unable to assist them – factors to consider include instructing them to stay where they are, training them in avalanche search methods, and training them in how to call for outside help.

Requirements for sole guides

Ensure that guides working sole guided trips are experienced and verified as competent to manage the trip alone. Factors to consider include:

- their level of experience and ability in the skills required for leading the trip, including managing emergency scenarios
- their degree of familiarity with the environmental particulars of that heli-ski trip
- their degree of familiarity with the operator's standard operating and emergency procedures.

Providing additional back up support

Ensuring adequate back up support for sole-guided trips may require normal trip monitoring procedures to be supplemented by additional back up support. Additional back up support should be based on the associated risk and could include:

- guide staff on standby to be part of an emergency response team
- other groups operating nearby who have been informed of the sole guided trip and agreed to be part of a back-up system.

Section 8 Equipment

This section looks at general use equipment, emergency equipment and equipment maintenance, testing and inspection.

Ensure that equipment is suitable and in good condition. Equipment choices should be based on:

- the heli-skiing activities on the trip
- identified hazards and associated management strategies
- factors on the day such as guide skills, client ability, back up support and environmental conditions.

8.1 General use equipment

Use equipment according to manufacturer's recommendations and current industry use.

Use equipment that complies with relevant internationally or nationally recognised standards such as the International Mountaineering and Climbing Federation (UIAA), the European Conformity (CE), and the New Zealand and Australian standard (AS/NZS). Technical equipment should be manufactured specifically for mountaineering, rock climbing, abseiling, skiing, snow-boarding or other equivalent activities — unless the equipment is generic such as first aid equipment.

This section looks at client equipment and guide equipment.

Client equipment

This section looks at client equipment for all trips and makes recommendations for when clients use their own safety equipment.

Check client equipment as suitable throughout the trip — such as when skis have come off after a violent crash. Checks may be physical or verbal.

Client equipment

Ensure a client within each group carries an avalanche rescue shovel and probe.

Ensure every client has:

- a transceiver of a type compatible with the other clients and guides — ensure the transceiver is worn on the client's body, not in a pack, and is in a harness system consistent with that approved by the manufacturer
- clothing that is sufficient to protect them from trip hazards such as cold temperatures, sun and rough surfaces
- protective eyewear.

Check that client's personal electronic equipment, such as cell phones, does not interfere with avalanche transceiver function. Consider turning devices off or into flight mode.

Clients using their own safety equipment

It is common for clients to use their own thermal clothing, skis or snowboard. Operators are responsible under health and safety legislation to take all practicable steps to ensure the safety of

people on the trip. This responsibility exists when the operator provides safety equipment as well as when a client uses their own. Safety equipment also includes avalanche rescue gear.

Methods of meeting this responsibility will be operation specific and should be based on the associated risk. Factors to consider when choosing safety management strategies include:

- clients signing a disclaimer does not affect an operator's statutory duty and therefore has little or no effect in meeting an operator's responsibilities
- operators and staff cannot know the history or storage of client equipment and therefore, despite conducting checks, cannot be as assured of the safety of that equipment as their own
- clients need to be informed of and acknowledge any potential increase in risk associated with using their own equipment — options include verbal or written acknowledgements
- ensure any client equipment checks are done by a staff member competent to do so.

Guide equipment

Guide equipment recommendations include the items recommended for clients, with the addition of:

- avalanche rescue gear including a shovel, probe and transceiver
- a radio — worn on the guide's body, not in a pack
- a first aid kit

Ensure a guide within each group carries:

- spare warm clothing, such as hats, gloves, down vest or similar
- a source of shelter such as a tarp or fly — large enough to shelter the group
- a small insulating pad.

Ensure either the helicopter or a guide within each group carries a list of the clients and guides in the group.

Other items to consider include:

- a map of the area and a compass
- snowpack information gathering and recording equipment
- spare sun protective eyewear
- spare sunscreen
- a light source such as a headlamp
- a repair kit — screwdriver, pliers, duct tape, zip ties, a knife, a ski pole basket and a lighter.

Consider equipping guides with an avalanche airbag or similar protective device if they are involved in snow control activities that expose them to higher avalanche risk, such as ski cutting.

8.2 Emergency equipment

This section includes information on the accessibility of emergency equipment, emergency equipment for different terrain types and first aid supplies.

Accessibility of emergency equipment

Ensure that trip emergency equipment is suitably available and accessible. Consider the recommendations in this section plus the trip risks and hazards when determining whether equipment is worn on the guide's body, carried in a backpack, carried in the helicopter, stored at a staging site and/or cached on the run.

Emergency equipment for different terrain types

Ensure emergency equipment is sufficient and suitable for managing group safety and is chosen based on identified emergency scenarios and the recommendations in this section. This section looks at emergency equipment recommendations for all trips, for trips in glaciated terrain and in terrain with cliffs and other falling hazards.

All trips

Ensure that the helicopter carries an emergency response procedure card, a comprehensive first aid kit, additional avalanche rescue equipment such as probes and shovels, and warmth and insulation equipment such as a blanket and insulation matt.

Additional sources of shelter and warmth should also be available — in the helicopter, cached in a van or at a staging post. The following items should be considered:

- extra blankets or sleeping bags
- enough high energy food for the group for 24 hours
- a cooker and billy.

Ensure resuscitation equipment and a backboard or rescue stretcher is available and accessible within a known timeframe. Depending on flight times they could be stored in the helicopter, at a staging post, or in a fixed cache in the field or other known location such as a van. Resuscitation equipment includes:

- medical oxygen and a regulator
- a bag mask and airway management equipment such as OP airways
- manual suction
- an automated external defibrillator (AED).

Trips in glaciated terrain where crevasse falls are possible

Have crevasse rescue equipment at a staging area, helicopter base or cached in the field.

Ensure equipment is sufficient for the emergency scenarios of the trip — consider crevasse depth and snow surface conditions.

Ensure guides carry a lightweight crevasse rope rescue system if crevasse falls are more likely due to factors such as known weak crevasse bridges.

Trips in terrain with cliffs and other falling hazards

Have vertical rope rescue equipment at a staging area, helicopter base or cached in the field.

Ensure equipment is sufficient for the emergency scenarios of the trip — consider cliff heights and general access issues.

Where conditions include sliding hazards such as hard snow surfaces, ensure that guides carry lightweight vertical rope rescue equipment. Note: where these hazards are significant it is likely that the trip should be moved to another location.

First aid supplies

Ensure that first aid supplies are suitable for the identified first aid scenarios of the trip. Suggestions for first aid kit contents can be found at www.supportadventure.co.nz/other-resources#firstaid

8.3 Equipment maintenance, testing and inspection

Maintain, inspect and test equipment regularly enough to ensure its reliability*. Ensure maintenance, inspection and testing techniques and schedules are consistent with manufacturers' recommendations and include rescue equipment and gear cached in the field.

Test avalanche transceiver's general functionality and range pre and mid-season, and batteries and general functionality before every trip.

Pay particular attention to safety equipment that is left in the field for extended periods of time, such as a cache of avalanche rescue equipment.

Additional information on equipment inspection can be found at www.aspiring.co.nz

*helicopter maintenance and inspection is the responsibility of the helicopter operator.

For more information on managing the equipment aspect of your operation go to

www.supportadventure.co.nz/safety-management-plans/equipment

Section 9 Emergencies

This section looks at preparing for effective emergency response and accessing suitable external emergency support — including contingencies for when access to support is limited.

Develop clearly documented and practised procedures for the full range of emergencies relevant to the operation — from incident management through to crisis response.

Trip monitoring and communication procedures are key components of your emergency response system. They are addressed in section 4.

9.1 Preparing for effective emergency response

Train staff to manage all identified emergency scenarios. Consider running a full scale emergency response training exercise every few years — include other operators where possible.

This section makes recommendations on preparation for effective emergency response for two of the heli-skiing emergency scenarios most likely to involve multiple people; people caught in an avalanche, or a crashed or overdue helicopter. Resolving these scenarios is particularly time critical and requires an extremely coordinated response.

The other most serious scenarios are falls into crevasses and other incidents requiring technical extraction, and injuries or medical incidents. Ensure strategies are in place to manage these emergencies.

Preparing for an avalanche emergency

Develop a detailed plan for response and coordination of resources in the event of an avalanche incident. Train staff in using the plan and ensure it includes:

- procedures for raising the alarm
- a clear description of the incident management chain of command
- the location of internal emergency response resources including equipment and staff
- the location of external emergency response resources such as equipment, dog handlers, rescue and medical personnel
- run lists with GPS coordinates.

Make the plan suitably available to support staff, guides and pilots. Consider supplying relevant information to external rescue personnel such as police and SAR teams.

Ensure all guides are proficient in avalanche rescue techniques including multiple burial transceiver searching, patient extraction and first aid.

Ensure guides and pilots are familiar with procedures for co-ordinating the early stages of a ground rescue.

Train pilots in rescue procedures including radio communications, aerial spotting and assistance and transceiver searching.

Preparing for a crashed or overdue helicopter

Helicopter base monitors the helicopter and will generally raise the alarm and initiate emergency response in the event of a crash or an overdue helicopter. Guides in the field should support the helicopter pilot by being aware of the helicopter's movements and maintaining regular contact.

Ensure guides know how to raise the alarm if they believe the helicopter pilot needs assistance. For information on communicating with external support see section 4.6.

Due to the nature of the alpine environment helicopter overdue time margins should not exceed 45 minutes.

9.2 Accessing suitable external emergency support

Ensure that suitable external emergency support is available within a planned period of time — where daylight is integral to the rescue this should be within daylight hours. Specify this period of time within documented emergency procedures.

Emergency planning and procedures should consider factors that could impact on the availability of suitable external emergency support*. These include:

- the ability to call for external support from within the heli-ski area
- the type of external emergency support required by each emergency scenario
- Helicopter access and evacuation options for likely emergency scenarios
- capacity and ability of local rescue resources such as other heli-skiing operations and community rescue agencies.

*for information on suitable external support see section 4 Trip Management.

Contingencies for limited access to emergency support

Heli-ski trips rely on the helicopter to provide access to emergency support*. Challenging light or weather conditions are the most likely factors to cause disruptions to helicopter access. This means that in an emergency scenario groups may spend long periods of time in the mountain environment in bad weather. Eliminate this risk by not running heli-ski activities in weather that will disrupt the ability for the helicopter to fly. It is also acknowledged that New Zealand weather is difficult to predict and can change quickly. This risk needs to be managed.

Management strategies should be based on the associated risk. Options include:

- informing clients of the risk of a prolonged stay in the heli-ski area in the event of an emergency
- increasing client screening requirements
- finishing trips early to allow time for an overdue trip response and rescue
- training with rescue response personnel — including the helicopter pilot and company
- storing emergency equipment in the field
- using more experienced guides and ensuring they are competent to manage an emergency scenario for an extended period of time
- taking extra care throughout the trip and considering excluding avoidable higher risk activities
- considering running only multiple guided trips
- having resources available to maintain group safety for an extended stay in the heli-ski environment — for more information see section 8 Equipment

* for information on trip monitoring see section 4 Trip Management.

For more information on developing procedures for emergency management go to www.supportadventure.co.nz/safety-management-plans/emergencies

Section 10

Safety System Reviews

Regular internal and external safety system reviews or 'audits' are a crucial part of running a safe heli-skiing operation.

Heli-skiing operations are required by the Adventure Activity Regulations to undergo an external audit before operations begin, and at regular intervals as defined by the the WorkSafe NZ adventure activities audit standard. To view the audit standard go to: www.business.govt.nz/safety audit standard for adventure activities – requirements for a safety audit of operators.

Conduct an internal safety system review after an incident that caused serious harm, or might have. Consider conducting an external review as well.

Schedule internal reviews as part of the yearly safety routine — before and after the busy season are often good times. Reviews should check that:

- safety systems and procedures are aligned with the recommendations in this guideline and are at or above industry good practice
- the safety management plan accurately reflects the operator's systems and procedures
- everyone in the operation follows the agreed safety systems and procedures.

One person should have responsibility for ensuring that reviews take place, but everyone in the operation is responsible for being part of the process. Use a competent person with suitable technical expert knowledge to conduct the review.

Record the process and the results, and share any relevant learning with staff and other heli-skiing operators.

For more information on safety system reviews go to www.supportadventure.co.nz/safety-management-plans/checking-your-systems

Appendix 1 Explanation of Terms

The guideline uses several terms you need to understand to be sure you comply with the health and safety legislation. This appendix looks at those terms, and what they mean for managing hazards. The terms are:

- practicable steps
- significant hazards
- serious harm.

What are 'all practicable steps'?

The health and safety legislation says you must take all practicable steps to safely provide adventure activities. You must take all steps that are reasonably practicable in the circumstances considering:

- the nature and severity of any injury or harm that may occur
- the likelihood of that harm occurring
- how much is known about the potential harm and the measures for eliminating, isolating or minimising the hazard from which the harm may arise
- the availability and cost of those measures.

Note: The 'circumstances' are those that an operator knows about, or ought reasonably to know about, taking into account good practice and knowledge throughout the adventure and outdoor sector.

The operator is responsible for balancing the likelihood and seriousness of potential harm against the cost, effort and effectiveness of measures.

Where there is a risk of serious or frequent injury or harm, a greater cost in the provision of safeguards may be reasonable. If there are significant hazards and the measures are too expensive, unavailable, or ineffective, the only reasonable safeguard might be to cancel the activity.

Any judgement of whether a safeguard was 'reasonably practicable' will take into account good practice and knowledge throughout the industry.

The SupportAdventure website has a guide to 'Health and Safety Act Made Easy'
www.supportadventure.co.nz/health-safetylegislation/health-safety-act-made-easy

What are 'significant hazards'?

The Act says an adventure activity operator must take all practicable steps to systematically and regularly identify, assess and manage significant hazards. Hazards that are not significant also need to be managed and this process may be applicable to those hazards too.

'Hazard' describes a danger or a potential source of danger. It is anything that does or could cause harm including harm due to exposure to the hazard over time. So a hazard may be:

- always present (such as a sharp edge that may injure or snag a client or equipment)
- potentially present (such as water levels that might rise after rain, or guide fatigue).

'Significance' is a combination of the likelihood of the potential harm and the seriousness — how bad the harm could be if it occurs, even if it is unlikely to happen.

The Act defines 'significant hazard' as a hazard that does or could cause:

- serious harm, or
- harm due to exposure over time, or
- harm that does not usually occur or become apparent until a significant time after exposure to the hazard.

Note: A hazard may include a person's behaviour including the effects of drugs and alcohol use, and physical or mental fatigue.

For more information on hazards and hazard management go to
www.supportadventure.co.nz/safety-management-plans/hazards

What is 'serious harm'?

Harm is illness, injury or both, and includes physical and mental harm. Serious harm is death, or harm of a kind defined to be serious for the purposes of the Health and Safety in Employment Act 1992. The Act does not give a simple definition of serious harm, but gives examples including:

- death
- conditions that result in permanent loss of bodily function, or temporary severe loss of bodily function such as eye injuries or bone fractures
- loss of consciousness from lack of oxygen
- harm that requires hospitalisation for 48 hours or more.

Operators should also manage hazards that could result in harm other than serious harm. The most common minor injuries in heli-skiing are sprains and contusions resulting from slips, trips and falls while negotiating uneven and slippery terrain. Managing these hazards reduces the likelihood of both minor injuries and unexpected serious harm.

To read the Health and Safety legislation definition of serious harm go to
www.supportadventure.co.nz/health-safetylegislation/health-safety-act-made-easy