



Canyoning
Australian
Adventure Activity
Good Practice Guide

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1.0	14 Dec 2018	Pre-release version. Final guidance content.

Foreword

“Adventure is worthwhile” – Aristotle

The Australian Adventure Activity Standard and Good Practice Guides are designed to ensure effective, responsible, sustainable and safe delivery of adventure activities to dependant participants. They can help people across the outdoor sector to develop appropriately managed adventure activities which enhance individuals and our communities, while protecting the environment and culturally significant places. In doing this, these documents can help ensure that people will continue to enjoy the benefits of adventure activities well into the future.

Best wishes for all your adventures.

The Australian Adventure Activity Standard Steering Committee.

Preface

About these documents

The **Australian Adventure Activity Standard (AAAS)** and related **Good Practice Guides (GPG's)** are a voluntary good-practice framework for safe and responsible planning and delivery of outdoor adventure activities with *dependent participants*.

The AAAS and related GPG's provide guidance on safety and other aspects of responsible activity delivery, such as respect for the environment, cultural heritage and other users. They are not a full legal compliance guide, nor are they a "how to" guide or field manual for outdoor activities. They do not provide guidance on providing a high-quality experience over and above safe and responsible delivery.

Activity *providers* are encouraged to obtain independent professional and legal advice in relation to their obligations and duties in delivering adventure activities and should reference the relevant laws to the area in which they intend to undertake the adventure activity.

Does the Standard and Good Practice Guides apply to me?

The AAAS and related GPG's are specifically designed to help activity *providers* who are conducting activities involving *dependent participants*, to provide a safe and responsible experience. It is for each *provider* to determine based on their own individual circumstances, if they are working with *dependent participants* or not.

A *dependent participant* is a person owed a duty of care by the activity *provider* who is reliant upon the *activity leaders* for supervision, guidance or instruction to support the person's participation in an activity. For example, this often includes participants under the age of 18, participants lacking the ability to safely undertake the activity, or participants reasonably relying on the activity *provider* for their safety. The degree of dependence may vary during an activity.

Considerations for determining if a person is a *dependent participant* may include, but is not limited to:

- the foreseeable level of *competence* of the participant in the activity and the associated level of reliance this creates on the *activity leaders*
- the level of foreseeable self-reliance of the participant to reasonably manage their own safety
- the possible variation throughout the activity of the level of reliance
- the variation of the degree of dependence throughout the activity
- the individual context, nature and circumstances of the activity
- the relevant circumstances and particular facts relating to the responsibilities assumed by the *provider*.

An activity *provider* can be any organisation – business, community group, government agency, school or any other groups – that organises and leads adventure activities. Individuals can also be an activity *provider*, if they have the ultimate legal duty of care to participants. In general, 'the Standard' and GPG's relate to a provider as a 'whole organisation', rather than to 'specific roles' within the provider 'organisation'.

Some providers may have their own standards or guidelines appropriate to their duty of care. It is recommended that these be reviewed periodically to ensure current duty of care expectations are met. 'The Standard' and 'GPG's' may aid such reviews.

Are they legally binding?

The AAAS and GPG's are voluntary, not legal requirements. However, they may refer to specific laws and regulations which may be legally binding on activity *providers*.

While the AAAS and 'GPG's' are voluntary, some *land managers* and other organisations may require compliance. This may be as a condition of obtaining a licence, permit or other permission, or some other condition (e.g. a contract).

Under Australian common law and relevant legislation, *providers* have a legal duty of care towards *dependent participants* in some circumstances. In broad terms, the legal duty requires *providers* to take reasonable care that their actions and omissions do not cause reasonably foreseeable injury to *dependent participants*.

The AAAS and GPG's are not legal advice, and they cannot answer whether a legal duty exists in specific circumstances. All adventure activity *providers* should check what legal requirements apply in their own situation and seek legal advice if at all in doubt.

Even in cases where participants are not dependent, other legal duties and obligations may arise. The AAAS and GPG's have not been developed for those contexts.

Structure of the Standard and Good Practice Guides

The AAAS (i.e. the Standard) has a related Core Good Practice Guide (Core GPG). They both include guidance that applies to all adventure activities. They set out recommendations for a common approach to risk management that can generally apply regardless of the specific activity being undertaken.

Individual activity Good Practice Guides include guidance on specific adventure activities.



For any given activity, (i) the AAAS (the Standard), (ii) the Core GPG and (iii) the activity Good Practice Guide that applies to that specific activity, should be consulted.

The AAAS and Core GPG cover only those activities specifically listed. While the AAAS and Core GPG may be useful in managing *risk* generally for other activities, they may not reflect good practice for such other activities.

Interpretation of the Standard and Good Practice Guides

The following words and phrases are used in all documents and have specific meanings:

- **Must:** used where a provision is mandatory, if the *provider* is to operate fully in accordance with AAAS or GPG's. (This is equivalent to the keyword "shall" used in other voluntary standards e.g. *Standards Australia, other International Standards Organisations (ISO's) etc.*)
- **Should:** used where a provision is recommended, not mandatory. It indicates that the *provider* needs to consider their specific situation and decide for themselves whether it applies or is relevant.
- **Can/cannot:** indicates a possibility and capability.
- **May/need not:** indicates a permission or existence of an option.

- But are not limited to: used to indicate that a list is not definitive and additional items may need to be considered depending on the context.

The following formatting is used throughout:

- Defined words are in *italics*. They are defined in the Glossary.
- The main key words are in *italics*.
- Examples are in *smaller italic 9-point font*.
- In document references are in underlined. References are to section heading titles.
- External references are in *dotted underline italic*.

Creation

The AAAS and GPG's were developed with the input from a wide range of outdoors and adventure activity experts with extensive field experience. They draw on state and territory-specific standards previously in place across Australia. The development process included work by a range of technical expert working groups, as well as open consultation throughout the community of activity providers and other experts.

Further details of the creation of the AAAS and GPG's can be found at www.australianaas.org. The Steering Committee wishes to thank all the Technical Working Group (TWG) members for their work and contributions.

It is intended that the AAAS and GPG's will be regularly updated to reflect changing practice and better understanding over time. Updates will be noted on the website www.australianaas.org.

1 Introduction

1.1 Canyoning introduction

Canyoning involves the descent and/or ascent of geological formations created by a watercourse using a range of techniques. These formations can range from open sided waterways to deep, narrow, steep-sided valley, often have vertical walls, cliffs and waterfalls. The cleft between these walls are the result from weathering and water erosion over geologic timescales. This creates a watercourse, which can be perennial or intermittent resulting in “wet” and “dry” canyoning and the possibility of rapid changes in water level and flooding to occur.

The terrain features *may* include:

- deep, narrow gorges with waterfalls, log-jams, rock-jams and cave-like structures or open face waterfalls, escarpments and/or exposed cliff-lines
- river and water features such as dry creek beds and sections of water that *may* include dark, deep, cold, slow moving pools and/or fast-moving water creating white-water conditions
- horizontal terrain that can be traversed
- tracks and/or unmodified landscapes.

Due to the terrain it is generally difficult to access, traverse and egress. A range of techniques are used to traverse the terrain, and *may* including abseiling, bouldering, bushwalking, rock climbing and swimming. Swimming might use a buoyancy aid as assistance.

Depending on the terrain features, a canyon *may* present opportunities for horizontal and/or vertical canyoning.

Horizontal canyoning involves the ascent, traversing and/or descent of steep and narrow watercourses where any fall safety required can be achieved using *spotting* or a *deep-water belay*. This activity involves a combination of multiple skills such as bushwalking, *bouldering* and swimming with or without buoyancy aids.

When horizontal canyons are involved, it *may* be unclear sometimes if the activity is canyoning or bushwalking. The environment and the techniques used to traverse the terrain needs to be considered in determining the activity type and the relevant Good Practice Guide (GPG). Refer to [Appendix 1 – Canyoning grading](#) for additional information on assessing the difference.

Vertical canyoning involves horizontal canyoning and the descent, traversing and/or ascent of vertical (or near vertical) natural surfaces where fall safety cannot be achieved using spotting due to the fall height. Technical roping techniques such as abseiling, rock climbing and lowering (*e.g. V-Lowers*) are used to provide fall safety for vertical elements encountered. Vertical canyoning can involve a single section or multi-pitch canyoning.

When vertical canyons are involved, it *may* be unclear sometimes if the activity is canyoning or abseiling/rock climbing. The environment and the techniques used to traverse the terrain needs to be considered in determining the activity type and the relevant GPG.

1.2 Exclusions

Activities that are not covered by this Good Practice Guide are:

- activities associated with Camping while on overnight or extended canyoning activities
- use of a water craft such as a canoe, kayak or raft
- activities within a cave
- use of flying foxes while canyoning.

1.3 Related activities

This Good Practice Guide ought to be read in conjunction with any other relevant Good Practice Guide(s) for:

- bushwalking
- abseiling (i.e. abseil and climb GPG)
- camping
- canoeing, kayaking and rafting (i.e. Inland water paddle-craft GPG)
- caving
- climbing (i.e. abseil and climb GPG).

1.4 Determining the appropriate Good Practice Guide to use

The appropriate individual activity Good Practice Guide to use *may* be unclear in some cases. The hazards and risks can vary between different types activities *e.g. canyoning verses bushwalking*. The correct selection of which activity Good Practice Guide to use needs to be based on the context of the particular activity in question.

The activity *must* be assessed to determine the appropriate activity Good Practice Guide to use.

Considerations in determining the appropriate activity Good Practice Guide to apply *must* include:

- the vertical difficulty and:
 - if climbing or down climbing is absent
 - if there is easy climbing or down climbing with little exposure
 - if there is climbing or down climbing that requires a *belay system*
 - if there is abseiling involved
- the aquatic difficulty and:
 - if there is any water or aquatic activity involved
 - if there is optional swimming involved
 - if swimming is required
 - if jumps into water are optional or required
- the commitment and:
 - if escape is easy throughout the activity route
 - if in the event of flooding or rising water escape from the affected area can be completed quickly.

2 Management of risk

2.1 Management of risk

There are no additional specific activity provisions other than 'Core Good Practice Guide' Management of Risk provisions.

3 Planning

3.1 Canyoning activity plans

Refer [Core Good Practice Guide – Activity Planning](#).

Canyoning activity planning considerations *may* include but are not limited to:

- geology, features, watercourses and obstacles within the canyon
- protecting from fall from height hazards
- protecting from water related hazards
- appropriate techniques for overcoming obstacles:
 - climbing
 - abseiling
 - swimming and wading
 - slides and jumping into water
- length of activity and time required
- the grade and difficulty of the activity
- the supervision required
- likelihood and consequences of changing water levels including flooding
- personal thermal protection necessary
- opportunities for rest breaks
- escape routes
- remoteness of site
- high points that are or will be above the highest water level
- group size
- group skill levels
- height of pitches, number of abseils and technicality
- equipment requirements
- ability to carry equipment
- how often the canyon is visited and likely environmental impact
- possible usage of canyon by other groups on the same day
- *activity leaders* recent familiarity with route
- land manager's permission and requirements
- any other relevant considerations listed in this document and the [Core Good Practice Guide](#).

3.2 Canyoning emergency management plan

A *non-participating contact* must be used as part of the emergency management plan.

Emergency management plans *must* address:

- the likely difficulty of establishing communication with external support and emergency services
- the relevant *triggers* and procedures when a group has become overdue or failed as planned to confirm the group is safe
- mapping of access and escape options
- *activity leader* induction training and ongoing practice on emergency access and escape routes
- fauna and flora risks
- catchment features
- weather assessment, forecasts and observations
- relevant considerations identified throughout this document and the [Core Good Practice Guide](#).

Emergency management plans *must* consider the need:

- for pre-rigging emergency access ropes or ladders
- managing hypothermia, hyperthermia and fatigue
- equipment loss or damage
- emergency equipment requirements and access.

The use of relevant rescue systems and procedures *must* be practiced periodically.

Where there is only one *activity leader*, the emergency management plan *must* have arrangements that allow participants an adequate and appropriate communication system if the leader becomes incapacitated.

Also refer [Core Good Practice Guide – Emergency planning section](#).

4 Participants

4.1 Participant considerations

Participant considerations *should* include but are not limited to:

- participant aims and objectives
- considerations listed in the [Core Good Practice Guide – ‘participants’](#) and [‘introduction – activity purpose’](#) sections
- the effect of the temperature of the environment on individual and groups of participants
- swimming ability
- ability to jump into water
- familiarity with and experience in a moving water environment
- fitness
- experience with heights
- abseiling and roping experience
- previous canyoning experience.

4.2 Canyoning information provided pre-activity

Pre-activity information *should* communicate:

- an overview of the planned activity
- difficulty of access
- remoteness from medical facilities
- associated hazards and risks
- if there will be a point where abseils, climbs, water features or jumps make it impossible to backtrack
- participant roles and responsibilities
- clothing requirements for *personal thermal protection*
- appropriate footwear
- ability to carry weight
- other relevant items as per [Core Good Practice Guide – Information provided pre-activity](#).

5 Environment

Also refer [Core Good Practice Guide – Environment section](#).

5.1 Canyoning environment considerations for planning

Environmental considerations for canyoning *must* include:

- fall from heights and means to protect possible falls
- the difficulty to traverse vertical obstacles and hazards
- the potential for rock falls
- current water levels
- quality of the water
- the depth, volume and velocity of water
- the difficulty to traverse aquatic obstacles and hazards
- the potential for flooding, *flash flooding* or fluctuating water levels
- the commitment and duration needed to complete the activity
- the associated climate conditions
- the weather conditions including recent, current and predicted weather
- the water and air temperature
- the type of geological structure and surfaces of the canyon
- the changes in the hazards as conditions change and over time
- current condition of anchors.

Other environmental considerations *may* include but are not limited to:

- the type of flora expected (*e.g. impeding progress, ability to cut or scratch etc.*)
- the fauna expected (*e.g. risks associated with venomous snakes, ants etc.*).

5.2 Canyon difficulty and grading systems

The use of a grading system to establish the difficulty of a canyon *may* be useful.

Considerations when choosing a grading system *should* include but are not limited to:

- the reason and objective for its use (*e.g. communicating to inexperienced participants, identifying leader competencies required to manage participant safety etc.*)
- its ability to help clarify communication of the risks involved
- its grades are bench-marked to reasonably identifiable attributes associated with the canyon difficulty (*e.g. 'prolonged immersion in cold water' establishes an aquatic grade benchmark etc.*)
- its grades consider key risk components (*e.g. vertical difficulty, aquatic difficulty and commitment/duration*)
- those grading and/or using the grading system are competent in using the system
- the weaknesses of the system are identified
- systems used address any relevant weaknesses of the grading system.

5.2.1 Grading system used in this document

The grading system used in this document is detailed in [Appendix 1 – Canyoning Grading System](#).

This document uses canyon grades as a way to identify when the changing difficulty, indicates a change in safety requirements. *For example, higher grade (i.e. more difficult) canyons may have additional leader competencies recommended.*

It rates the vertical difficulty (**v**), the aquatic difficulty (**a**) and the commitment/duration (**c**). While canyon quality (**q**) is also part of the grading system, for the purposes of this document it is not used.

The **v** and **a** grades are a number from 1 to 7, while the **c** grade is a number 1 to 6. The higher the number the more difficult the canyon is. Grades are written as **v#a#c#** where # equals the grade given (e.g. **v3a4c3**)

Grade ranges:

At times the Canyoning Good Practice Guide *may* list a range of grades to clarify when a provision is required.

A range is shown by the grade component followed by #-# (i.e. a number – number). For example, **v2-4** is vertical difficulty ranging from grade 2 up to and including grade 4.

Use of other grading systems

While this document uses the system referred to in [Appendix 1](#), there are a number of other grading systems available that *can* be used. Refer above for considerations regarding choosing a grading system. Although this document uses a particular grading system, it does not imply it is the only grading system that *can* be used. The use of this grading system is recommended but not required.

5.3 Environmental risk management triggers

Trigger points must be based on the relevant warnings and actual conditions.

The risk management plan and emergency management plan *should* include guidance on *trigger points* and associated actions for:

- rain
- watercourse water levels
- wind
- snow
- severe weather warnings
- severe thunderstorm warnings
- tropical cyclone advice: watch and warning
- extreme cold temperatures
- extreme hot temperatures
- water quality (e.g. algal blooms and pollution)
- air quality (*refer Core Good Practice Guide*).

Actions for triggers *may* include but are not limited to:

- cancellation of activity
- postponing the activity
- evacuating to a safe location
- avoiding areas that have the potential for flooding, flash flooding or inappropriate water levels
- preparations to avoid the risks associated with lightning
- preparations to avoid the risks associated with blizzards
- moving to areas that are protected from strong winds and/or hail
- managing risks of flying or falling items during strong winds.

5.4 Weather information

Appropriate sources *must* be used for recent, current and forecast:

- weather
- weather warnings.

For weather warnings information refer [Appendix 6 – Weather warnings](#).

5.5 Water

5.5.1 Water level information

Sources of water level information to assess the suitability of the water level for the activity *should* include but are not limited to:

- the Bureau of Meteorology relevant 'water level' information and flood warning information
- relevant local information sources (*e.g. river gauges, dam operators etc.*)
- inspection of the site.

5.5.2 Water level risk management

Risk management plans *must* include procedures to mitigate relevant hazards and risks relating to the:

- water level being too high (*e.g. water flow too great, routes being submerged etc.*)
- water level being too low (*e.g. insufficient water for deep water protection etc.*)
- water level rising rapidly
- canyon flooding.

Considerations relating to 'water level rising rapidly' or 'the canyon flooding' *must* include:

- the current water level conditions
- the possibility of further water release into the canyon's catchment area
- the impact of the changing water level on the canyon and the activity.

Considerations relating to 'the current water level conditions' *must* include:

- how accurate and/or the degree of certainty as to what the current water level is
- can the activity be conducted at the current water level.

Considerations relating to 'the possibility of further water release into the canyon's catchment area' *must* include:

- the characteristics of the catchment including:
 - size
 - gradient
 - vegetation types and levels
 - soil type, character and depth
 - existence of water bodies (*e.g. lakes*)
 - man-made features (*e.g. dams, spillways, hydro power stations etc.*)
 - natural dams (*e.g. soil, logs, vegetation, rocks etc.*)
- the current conditions within the catchment including:
 - current rainfall:
 - volume
 - intensity (volume of rainfall during a given period of time)
 - rainfall location
 - water saturation levels of the soil
 - snow conditions and amount of snow available
 - likelihood of snow melt adding to water levels
 - forecast weather:
 - rainfall occurring
 - rainfall amount
 - thunderstorms occurring
 - flooding or flash flooding
 - temperature
 - impact of other prior events:
 - bushfires

- drought
- heavy rain or flooding
- heavy snow falls
- the characteristics of the canyon including:
 - profile
 - width
 - depth
- the operation of man-made features including:
 - release of water from dams, spillways or hydro-electric plants
 - current water levels of dams
 - expected inflow of water to the dams.

Considerations relating to the 'impact of the changing water level on the canyon and the activity' *must* include:

- the current water level
- canyon gradient
- canyon formation
- narrow points
- the time required to exit the canyon
- the availability of high ground
- obstacles creating water hazards.

5.5.3 Flooding

Any water level variations including flash flooding that may impact the activity *must* be assessed prior to and during the activity.

The suitability of water for drinking during and after flooding *should* be assessed.

5.5.4 Water quality

Refer *Core Good Practice Guide – Drink water safety*.

Areas where the water is polluted or contaminated may pose a risk to human health *should* be avoided.

Polluted or contaminated water *may* include water impacted by:

- chemicals
- rubbish
- sewage
- upstream 'runoff' (e.g. urban runoff such as oil from roads, industrial operations etc.)
- dead animals
- waterborne microorganisms such as:
 - microbial or bacteria (e.g. *e.coli*)
 - protozoa (e.g. *gardia*)
 - cyanobacteria (e.g. blue-green algae)
 - viruses (e.g. *hepatitis*).

5.6 Bushfire, prescribed fire and fire danger

Refer *'Core Good Practice Guide' section - Bush fire, prescribed fire and fire danger*.

5.7 Lightning

Whilst thunder is audible groups *should* avoid:

- being on high elements
- being in unsuitable locations.

When thunder is audible, a suitable location *should* be sought, to wait out the thunder storm.

Considerations for locations to waiting out the thunder storm *should* include but not limited to avoiding:

- being on the water (*e.g. paddling, swimming*)
- being on high structures
- being connected to metal structures, cable or equipment
- being on the highest ground in the area
- tall trees or structures that may act like a lightning rod
- water saturated ground near watercourses
- locations where group is unable to spread out
- caves or rock overhangs.

5.8 Wildlife safety

Procedures *should* be in place to minimise the risks associated with fauna and flora that may be encountered.

Considerations *may* include but are not limited to:

- snakes (*e.g. when blocking progress etc.*)
- fauna that may dislodge items that create falling objects risks.

5.9 Environmental sustainability procedures

The *procedures may* include but are not limited to procedures listed in 'Core Good Practice Guide' Environmental sustainability and the following:

5.9.1 - Travel and camp on durable surfaces

Travelling in an area on durable surfaces *may* include but is not limited to:

- walking on established routes and avoiding vegetated, moss covered or steep creek banks
- minimising the use of living trees used as anchors
- use of 'tree protectors' and/or wide tape slings when using living trees as anchors
- locate activity area and waiting areas to reduce repeated soil and root compaction around trees and vegetation
- the use of temporary edge protection
- use of geological features or artificial anchors where installed, in preference to living trees as anchors
- the use of existing site access tracks wherever possible
- avoid using the edge of access tracks
- choosing sites that are appropriate for the group size
- use removable protection in a manner that avoids damage to and protects natural surfaces.

5.9.2 - Dispose of waste properly

Dispose of waste properly *may* include but is not limited to:

- carry out human waste and personal hygiene waste
- carry out food and general waste.

5.9.3 - Leave what you find

Leave what you find *may* include but is not limited to:

- avoiding the modification of any natural surfaces or removal of natural features
- avoiding the removal of selected rock surface vegetation
- clean footwear and equipment to avoid the spread of soil borne pathogens (*e.g. phytophthora*)
- the modification of natural surfaces or removal of natural features only being carried out with the permission of the Land Owner or Land Manager.

5.9.4 - Be considerate of your hosts and other visitors

Be considerate of your hosts and other visitors *may* include but is not limited to:

- actively managing groups to minimise impact
- avoiding blocking access to other users
- negotiating with other users regarding shared use of a site
- the installation of permanent artificial anchors or equipment only being carried out with the permission of the Land Owner or Land Manager.

6 Equipment and logistics

6.1 Equipment requirements

Refer [Appendix 2 - Equipment lists](#) for equipment that *may* be required.

6.1.1 Aquatic and Horizontal canyoning

Equipment listed below *must* be manufactured for use in the context of the activity:

- Helmets to protect from 'falling object' and/or 'white-water' hazards and risks
- Lifejackets (also known as personal floatation device).

Procedures *must* be in place to ensure appropriate clothing and *personal thermal protection* for the expected and foreseeable weather conditions is available.

Procedures *must* be in place to ensure appropriate footwear for the expected and foreseeable terrain is used.

Footwear *must* be fit for purpose.

6.1.2 Vertical canyoning

Vertical canyoning equipment requirements *must* include all provisions listed in horizontal canyoning above.

Equipment *must* be carried to build improvised anchors.

Vertical canyoning equipment *must* be manufactured for use in the context of the activity. (Refer [Appendix 3 – Equipment relevant standards.](#))

6.1.3 Other Equipment

Procedures *must* identify the appropriate equipment required for the activity.

6.2 Use of equipment

6.2.1 General equipment use

All equipment *must* be used with reference to the manufacturers' instructions.

Training in the use of equipment used *must* be provided to *activity leaders* and participants.

Before use, the compatibility between and correct functioning of all equipment *must* be confirmed.

Procedures *must* be used so that relevant provided equipment is hygienic.

Provided equipment that *may* require hygiene procedures includes but is not limited to:

- wetsuits
- footwear
- helmets
- other personal attire or *personal thermal protection*.

6.2.2 Personal thermal protection

Considerations in determining the *personal thermal protection* necessary *may* include but are not limited to:

- time and commitment requirements to complete canyon
- length, duration, water temperature and frequency of compulsory swimming sections
- the time, distance and type of activity required between immersion
- the likely weather conditions and ambient air temperature
- the topography and possible waiting times to complete obstacles
- the physical attributes of likely participants.

Personal thermal protection should be checked it is in good condition and provides appropriate protection.

6.2.3 Helmets

An appropriate helmet *should* be worn while canyoning.

An appropriate helmet *must* be worn while canyoning grade **V2** or higher and/or **A4** or higher.

Considerations as to the type of helmet used *must* include:

- the hazards and risk of objects falling from height
- the water hazards and risks that need to be negotiated (*e.g. white-water swimming*)
- the hazards and risks of sustaining a head injury during the activity.

6.3 Aquatic equipment use

The requirements for wearing an appropriate *lifejacket* or use of other *buoyancy aids* *must* be considered as part of the activity risk assessment.

When used *lifejackets* *must* be correctly sized and fitted.

Procedures *must* ensure wearing an appropriate *lifejacket* occurs where it is required.

Considerations when assessing the need for wearing a *lifejacket* or use of other *buoyancy aids* *must* include:

- aquatic hazards and risks present
- the abilities of the participants
- the buoyancy provided by *personal thermal protection*
- the other *buoyancy aids* available
- the impact of fatigue over the length of the activity
- the water temperature
- the types of obstacles to be overcome
- the possibility of water level rises or flooding
- the height of any jumps.

All buoyancy aids *must* be suitable for the task and activity.

Appropriate 'waterproofing' and/or 'waterproof' equipment *must* be used to protect any necessary equipment identified as needing protection in the risk management plan.

6.4 Vertical equipment use

An appropriate harness *must* be worn when *vertical canyoning*.

6.4.1 Equipment loading

Equipment will have a *stated strength* that *may* or *may not* include a *safety factor*. The type of *stated strength* rating needs to be known before use to ensure equipment is safely loaded. (Refer [Appendix 4 – Equipment load ratings](#) for more details).

Equipment with the *stated strength* providing the *Minimum Breaking Strength* (MBS) *must* have a suitable *safety factor* applied.

Equipment with the *stated strength* providing the *Safe Working Load* (SWL) *must* be loaded only to a maximum of the *Safe Working Load* (SWL).

Reference to the manufacturers' instructions *must* occur when determining a *safety factor* and/or *safe working load*.

The expected peak load and possible additional loads should a rescue be carried out *must* be considered when determining equipment loading.

6.4.2 Connections

Connection methods, equipment and systems used *must* be periodically reviewed.

Considerations when determining *belay system* connect methods, equipment and systems *should* include but are not limited to:

- the type of anchor or anchors being used
- the redundancy available should an anchor fail
- what needs to be attached to the harness (*e.g. direct connection to rope or a descender device*)
- the experience and context of who is completing the connection of the rope to the harness or descender device
- the availability of a *competent person* to supervise or check the connection that is completed by a participant.

6.4.3 Connectors – practices relating to use

Carabiners *must* be used so that no load is intentionally across the gate.

Systems that have loads applied and release so that alignment of *connectors* or equipment may change, or subject to vibration *should* be inspected at an appropriate frequency.

The type of *connector* used *must* be suitable for the task.

Where a *connector* is used in a situation that has no other system redundancy, the connector *must* be a *locking* or *auto-locking* connector. (*For example, the connection between descender and harness.*)

In situations where participants complete any connection to a harness the connection or knot *must* be checked by a person verified as *competent* at the task.

6.4.4 Full body harnesses and chest harnesses

Chest harnesses are only used in combination with a sit harness.

Consideration of the use of a combination chest and climbing sit harness or a full body harness *should* occur:

- when inversion is intended or likely

- when the security of a sit harness cannot be relied upon due to body shape
- when the security of a sit harness cannot be relied upon if the person were to experience a pre-existing health, medical or personal condition episode (*e.g. epilepsy*)
- very young participants.

6.4.5 Other vertical equipment – use considerations

Static rope should be used except where the fall factor indicates dynamic rope is required.

Dynamic rope *must* be used for the belay rope:

- when *lead climbing*
- when a *fall factor* is likely to approach or exceed 0.3
- when lanyards are used at or above anchor height.

A procedure regarding participant supplied equipment *should* be developed.

Where a participant supplies any personal climbing or abseiling equipment, this *must* comply with the above equipment requirements and equipment use sections and be serviceable.

Considerations for other equipment use include but is not limited to the ability to communicate with the abseiler (*e.g. use of whistles etc.*).

6.4.6 Rescue systems and rigging for rescue

Anchor systems and belay systems must be rigged for a timely and effective rescue.

Abseils in running waterfalls with vertical flows of grade **v4** or above *must* use releasable rigging.

Considerations in rigging systems for rescue *should* include but are not limited to:

- load direction
- load magnitude
- ability to raise the person
- ability to lower the person
- ability to conduct sideways hauls
- ability to enable an *activity leader* to complete a contact rescue
- abseiling through running waterfalls
- abseiling into water.

6.5 Maintenance of equipment

All equipment *must* be checked that it is serviceable before each activity or before being used.

Appropriate maintenance of relevant equipment to prevent corrosion *should* be undertaken before it is stored.

All equipment *should* be inspected periodically that it is serviceable.

Appropriate procedures *must* be in place for inspections and determining the time periods between inspections.

Equipment and inspection records *must* conform with any required law or regulation.

An equipment record *should* be maintained.

Where used, an equipment record *should* record but is not limited to the:

- item individual identifier
- date of purchase
- date of inspections
- recommended or maximum lifespan.

A retirement of equipment policy *should* be developed.

Considerations for a retirement of equipment policy *may* include but are not limited to:

- type of use
- frequency of use
- prevailing conditions when used
- actual deterioration, wear and tear
- extreme usage events or patterns (*e.g. impacts, 'catches'*)
- age
- years in service
- manufactures recommendations.

6.6 Storage of equipment

Activity equipment *must* be stored with reference to the manufacturer's recommendations or instructions.

Where no manufacturer's recommendations exist, considerations for storage of equipment *may* include but are not limited to:

- equipment is clean and dry
- the storage is free from harmful chemicals
- the storage is free from damp conditions
- the storage is free from environmental exposure including Ultra Violet (UV) light and avoids extremes of temperature
- the storage is free from interference of fauna or vermin.

7 Leadership

7.1 Naming conventions

The activity leader naming convention enables this activity GPG to be related to Core Good Practice Guide requirements. The leadership naming conventions for Canyoning activities are:

"Canyoning guide" and "canyoning instructor" is equivalent to Leader in the Core Good Practice Guide.

It is important to clarify specific roles and competencies required to avoid the possibility of a "guide" leading a group when "instructor" competencies are required.

"Assistant Canyoning guide" is equivalent to Assistant leader in the Core Good Practice Guide.

Activity leader(s) collective noun for canyoning assistant guide(s), guide(s) and/or instructor(s).

7.2 Competencies

This section outlines the competencies that *activity leaders should* have.

7.2.1 Overview

The Australian Adventure Activity Standard and Good Practice Guides refers to units from the Sport, Fitness and Recreation Training Package for descriptive statements of the knowledge and skills required of activity leaders.

The Training Package units are used for the sole purpose of providing descriptions for the knowledge and skills required. It is not intended to imply or require that specific formal training, assessment or qualification is the only means of gaining or recognising knowledge and skills.

Providers can recognise activity leaders as having the 'ability to apply knowledge and skills to achieve expected results' (i.e. competencies) in a number of different ways as detailed in Core Good Practice Guide – Recognition of competence.

The Training Package units listed can be found by searching for the units on the training.gov.au/Home/Tga website. The code provided with the unit name assists in this search.

7.2.2 Canyoning competencies

Refer to Appendix 8 – Canyoning leader competencies for recommended competencies.

7.2.3 Assistant canyoning guide competencies

An assistant canyoning guide is a currently competent person within the role, who takes some responsibility for participants and is able to lead or supervise delegated elements or tasks of an activity. The competencies required by an assistant canyoning guide depend on the delegated elements or tasks.

The competencies required of assistant canyoning guide *must* be identified and based on the role and/or responsibilities required.

When determining assistant canyoning guide competencies, consideration *must* include:

- the type of canyoning environment
- the canyoning *activity leader* competencies listed in Appendix 8 and
- the *activity leader* competencies listed in the Core Good Practice Guide.

7.2.4 Canyoning recognition pathways

Refer to considerations for recognition pathways outlined in Core Good Practice Guide.

7.3 Group size

Considerations when determining group size *must* include:

- canyon grade – including vertical, aquatic and commitment grade
- site capacity
- site related legislation or regulation
- the time allowed to enable all participants in the group to complete the activity is sufficient and realistic and does not compromise safety
- having appropriate supervision for non-actively participating participants
- considerations for determining group size outlined in Core Good Practice Guide.

7.4 Supervision

7.4.1 Recommended supervision ratios

Supervision ratios *must* be determined by a risk management process and considerations listed below and in the Core Good Practice Guide.

Considerations for determining supervision requirements *may* include:

- the obstacles, hazards and risks
- canyon grade – including vertical, aquatic and commitment grade
- characteristics of the site
- type of canyoning
- supervision requirements of participants who are non-actively participating
- time for the *activity leaders* to allow all participants to undertake the activity being sufficient and realistic
- participant training progression and competence
- purpose of activity

- general considerations for determining supervision requirements outlined in the *Core Good Practice Guide*.

The following table provides examples of commonly used supervision ratios used when Canyoning:

Vertical canyon difficulty (Grade)	Aquatic canyon difficulty (Grade)	Commonly used supervision ratio* (leader: participants)
V1	A1	1:8 to 1:15
V2	A2	1:6 to 1:12
V3	A3	1:4 to 1:10
V4	A4	1:3 to 1:8
V5	A5	1:2 to 1:6

Note: * While commonly used supervision ratios, these *may* vary depending on the specific context of the specific activity and risk management procedures in place. Refer to the considerations for determining supervision ratios noted above for more details.

The supervision requirements and ratios for programs that train/teach participants to become canyoning guides or instructors *should* be determined on a case-by-case basis, according to the progress of those participants towards being fully independent canyoning guides or instructors themselves.

Considerations for deciding when more than *activity leader* is required irrespective of the number of participants *may* include but is not limited to:

- jumps, slides or siphons with no ability to reascend
- moving water hazards that requires multiply supervision points (*e.g. entry & exit, entry & hazard, exit & hazard etc.*)
- abseiling into moving water graded A5
- multi-pitch abseiling that involve mid-route hanging belays
- multi-pitch abseiling that involve mid-route belay stations that require an *activity leader* to establish (*e.g. no pre-existing anchors at station*).

7.4.2 Supervision of belay systems

Adequate supervision *must* be provided for participants both actively using or controlling a belay system and non-actively participating.

The following supervision recommendations are based on participants who are non-actively participating are either:

- capable of self-managing their own safety in a waiting area based on instructions provided or
- are under the supervision of either another *activity leader* not providing direct supervision of the activity or a responsible person.

Recommended supervision for participants actively abseiling and/or belaying is:

- top-belay with *activity leader* belaying at top:
 - 1 x *activity leader* to 1 x belay system in use.
- top-belay with participants used as belayers at top, with backup belayers, while in close proximity to each other:
 - 1 x *activity leader* to a maximum of 2 x belay systems in use.
- bottom braking:
 - 1 x *activity leader* dispatching at top and 1 x *activity leader* at the base to a maximum of 1 x active belay system in use.
- self-belay (note: is context dependent based on an appropriate learning progression):
 - 1 x *activity leader* to maximum 2 x belay systems in use.

- multipitch abseil:
 - 1 x *activity leader* dispatching at top and if required 1 x *activity leader* to establish the lower belay station to a maximum of 1 x active belay system in use.

7.4.3 Assistant canyoning guides and supervision ratios

An 'assistant canyoning guide' is a currently *competent* person within the role, who takes some responsibility for participants and is able to lead or supervise delegated elements or tasks of an activity.

The use of 'assistant canyoning guide' to impact the supervision ratio *should* be avoided, unless an appropriate risk assessment indicates the circumstances are appropriate.

A risk assessment *must* be completed, when an 'assistant canyoning guide' is used to impact the supervision ratio and is to consider:

- the specific activity context
- the canyoning environment involved
- the competencies needed for the canyoning environment and the elements or tasks of the role
- the current competencies the 'assistant canyoning guide' has
- the appropriateness of the current competencies of the 'assistant canyoning guide'
- the "level of supervision" by the canyoning guide the 'assistant canyoning guide' needs
- emergency management plan if the canyoning guide or instructor is incapacitated.

7.4.4 Single activity leader – all canyoning

Considerations when a solo *activity leader* are used *must* include:

- ensuring participants are adequately supervised
- possibly of participants spending an increases period of time in the canyon in an emergency
- the available and timely access to external emergency support
- the participants skills, age and suitability to the activity
- the competence and training of the *activity leader*
- the familiarity with the activity location and location specific hazards
- emergency communications (refer [Planning – emergency management plan](#)).

Solo *activity leader* activity management considerations *should* include but are not limited to:

- participants skills and suitability are appropriately assessed prior to the activity
- inform participants:
 - the higher risk that they may be indirectly supervised at times
- training participants:
 - in signals used to assist with communication
 - how to maintain body temperature
 - how to use and access warmth sources
 - what to do if the *activity leader* becomes unable to assist them
 - how to obtain outside help
- sole *activity leader* requirements including:
 - verified as competent to manage the trip alone
 - ability in the skills required for leading the trip, including managing emergency scenarios
 - their degree of familiarity with the environmental particulars of the canyon
 - their degree of familiarity with the operator's standard operating and emergency procedures
 - ability to rig the canyon system for sole *activity leader* trips
 - canyon rigging system allows participants to be supervised or contained in a safe place when necessary.

7.4.5 Single activity leader – vertical canyoning

When a single *activity leader* working independently requires a *belayer* and relies on *dependent participants* to belay them, additional procedures that *should* be considered include:

- assessment of the participants competence to operate the *belay system*
- the use of a backup belayer
- appropriate selection of the climb route difficulty to minimise the possibility of the *activity leader* falling while climbing.

When a single *activity leader* working independently is lead climbing or doing multi-pitch activities, a procedure for pre-attachment of dependent participants to the required systems *must* be used prior to the *activity leader* leaving to establish the next belay station.

7.5 Activity management

7.5.1 Progression through a canyon

Procedures *must* be used to reduce the potential of:

- unanticipated changes in water levels impacting activity safety
- falls from height hazard and risks (refer [vertical canyoning management](#))
- water related hazards and risks (refer [aquatic canyoning management](#))
- slippery surfaces related hazards and risks
- rock fall hazards and risks
- being unaware of recent changes to a canyons natural formations and associated hazards and risks.

Considerations while progressing through a canyon *must* include:

- selection of a route that best provides a suitable adventure for the participants while keeping the level of risk within the accepted risk management plan
- what alternative route options can be offered to participants to meet their individual abilities or requirements
- what warnings need to be provided regarding the current hazards and risk
- what instruction is required to avoid or minimize the current hazards and risk
- what alternative techniques that may be used to overcome obstacles or hazards and/or reduce risks (*e.g. swimming rather than walking on slippery rock etc.*)
- the supervision required as participants encounter and/or use techniques to overcome obstacles or hazards
- what aids can be used to address risks (*e.g. establishing traverse lines, use of flotation aids etc.*).

7.5.2 Knowledge of site

The knowledge and experience of the activity site that *activity leaders* require before leading participants at that site, *should* be considered when allocating *activity leader* roles.

7.5.3 Canyoning activity information for participants

The information and requirements to be communicated *may* include but are not limited to:

- the plan for the activity
- participant roles and responsibilities
- relevant hazards and risks and relevant procedures to address the risks
- appropriate personal clothing and footwear requirements
- *personal thermal protection* requirements
- requirements for when and where any Personal Protective Equipment (PPE) is required
- correct fitting of equipment and this to be checked before use
- canyoning techniques appropriate to the current and anticipated terrain

- techniques and procedures to address relevant hazards and risks
- procedures for system for toileting and personal hygiene
- food and drinking water sources, requirements or recommendations
- procedures to avoid becoming lost or separated
- procedures if someone does become lost or separated
- appropriate sun protection procedures
- appropriate methods to waterproof and protect equipment
- techniques or procedures to reduce environmental impact
- systems of communication used
- relevant procedures to reduce over-crowding and to provide efficient group movement
- emergency response if the *activity leader(s)* are injured or incapacitated
- any other relevant activity information or procedures.

7.6 Vertical canyoning activity management

7.6.1 Vertical Canyoning activity information for participants

The information and requirements to be communicated for vertical canyoning *may* include but are not limited to:

- information and requirements listed in canyoning information above
- relevant vertical canyoning hazards and risks including but not limited to fall from height, falling objects and water submersion
- relevant procedures to address the risks
- any requirements to have equipment and systems checked before being relied upon
- relevant abseiling and/or climbing techniques
- the correct use of belay systems or other fall protection systems
- the system for transferring between *belay systems* or other fall protection systems
- the release from *belay systems*.

7.6.2 Fall from heights

Considerations for the likelihood of a fall from height *should* include but are not limited to:

- how close to the edge people are
- the slope of the surface being stood on
- the stability and grip of the surface being stood on
- available hand holds
- obstacles that need to be negotiated
- abilities of participants including the ability to follow instructions.

To reduce the potential for falls from height, procedures *should* include:

- designating what areas that are not to be enter
- designating waiting areas
- designating areas that can only be accessed when attached to a *belay system*.

7.6.3 Unprotected climbing

Unprotected climbing is a form of climbing activity where a fall protection system or *spotter* is not used.

Unprotected climbing must only the be used where the risk is acceptably low of a fall from height indicate the climb does not require the use of a fall protection system or *spotter*.

Considerations when unprotected climbing *should* include but are not limited to:

- the likelihood of falling
- the fall height involved
- the hazards within the fall zone
- whether the surface has holds on vertical, inclined and/or overhanging surfaces
- the body orientations of the person that the holds permit
- the need for *spotting*
- the possibility of falling objects
- the supervision required.

An appropriate helmet *should* be worn when *unprotected climbing*.

Adequate supervision *must* be provided for participants both actively and *non-actively participating*.

The number of climber's that can be supervised while *unprotected climbing must* be based on the:

- the ability and need for providing *direct supervision* or *indirect supervision* of the climber(s)
- the available distance separating multiple climber's.

7.6.4 Bouldering

Bouldering while canyoning is a form of climbing activity, limited in height and for which fall safety can be achieved by a *spotter* providing control of a fall or use of a *deep-water belay*.

The need for *spotting* during the activity *must* be considered.

Considerations when *bouldering should* include but are not limited to:

- the likelihood of falling
- the fall height involved
- the hazards within the *fall zone*
- the need for another fall protection system that is not *spotting* or a *deep-water belay*
- whether the surface has holds on vertical, inclined and/or overhanging surfaces
- the body orientations of the person that the holds permit
- the need for *spotting*
- the availability of a *deep-water belay* in the *fall zone*
- the possibility of falling objects
- the supervision required.

An appropriate helmet *should* be worn when *bouldering* and *spotting*.

Where participants are *spotting* they *must* be instructed and appropriately supervised.

Adequate supervision *must* be provided for participants both *actively* and *non-actively participating*.

The number of climber's that can be supervised while *bouldering must* be based on the:

- the number of *spotters*
- the competence of the *spotters*
- the ability and need for providing *direct supervision* or *indirect supervision* of both the climber(s) and spotter(s)
- the available distance separating multiple climber's
- the site considerations including hazards within the *fall zone*.

7.6.5 Deep-water belays

Procedures to assess the suitability and safety of *deep-water belays must* be developed and used.

Deep-water belays should not be used to protect falls for climbs, traverses or scrambling with a free fall of over 5 metres.

Appropriate assessment by a suitably competent person *must* be undertaken prior to the use of a *deep-water belay*.

Considerations when using *deep-water belay* *must* include:

- any pre-existing or past medical conditions/injuries
- any items worn that may be loose or become dislodged, lost or damaged (e.g. *prescription glasses, contact lens, sun glasses, dentures, hearing aids, insulin pumps, cameras, etc.*)
- depth of the water in the *fall zone*
- whether the water is aerated or not
- level of aeration of the water
- the *fall height* (see [Appendix 7 – Water landings](#))
- impact forces on entering water (see [Appendix 7 – Water landings](#))
- obstacles and water hazards in the *fall zone*
- the speed of the water
- downstream water hazards
- potential for floating objects to move into the *fall zone*
- potential for unexpected or uncontrolled take-offs or landings
- likelihood of landing awkwardly if surprised
- the spacing between and the progress of participants, so they do not cause each other to fall and/or land on others in the *fall zone*.

Instruction on how to avoid any *river hazards* *must* be provided.

Procedures *must* protect against the possibility of anyone using *deep-water belay* being swept into a downstream *river hazard*.

Instruction on how to take-off and land if balance or control is lost *must* be provided when using *deep-water belay*.

7.6.6 Participants belaying or spotting

Considerations for when participants operate *belay systems* or *spotting* *should* include but are not limited to:

- participants are willing and capable
- appropriate training is provided
- the need for ongoing monitoring to ensure:
 - correct technique is used
 - attention to the task is maintained
 - equipment is used correctly
- can appropriately communicate with the climber or abseiler
- backup systems to support the belayer (e.g. *backup belayer*).

7.6.7 Abseiling and Climbing

To reduce the potential for falls from height, procedures *must* include:

- designating what areas that are not to be entered
- ensuring ropes are of a sufficient length for the pitch
- remove unnecessary slack in *belay system* before use
- monitoring the correct use of *belay systems*
- monitor attaching to *anchors* or *belay systems*
- monitor *belay rope(s)* to keep them at the appropriate length
- monitor *belay systems* to remove unnecessary slack in *belay ropes*
- providing appropriate instruction to mitigate risks caused by the stretch in dynamic rope.

To protect from a fall from height, procedures *must* include checking participant(s):

- equipment is correctly fitted before they need to rely on the *belay system*
- correct attachment to the *belay system*, abseil system and/or other safety systems.

To reduce the potential for falls from height, procedures *should* include:

- items listed in 'falls from height' section
- checking participant's equipment is correctly fitted before they need to rely on the *belay system*
- checking correct attachment to the *belay system*, safety or other systems
- anchoring the *belayer* where the *belay system* relies substantially on the belayers weight to arrest a fall and the weight of the abseiler or climber is greater than that of the belayer.

Consideration *must* be given to the need for separately *spotting* climbers when starting their ascent, until such time the climber reaches a *fall height* where the *belay system* will full operate to stop their fall before they reach the *fall zone*.

Checking equipment and attachment *must* not be delegated to the participants themselves, unless they have demonstrated *competence* in the procedure(s).

Considerations for participants not having their belay attachment checked or using a self-belay method *should* include but are not limited to:

- the participant has been assessed *competent* in the skill
- use of an alternative system of checks
- the initial weighting of the abseil is backed up by another form of safety (*e.g. attached by a lanyard*).

7.6.8 Abseiling specific

Equipment and systems to affect a rescue *must* be available.

Abseil belay systems *must* use at least one belay method to protect the abseiler if they lose control of the descent.

Belay methods include but are not limited to a separate *top belay system*, *bottom braking*, *deep-water belay* or a *self-belay* (*e.g. prussik brake*).

The belay method used *must* be a releasable top belay system, unless other considerations indicate another belay method is more appropriate.

Considerations for using a *top belay system* *should* include but are not limited to:

- any stretch in the belay system still allows it to effectively protect a fall
- the likelihood of the abseiler spinning or twisting the belay and abseil ropes together (*e.g. abseiling over overhangs*).

Abseiling activity management considerations *should* include but are not limited to:

- the starting area affecting the ease of weighting the rope and practising the abseil technique
- equipment loads to be carried
- the time a person spends hanging in a harness
- use of belay systems rigged for rescue
- sites having suitable *activity leader* supervision positions to enable appropriate supervision of the abseiler's descent
- use of appropriate equipment to prevent the abseiler becoming inverted
- anchors and equipment are suitable for the peak loads including possible rescue requirements
- the potential for objects falling onto people below including but not limited to equipment
- providing instructions on:
 - actions if they lose control of the *descent system*

- correct abseil technique including body position, speed control and braking.

7.6.9 Abseiling with bottom braking

The belay method used *must* be a releasable *top belay* system, unless other considerations indicate that *bottom braking* is more appropriate.

Participants operating a *bottom braking* belay *should* be avoided.

Considerations for using *bottom braking* *should* include but are not limited to:

- the appropriateness of the system compared to other possible belay systems: *top belay*, *self-belay* or *deep-water belay*
- that any stretch in the *belay system* still allows it to effectively protect a fall
- the appropriate equipment required to ensure the descent speed is appropriate
- the ability of the *belayer* to react in time to stop the abseiler
- the *belayer* having an appropriate location to operate the belay from, including but not limited to stable footing
- the *belayer's competence* or the ability to be appropriately supervised
- the activity aims, and objectives being suited to the participants
- any policy requirements of the 'organisation' engaging the provider to deliver activity for its participants (*e.g. education department policy*)
- the appropriateness of the site
- situations where abseilers are free hanging and/or negotiate overhangs is suited to the participants
- the ability of the *belayer* to see the abseiler at all times
- the likelihood of objects falling on the *belayer*.

7.6.10 Abseiling with self-belay

The belay method used *must* be a releasable *top belay* system, unless other considerations indicate that a *self-belay* is more appropriate.

A *self-belay* system *must not* be used when abseiling in or through strong vertical water flows.

A *self-belay* system *must* be appropriately attached and rigged to prevent jamming or interfering with the correct functioning of the descender device.

During the assessment to confirm *competence* in the use of a *self-belay*, an additional *belay system* *must* be used to protect the person being assessed until *competence* has been demonstrated.

Considerations for using a *self-belay* system (*e.g. prussik brake*) to protect the abseiler if they lose control of the *descent system* *should* include but are not limited to:

- the appropriateness of the system compared to other possible belay systems: *top belay*, *bottom braking* or *deep-water belay*
- the abseiler being competent in operating the *self-belay* system and releasing the prussik under load
- having available releasable rigging, equipment and systems to affect a rescue
- the stretch in the belay system is too great for a *top belay* system or *bottom braking* system to effectively protect a fall
- the amount of vertical water flow that the abseil will occur in or passes through.

7.6.11 Abseiling in waterfalls or into water

Additional considerations when abseiling waterfalls or into water *must* include:

- *features* (*e.g cracks etc.*) behind the waterfall trapping the abseiler
- the force of water hitting the abseiler or belayer affecting their ability to control the abseil or belay
- the surface conditions enable maintenance of an appropriate stance

- potential for foot entrapment
- ability to communication between participants and *activity leader(s)*
- rope entanglement while in water
- the flow rate of the water the abseiler is entering.

Abseiling waterfalls or into water, additional activity management considerations *should* include but are not limited to:

- the abseil rope ends at water level (i.e. no rope floating in the water that could create an entanglement hazard)
- where water with high water flow rates:
 - ending abseils at or above water level
 - using an abseil device that allows easy rope release
- packs not be worn when abseiling in waterfalls with significant water flows
- the abseiler *should* be within sight of the *activity leader* in the parts of their descent involving:
 - significant water flows
 - ledges containing pools of water which present a drowning risk
 - *features* which present an entrapment risk
- appropriate participant assessment and skill progressions to ensure participants are suited to managing their role
- *bottom braking* belayers can stand back from the waterfall, have stable footing and good visibility of the abseiler
- participants acting as *bottom braking* belayers that may be needed to assist in complex rescues, appropriately assessed at moving an abseiler out of the main flow
- appropriate briefing and instruction based on the:
 - hazards of a particular waterfall or water feature below
 - ways to maintain a breathing space through body and head positions
 - how to get clear of the rope if abseiling into water.

7.6.12 Long abseils

Additional considerations for longer abseils *should* include but are not limited to:

- appropriate communication systems to enable effective communication between the top and bottom of the pitch
- ensuring that the belay system(s) that are effective throughout the descent
- use of an appropriate descender device to handle the heat build-up over the length of the abseil
- issues caused by the weight of the rope(s)
- the time the abseiler will be suspended in a harness
- strategies to manage the varying amount of friction experienced over the length of the abseil.

7.6.13 Abseils using a track-line

When a *track-line* is more horizontal than 45 degrees OR the majority of the users weight is supported by the track-line then it *should* be considered a *flying fox*.

Hazards and risks for abseils using a *track-line* that *must* be considered include:

- the abseiler spinning around the track-line causing entanglement or top belay rope friction that halts progress
- moving top belay rope rubbing against stationary *track-line* rope
- possible entanglement including around neck, body parts and equipment
- hands, hair or equipment being caught
- *track-line* failure causing the participant to pendulum into hard surfaces
- equipment or anchor failure by over tensioning the *track-line*
- increased force on the track-line if a *bottom braking* is used
- relevant items listed in other abseil sections above.

Management considerations for abseils using a *track-line should* include but are not limited to:

- use of a sliding carabiner rather than a pulley
- training requirements for *activity leaders* to work with track-lines
- ability to adjust track-line tension during descent
- the ability to complete a rescue
- appropriateness of using a top belay system with a track-line
- participant briefing on appropriate technique and disconnection
- an appropriate belay method is used
- relevant items listed in other abseil sections above.

7.6.14 Lowering

Lowering from an anchor point

Lowering activity management considerations *must* include:

- the use of a secondary 'braking system' for the rope controlling the descent (*e.g. use of a 'prussik autoblock' or belay device 'with assisted braking' in case the person lowering loses control of the rope*)
- communication methods between the participant and the person lowering
- slack is removed from the system prior to use
- the rope length is checked to ensure sufficient rope length is available to complete the descent
- relevant items listed in other abseil sections above.

"V-Lowers"

V-lower activity management considerations *should* include but are not limited to:

- relevant items listed for lowering above
- the person operating the system can visually monitor throughout the person descending
- an appropriate locking or auto-locking connector is used as the attachment to the harness
- the connector size and shape allows the rope to flow smoothly and avoid jams or pinches
- the weight of the person being lowered remains in the V of the rope
- at the end of the lower, the rope end thrown down to allow disconnection is done in a way to avoid hitting people below
- the rope is managed to avoid the 'loose end' becoming tangled or wrapped around body parts or other objects
- those being lowered keep their hands clear of the rope during the descent.

7.6.15 Multi-pitch activities

A pre-activity check and ongoing monitoring *must* be used to confirm that the activity follows and uses the correct route and belay station locations.

Procedures *must* enable appropriate communication between groups at each belay system.

Participant management practices *should* be used to prevent overcrowding at belay stations.

Participants *should* have the competence in using basic skills to temporarily operate out of line of sight or communication of an *activity leader*.

Additional pre-activity information *should* include but is not limited to the method of transferring from the activity belay system to an anchor and back to the activity belay system.

7.6.16 Traverse-lines

To protect from a fall from height, procedures when using a *traverse-line* should include but are not limited to:

- having attachment points easily accessible and in safe locations
- lines rigged above waist height
- monitoring lines remain above waist height
- avoiding the use of lanyards to protect vertical travel in conjunction with *traverse-lines*
- consideration of peak forces on people and equipment when:
 - establishing *traverse-line* angles and anchors
 - choosing the type of equipment used (e.g. *static or dynamic material*)
- methods for staying attached at change over points that still require protection (e.g. *'add before you subtract'*)
- checking carabiner use, locking and orientation
- the number of people using it at one time is appropriately limited
- a maximum of one person between each intermediate anchor point.

7.6.17 Entanglement and snags

Belay rope(s) should be monitored to keep them at the appropriate length and tension, to prevent the possibility of a slack rope becoming entangled or snagged.

To avoid entanglement in ropes and devices:

- long hair *must* be secured to stop it being able to be entangled
- loose jewellery and watches (e.g. *bracelets and necklaces*) should be removed or secured
- loose clothing and drawstrings should be secured.

To avoid being caught or snagged, where there is such a risk:

- rings should be removed or tapped over
- body piercings should be removed or taped over.

7.6.18 Swinging falls

To reduce the potential for injury or damage to participants or equipment consideration should include but is not limited to the possibility of participants:

- taking a route on an angle that creates the potential for a pendulum swing if control is lost
- swinging or falling against or across hard, abrasive or sharp objects.

7.6.19 Harness hang syndrome

Harness hang syndrome is medical complications due to being "suspended within a body harness for a prolonged period of time (5 to 30 minutes)" (reference: Australian Resuscitation Council – Guideline 9.1.5 – July 2009). Harness hang syndrome can lead to blood pooling, "shock", unconsciousness and/or death. It is also known as 'suspension trauma' or 'suspension syndrome'.

Rescue systems in place *must* enable rescue of a person suspended in a harness in timely manner.

Emergency management plans *must* include:

- rescue of unconscious persons suspended in a harness
- guidance on trigger points for considering the possibility of 'harness hang syndrome' occurring
- appropriate actions to follow where 'harness hang syndrome' is suspected, including but not limited to the relevant first aid treatment.

7.6.20 Flying foxes

The use of flying foxes is beyond the scope of this Good Practice Guide.

Providers *must* assess and address flying fox hazards and risks by:

- completion of their own appropriate risk assessment
- referral to any other relevant standards or guidelines.

7.7 Aquatic canyoning activity management

7.7.1 Aquatic Canyoning activity information for participants

The information and requirements to be communicated for aquatic canyoning *may* include but are not limited to:

- information and requirements listed in canyoning information above
- appropriate use of any buoyancy aids
- suitable information and instruction on hazard avoidance including but not limited to:
 - wading and/or swimming techniques suited to the route to be negotiated
 - ways to recognise hazards where appropriate
 - hazard avoidance techniques such as 'white-water float position' and 'active swimming'
- suitable instruction provided in take-off and landing positions for jumps or slides, including body, head and limb positions.

7.7.2 Aquatic activity management

Aquatic activity management *must* include:

- monitoring water levels are within the maximum and/or minimum water level trigger points
- monitoring weather conditions and where possible weather forecasts and warnings including flood and flash flood warnings where available
- appropriate storage or management of ropes to avoid entanglement while in water.
- consideration of:
 - the water temperature
 - the length of swims or wades
 - the overall amount of swimming or wading involved.

7.7.3 Buoyancy aids

Considerations on the use of *lifejackets* or other *buoyancy aids* *must* include:

- the likelihood of falling into or moving through water
- the safety systems used to protect from falling into water
- the water hazards and risk involved
- the water temperature
- the aeration of the water
- the amount of buoyancy provided by the clothing worn or the equipment used
- the amount of reduced buoyancy caused by clothing worn or the equipment carried
- the amount of buoyancy provided by the lifejacket or aid
- the likelihood of being in water for a long time
- the likelihood of being washed downstream
- the swimming ability of participants
- the impact of the length of the journey and environmental conditions on the participants ability to swim
- if needed to assist with jumps into shallow water
- if needed as a means of holding or supporting people
- if needed as a means of helping people out of water
- if provides padding to protect from other injury (e.g. during slides).

7.7.4 Jumping into water

Hazards and risks when jumping into water that *must* be considered include:

- ability of participants
- any pre-existing or past medical conditions/injuries
- any items worn that may be loose or become dislodged, lost or damaged (*e.g. prescription glasses, contact lens, sun glasses, dentures, hearing aids, insulin pumps, cameras, etc.*)
- difficulty and exposure of access routes
- exposure to potential unintended falls from height
- falling or jumping outside of the intended *fall zone*
- the features of the take-off area
- the horizontal travel distance from the take-off position to the *fall zone*
- obstacles within the route of the jump
- the *fall height* involved (see [Appendix 7 – Water landings](#))
- the depth of and obstacles within the *fall zone*
- the impact forces when entering the water (see [Appendix 7 – Water landings](#))
- level of aeration of the water
- equipment being carried impacting the jumper on landing
- fast flowing water in the *fall zone* flowing into hazards.

Jumps *should* not be from a height greater than 10 metres.

Jumping into water activity management considerations *should* include but are not limited to:

- assessment of the *fall zone* (refer [Vertical section – deep-water belay](#))
- participant management ensures they do not interfere with each other's stability in access and take-off areas
- the *fall zone* is clear of other people before each person jumps
- difficult access, take-offs and/or landings have *direct supervision*
- appropriate protection against falling used while accesses the take-off areas
- appropriateness of wearing a pack (*e.g. height of jump, impact forces, type of pack, weight of pack etc.*)
- physical characteristics of the participants
- actively managing jumps into difficult *fall zones*
- positioning an *activity leader* at the bottom to indicate the required *fall zone* and/or mark a hazard
- providing a suitable alternative where relevant (*e.g. lower jump, abseiling or being lowered*)
- the location and difficulty of the exit from the water
- briefing participants on appropriate technique
- features of the take off and technique used
- when wearing a lifejacket it must be correctly fitted and correct technique used to ensure the lifejacket does not dislodge on impact and affect movement
- appropriate technique so that helmets and chin strap do not cause injury when a helmet hits the water on higher jumps.

7.7.5 Slides into water

Hazards and risks when sliding into water that *must* be considered include:

- ability of participants
- any pre-existing or past medical conditions/injuries
- any items worn that may be loose or become dislodged, lost or damaged (*e.g. prescription glasses, contact lens, sun glasses, dentures, hearing aids, insulin pumps, cameras, etc.*)
- difficulty and exposure of access routes
- exposure to potential unintended falls from height
- the features of the take-off areas
- the volume of water on the slide

- obstacles within the route of the slide
- the length of the slide involved
- the depth of and obstacles within the *fall zone*
- the impact forces when entering the water
- equipment being carried impacting the slide
- fast flowing water in the *fall zone* flowing into hazards.

Slides into water activity management considerations *should* include but are not limited to:

- assessment of the *fall zone* (refer [Vertical section: deep-water belay](#))
- participant management ensures they do not interfere with each other's stability in access and take-off areas
- the *fall zone* is clear of other people before each person slides
- difficult access, take-offs and/or landings have *direct supervision*
- appropriate protection against falling used while accesses the take-off areas
- use of appropriate padding as protection when sliding
- providing a suitable alternative where relevant (*e.g. abseiling or being lowered*)
- the location and difficulty of the exit from the water
- briefing participants on appropriate technique
- equipment appropriately secured so the possibility of that equipment causing entanglement or entrapment is minimised
- wear and potential for damage to equipment.

7.7.6 Swimming and wading

Hazards and risks when swimming and wading that *must* be considered include:

- swimming ability of participants
- any pre-existing or past medical conditions/injuries
- if prescription glasses, contact lens or sun glasses are being worn
- *river hazards* including those at the current activity location and downstream
- the speed of the water
- the amount of aerated water and the buoyancy available
- the depth of the water including being too shallow or too deep for the method used
- the base of the watercourse including its stability and grip
- buoyancy aids available
- the spacing between and the progress of participants
- floating debris.

Swimming and wading activity management considerations *should* include but are not limited to:

- matching the activities to the participants abilities
- using appropriate routes to address entrapment or other hazards and risks
- swimming competence being checked prior to commencing the activity
- assessment of swims and wades to ensure:
 - appropriate supervise can be provided
 - appropriate intervention can be used if needed
- *direct supervision* of difficult swim, wade, exit points or where exiting at a point is integral to avoiding hazard(s)
- swimming over drops only where it does not form and/or flow into a *river hazard*
- managing weaker swimmers by:
 - using alternatives to avoid the swim or wade
 - swimming with an *activity leader*
 - providing extra buoyancy
- the location and difficulty of the exit from the water

- if there is debris floating or flowing in the current
- how clear the water is and if the base of the watercourse can be seen
- the depth, speed, and amount of water needed to be overcome to avoid being washed away
- the base of the watercourse (*e.g. pebbles, sand, small rocks or large rocks*) that can increase the danger of foot entrapment and/or reduce the likelihood of maintaining stable footing.

Glossary

AAAS: Australian Adventure Activity Standard – See Preface for details.

Anchor: Any load bearing attachment to which any part of a *belay system* is attached.

Anchor system: a group of individual *anchors* to which any part of a *belay system* is attached.

Abseiling: descending vertical or near vertical natural surfaces or artificial surfaces using ropes and descending friction devices to manage the descent. It is also known as rappelling.

Activity leader(s): collective noun for canyoning assistant guide(s), guide(s) and/or instructor(s).

Belay System: The means by which the climber or abseiler is protected from an uncontrolled fall or descent.

Belayer: A person that operates the *belay system*.

Bottom belay: Belaying a climber or abseiler from the bottom of a *pitch*.

Bottom braking: The controlling of the descent of an abseiler, by a belayer located below the abseiler applying tension to the abseil rope. Used as a method of belaying the abseiler if they lose control of the descent.

Bouldering: A form of climbing activity, limited in height and for which fall safety can be achieved by the provision of an impact absorbing system, by a spotter providing control of a fall or by a combination of these measures. (Also see *deep-water belay* and *spotter*.)

Buoyancy aid: a device that provides additional buoyancy in water. (For example, *inflatable mattress, waterproofed backpack, kickboard, noodle, etc.*) Also see *Lifejacket*.

Bushwalking: walking in natural areas.

Camping: the use of a temporary site for overnight camping.

Canyon: geological formations that involve flowing or dry watercourse(s). (Also known as gorges.)

Canyoning: the descent, traversing and/or ascent of a canyon using a range of techniques.

Carabiner: (refer *connector*).

Caving: [to be developed]

Climbing: ascending, traversing or descending vertical or near vertical natural surfaces or artificial surfaces. (Also see *rock climbing*).

Competence: ability to apply knowledge and skills to achieve expected results.

Competencies: the plural of competence. Having competence in more than one ability.

Competent: leader/participant/person/assessor: someone who has the competence to perform specific functions.

Connector(s): a metal device used to link components together. A connector may be:

- **Non-locking:** a connector that cannot be locked to prevent it opening.

- *Locking*: a connector that can be manually locked and unlocked to reduce the possibility of it opening
- *Auto-locking*: a connector that will automatically lock to prevent it from opening and requires two or more deliberate actions to unlock.

Contact rescue: a rescue requiring an *activity leader* to manoeuvre to the persons actual location to physically assist them.

Descent system: the *belay system* that an abseiler operates to control their descent.

Deep-water belay: a safety system relying on deep water in a *fall zone*.

Direct supervision: where a nominated person responsible for supervising others during all or part of the activity is able to intervene immediately (also see *indirect supervision* and *remote supervision*).

Dynamic rope: a specially constructed kernmantle rope that is somewhat elastic under load. The elastic 'stretch' under load is what makes the rope 'dynamic'. (Also see *static rope*.)

Fall factor: is the ratio of the height of a fall (h) (measured before the rope or lanyard begins to stretch) and the rope or lanyard length available to absorb the energy of the fall (L). It is used as a representation of the severity of a fall when arrested by a *belay system*. It is calculated by (h) divided by (L).

Fall height: The vertical distance between the climber's or abseiler's lowest body element and the surface beneath.

Fall zone: The surface that can be hit by a climber or abseiler falling.

Feature: a part of a natural surface or artificial surface.

Flash flooding: is flooding in a localised area with a rapid onset, usually as the result of relatively short intense bursts of rainfall.

Flying fox: a means of travel along a sloping rope or cable by attaching to it using a free moving pulley and being propelled by gravity.

Forward abseiling: abseiling while facing towards the ground.

GPG's: Good Practice Guide(s) – See Preface for details.

Guided rappels: an abseil that uses a *track-line*.

Horizontal canyoning: the ascent, traversing and/or descent of a canyon where any fall safety required can be achieved using *spotting*.

Hydraulics: refer *river hazards*.

Indirect supervision: where a nominated person responsible for supervising others during all or part of the activity is in the vicinity but unable to intervene immediately (also see *direct supervision* and *remote supervision*).

Lead climbing: where the climber ascends a *pitch* while periodically attaching their rope to fixed or removable protection.

Lifjacket: a worn device that provides the wearer with additional buoyancy in water. (Also known as Personal floatation device (PFD))

Lowering: a descent which is controlled by a rope from above. Also known as 'passive abseiling'.

Minimum Breaking Strength (MBS): is the magnitude of a load that may permanently distort or damage equipment but not cause it to break. (Refer [Appendix 4 – Equipment load ratings](#)).

Multi-pitch: a section of a natural surface or artificial surface that to ascend, traverse or descend, progress is made by using more than one pitch and establishing *belay systems* mid route.

Natural surface(s): the geologic structure and flora that forms a cliff or steep face.

Non-actively participating: a participant that is waiting to but is not currently doing the activity.

Non-participating contact: a suitable person not involved in and not located with those conducting the activity, who is the nominated person to act on behalf of those undertaking the activity in accordance with the emergency management plan. This may include *but is not limited to* responsibility for alerting authorities on the failure of those undertaking the activity to report in as being safe or return on time.

Personal floatation device (PFD): See *lifejacket*.

Personal thermal protection: clothing worn to mitigate the effects of the temperature of the canyon environment.

Pitch: a section of a natural surface or artificial surface that requires no greater than one length of rope to ascend, traverse or descend. (Also see *multi-pitch* and *single-pitch*.)

Rappelling: see *abseiling*.

Releasable rigging: a system where the abseil rope may be lowered in a controlled manner, even while weighted by a abseiler, by releasing part of the system.

Remote supervision: where a nominated person responsible for supervising others during all or part of the activity is not involved in *direct* or *indirect supervision* and is unlikely to be in the vicinity, and would therefore take time to respond (also see *direct supervision* and *indirect supervision*).

Responsible person: a *competent* person who is able to complete delegated elements or tasks during an activity that does not require the activity-specific competence of a *leader* or *assistant leader*.

River hazards: a hazard created by a watercourses' geology and flora, the water within it or a combination of both. Common river hazards include *but are not limited to*: aerated water, drops, eddies, entrapment points, fast flowing water, floating objects, undercut rocks, re-circulations (also called 'holes'), rapids, sieves, strainers, submerged objects etc. (Some hazards (e.g. *eddies*, *re-circulations*) are also known as hydraulics.)

Rock Climbing: ascending, traversing or descending vertical or near vertical natural surfaces. At times also used to describe climbing on artificial surfaces. (Also see *climbing*.)

Safety factor: the ratio between the *Minimum Breaking Strength (MBS)* and *Safe Working Load (SWL)* to provide a safety margin. It is expressed as a ratio (e.g. 8:1). (Refer [Appendix 4 – Equipment load ratings](#)).

Safe Working Load (SWL): is the magnitude of load that does not permanently distort, weaken, damage or break equipment and includes a safety margin. (Refer [Appendix 4 – Equipment load ratings](#)).

Self-belay: a *belay system* that requires the climber or abseiler to operate and does not use an independent belayer or *auto-belay system*. For example, *abseiling with a prussik brake* would involve a *self-belay* operated by the abseiler.

Single-pitch: a section of a natural surface or artificial surface that requires no greater than one length of rope to ascend, traverse or descend.

Siphon: where water passes underneath an obstruction. (Note that this differs to a sieve where the water passing through & around obstructions such as rocks, wood or other debris.)

Sports climbing: *lead climbing* where the *belay system* relies on permanent fixed anchors for protection. (Also see *traditional climbing*.)

Spotter(s): a person or persons who are *spotting*.

Spotting: a support process provided by a person, or persons, who offer physical protection of the head and upper body of a person should they fall.

Stated strength: the magnitude of load that is either the *Minimum Breaking Strength* (MBS) or *Safe Working Load* (SWL) marked on equipment or listed in manufacturer's literature. (Refer [Appendix 4 – Equipment load ratings](#)).

Static rope: a specially constructed low stretch kernmantle rope, that has low elongation under load. The low elongation or 'stretch' under load is what makes the rope 'static'. (Also see *dynamic rope*.)

Top belay: Belaying a climber or abseiler from the top of a *pitch*.

Top-rope climbing: climbing where the *belay system* has its *anchor* or *anchor system* at the top of the pitch and uses either a *top belay* or *bottom belay*.

Traditional climbing: *lead climbing* where the *belay system* relies on anchors for protection that the climber places during the climb. (Also see *sports climbing*.)

Traverse-line: A *belay system* secured in a generally horizontal direction to allow horizontal movement.

Track-line: a line that guides the path of the abseilers descent. (For example, to divert the abseiler away from an obstacle or high water flow.)

Trigger point: a particular circumstance or situation that causes an action to occur.

Unprotected climbing: a form of climbing activity where a fall protection system or *spotter* is not used. (For example, rock scrambling).

V-Lower: A lowering technique controlled from above using a two to one haul system, that allows the rope to be released from what is lowered without having to unclip a connector. The release is completed by releasing one end of the rope and pulling the other, as the rope is free flowing through the connector that attached what was lowered to the haul system. Also known as a 'drop-loop' or 'rolling' lower.

Vertical canyoning: the descent, traversing and/or ascent of vertical or near vertical canyon surfaces, where fall safety cannot be achieved using *spotting* due to the *fall height*.

Via ferrata climbing: climbing where the safety system does not use a *belayer* and relies on a series of permanent fixed *anchors* that limit the distance a climber can fall.

Waiting areas: a location in which to wait prior to undertaking the activity, where it is reasonable for a person to not be required to use equipment to protect them from a fall from height.

Appendices

Appendix 1 Canyon grading system

A1.1 Introduction

The grading system is based on the English translation of the French grading system that is used in New Zealand. The original translation source can be found at: <http://www.kiwicanyons.org/legend/grading/> (Used with Permission). Refer the end of this section for further detail.

Assumptions

The grading is indicative of the most difficult compulsory section of the canyon and reflects the technical skill required to descend that part.

The level of difficulty is set by at least one of the situations listed in the table(s) being found in the canyon.

When grading aquatic difficulty, it *should* specify the water flow it is applicable for or based on.

When grading commitment, it *should* specify the number of people in the group and their relative experience. (General usage with the Good Practice Guide would normally see groups experience being *activity leader(s)* are competent at canyoning, while all others in the group are dependent participants.)

Grading any technical activity is always an exercise in compromise.

In the grade, there is no way to distinguish between a canyon with one difficult section and another canyon where the whole canyon has difficult drop after difficult drop.

The gradings *must* be used in conjunction with route descriptions and maps to gain a better understanding of the overall difficulty of the trip.

Canyons may change with every flood, to the point that the initial grade *may* change.

A1.2 Grading

Canyon grading has 3 parts:

- difficulty of the vertical and aquatic sections
- commitment and
- quality

Difficulty:

Vertical difficulty – The letter ‘v’ followed by a number from 1 to 7. Rock climbing grades used in the descriptions are from the free climbing Australasian Ewbank system and the Aid climbing Grade. See Wikipedia grade comparison:

[https://en.wikipedia.org/wiki/Grade_\(climbing\)#Free_climbing_ratings_comparison_table](https://en.wikipedia.org/wiki/Grade_(climbing)#Free_climbing_ratings_comparison_table)

Aquatic difficulty – The letter ‘a’ followed by a number from 1 to 7. White-water grades referred to in the grade descriptions are from the international white-water grading system. See Wikipedia international white-water grades: https://en.wikipedia.org/wiki/International_scale_of_river_difficulty.

Note: The current difficulty numbers only reach 7, but more difficult canyons in the future could require higher numbers.

Commitment:

Commitment – The letter ‘c’ (for commitment and duration of the canyon) followed by a number from 1 to 6.

Quality:

Quality – An optional grading. The letter 'q' (for the quality/beauty/fun factor of a canyon) followed by a number from 0 to 4.

Examples:

Example of presentation: **v3a2c3q2**

Example of grading a canyon:

- each component is rating separately (*e.g. vertical difficulty then aquatic etc.*)
- the most difficult compulsory section of that component is selected and rated (e.g. the hardest vertical section in the canyon has “rappels anchors are difficult to reach”)
- the statement “rappels anchors are difficult to reach” in the table is graded a difficulty v4 “difficult” so the grade v4 is assigned
- the next component is assessed (*e.g. aquatic*) in the same way.

Notes:

The highest-grade difficulty statement is always used for grading – for example:

- if both “Rappel anchors are easily reached.” and “Rappels are easy. <= 30m.” occurs then the grade is v3
- if either “Rappels anchors are difficult to reach and/or Rappels > 30m” occurs the grade is v4
- so even if “Rappel anchors are easily reached” but “Rappels > 30m” then it is graded v4
- and if “Rappels anchors are difficult to reach” but “Rappels are easy. <= 30m.” then grade v4 i.e. same as the dot point 2 example above.

See next page for grade tables.

A1.3 Background to system

There are several different canyon grading systems around the world.

The above grading system is based on the English translation of the French grading system. It is used in New Zealand.

The original source was <http://www.kiwicanyons.org/legend/grading/> (Used with Permission).

The presentation of the grades - as presented in the NZ translation - have been modified with the:

- commitment grade expressed as a number rather than 'roman numeral'
- quality grade expressed as a number rather than a number of 'stars'
- addition of white-water grades in some of the aquatic difficulty descriptions.

Overview of the French system

The modern sport of canyoning has its roots strongly centered in Europe, and in particular France. As the sport began to really take off, a number of French Outdoor Associations standardised their grading systems in 2003.

The gradings presented are the English translation of those agreed on by the French Federation of Mountain Climbing (FFME), with support from the French Federation of Speleology (FFS) in conjunction with the National Union of Mountain Guides (SNGM), the National Union of Professionals Climbing and Canyoning (SNAPEC), the National Union of Professional Speleology and Canyoning (SNPSC) and the Federation of French Alpine Clubs (FCAF).

The French grading system aligns with 'best international practice'.

A1.4 Grade tables

Difficulty rating	“v”: Vertical difficulty criteria <i>(e.g. vertical surface, climbing, setup, rappels, multi-pitch, flow & pools)</i>	“a”: Aquatic difficulty criteria <i>(e.g. swims, current, hydraulics, slides, siphons & jumps)</i>
1 Very easy	<ul style="list-style-type: none"> • No climbing or down climbing. • No rappels, rope normally unnecessary for progress. 	<ul style="list-style-type: none"> • No water or calm water. • Swimming optional.
2 Easy	<ul style="list-style-type: none"> • Easy climbing and down climbing with little exposure. • Rappel anchors are very easily reached. • Rappels are very easy <= 10m. 	<ul style="list-style-type: none"> • Swims less than 10m in calm water. • Short, low angled slides • Simple jumps less than 3m.
3 A little Difficult	<ul style="list-style-type: none"> • Climbing moves to grade 12. A little exposure, which may require the use of a rope. • Setting hand lines is easy. • Rappel anchors are easily reached. • Rappels are easy. <= 30m. • Rappels are separated by enough room to regroup. • Low vertical flow. Rappels land in pools with calm water. 	<ul style="list-style-type: none"> • Swims less than 30m in calm water. • Slight current in places. • Long or moderately angled slides. • Simple jumps between 3 and 5m
4 Difficult	<ul style="list-style-type: none"> • Climbing moves to grade 15 or A0. Exposed and/or requires belaying and protection. • Setting handlines is difficult and delicate. • Rappels anchors are difficult to reach and/or Rappels > 30m • Rough rock edges requiring rope wear management. • Rappels with obscured sections and/or landings pools. • Multi-pitch rappels with relatively spacious re-belay stations. • Low to moderate vertical flow that can begin to cause imbalance or entrapment. • Landing pools have current. 	<ul style="list-style-type: none"> • Prolonged immersion in cold water. • Moderate current in places. • Large or steep slides. • Siphons of less than 1m in length and / or depth. • Simple jumps between 5 and 8m • Jumps with difficult trajectory and/or landing of less than 5m.
5 Quite Difficult	<ul style="list-style-type: none"> • Canyon surface is very slippery and/or has significant obstacles • Exposed climbing moves up to grade 18 or A1. • Retrieving the rope is difficult or has to be done whilst swimming. • Multi-pitch Rappels may have hanging re-belays. • Medium to high vertical flow. Crossing the flow requires correct route selection and balance. • Requirement to cross pools with current during the descent. 	<ul style="list-style-type: none"> • Prolonged immersion in cold water resulting in a substantial heat loss. • Current strong enough that it could affect a swimmer’s path through the water. • Hydraulics such as eddies, recirculation’s, holes may trap a Canyoner for a short period of time. (White-water grade 2) • Large Siphons up to 2m in length and / or depth. • Simple jumps between 8 and 10m. • Jumps with difficult trajectory and/or landing of 5 to 8m.

Difficulty rating	"v": Vertical difficulty criteria (e.g. vertical surface, climbing, setup, rappels, multi-pitch, flow & pools)	"a": Aquatic difficulty criteria (e.g. swims, current, hydraulics, slides, siphons & jumps)
6 Very difficult Exposed	<ul style="list-style-type: none"> • Canyon surface exceptionally slippery and/or loose. • Exposed climbing moves to grade 19 or A2. • Setting hand lines is very difficult and very delicate. • Requirement to build advanced and/or delicate natural anchors • Rappel anchors are very difficult to reach. • Strong to very strong vertical flow • Sustained waterfalls • Crossing the flow is very difficult, requiring effective management of selected route and / or balance. • Rappel landing pools are turbulent and/or with significant current. 	<ul style="list-style-type: none"> • Moderate current that makes a selected swimming path or stopping point difficult to achieve. • Hydraulics such as eddies, recirculation's, holes may trap a Canyoner for a moderate period of time. • Siphon of up to 3m depth and / or length. • Technical siphon, up to 1m deep, with possible current. • Simple Jumps between 10 and 14m • Jumps with difficult trajectory and/or landing of 5 to 8m.
7 Extremely Difficult Very Exposed	<ul style="list-style-type: none"> • Exposed climbing moves > grade 19 or A2 • Limited visibility of route and frequent obstacles. • Very strong to extremely strong vertical flow • Very sustained waterfalls that lead into one another without a gap. • Crossing the flow is extremely difficult; requiring anticipation and specific rope management, manoeuvre, balance, support and pace. • Requirement to move through powerful current at the end of a rappel or rappel landing in a very turbulent pool with powerful current. • Control of breathing: sections where you must hold your breath. 	<ul style="list-style-type: none"> • Strong current that makes a selected swimming path or stopping point extremely difficult to achieve • Hydraulics such as eddies, recirculation's or holes may trap a Canyoner for a prolonged period of time. • Siphons over 3m in length and / or depth. • Technical and committing siphon, more than 1m tall, with current or no visibility. • Simple jumps greater than 14m • Jumps with difficult trajectory and/or landing greater than 10m.

Rating	Commitment/ duration "c" Criteria	French/NZ Rating
c1	<ul style="list-style-type: none"> • Able to get out of a flood quickly. • Escape is easy throughout the Canyon • Total time (approach, descent, return) less than 2 hours. 	I
c2	<ul style="list-style-type: none"> • Able to get out of a flood in less than 15 mins • Escape takes up to 30 minutes. • Total time (approach, descent, return) is between 2 and 4 hours. 	II
c3	<ul style="list-style-type: none"> • Able to get out of a flood in less than 30 minutes. • Escape takes up to 1 hour. • Total time (approach, descent return) is between 4 and 8 hours. 	III
c4	<ul style="list-style-type: none"> • Able to get out of a flood in less than 1 hour. • Escape takes up to 2 hours. • Total time (approach, descent return) between 8 hours and 1 day. 	IV
c5	<ul style="list-style-type: none"> • Able to get out of a flood in less than 2 hours. • Escape takes up to 4 hours. • Total time (approach, descent return) is between 1 and 2 days. 	V
c6	<ul style="list-style-type: none"> • Getting out of a flood takes more than 2 hours • Escape requires more than 4 hours. • Total time (approach, descent return) is more than 2 days. 	VI

Rating	Quality "q" Criteria	French/NZ - stars
q0	Canyons that have been descended but are not really worth the effort required. Included so people searching for new canyons know to discount these streams.	No stars
q1	Locally Significant Canyons. Good canyons that are worth the effort required to descend	*
q2	Regionally Significant Canyons.	**
q3	Canyons of above average quality that are worth returning to several times	***
q4	Nationally significant Canyons. The highest quality canyons, with an excellent mix of good access, beauty, fun and challenge. Canyons of International significance.	****

Appendix 2 Equipment lists

The equipment required, and the appropriate “type” of equipment used is dependent on the specific context of the activity.

Equipment used for canyoning *may* include but is not limited to:

A2.1 Canyoning specific equipment

Equipment used for canyoning (excluding abseiling or climbing equipment) *may* include but is not limited to:

A2.1.1 Personal equipment

- ‘white-water’ helmet and/or ‘climbing’ helmet as appropriate
- *lifejacket* (Also known as Personal flotation device (PFD))
- other buoyancy aids
- whistle (for communications or emergency)
- appropriate footwear
- personal thermal protection:
 - thermal clothing
 - windproof jacket
 - wet suit
 - dry suit
 - beanie
 - gloves
 - booties.

A2.1.2 Rescue equipment

- throwbags
- knife
- heat sources (*e.g. stove and related equipment, heat packs, high energy food*)
- shelter (*e.g. space blankets, bivvy bags, ground mat, additional personal thermal protection*)
- goggles or diving mask
- pliers
- a length of hollow tube.

Refer following sections for other related abseiling or climbing equipment.

A2.1.3 Other equipment

Suitable equipment for:

- collecting and carrying out human waste and personal hygiene waste
- collecting and carrying out general waste
- ‘waterproofing’ necessary equipment.

A2.2 Abseiling and climbing specific equipment

- ‘climbing’ helmet
- harness
- descending device
- belay device
- carabiner
- ropes – static and dynamic as appropriate
- slings
- climbing cord
- artificial removable anchors including but not limited to chocks, cams, nuts, hexes, bolt plates

- artificial anchors
- nut tool
- rescue equipment

Rescue equipment *may* include but is not limited to:

- additional rope
- pulleys
- ascenders
- prusik loops
- slings
- climbing cord
- carabiners
- belay device
- knife suitable for cutting ropes (preferably on a lanyard).

A2.2.1 Abseiling specific equipment

Specific equipment for abseiling *may* include but is not limited to:

- gloves.

A2.2.2 Climbing specific equipment

Specific equipment for climbing *may* include but is not limited to:

- gloves
- climbing shoes.

A2.3 Bouldering specific equipment

Specific equipment for *bouldering* *may* include but is not limited to:

- appropriate helmet.

A2.4 General equipment

Specific general equipment *may* include but is not limited to:

Emergency/rescue

- documentation (see [Core Good Practice Guide - Activity leader required documentation](#))
- emergency communication equipment (see [Core Good Practice Guide - emergency communication](#))
- first aid kit in waterproof storage (see [Core Good Practice Guide -First aid equipment and medication](#))
- a waterproof method of storing and carrying documentation and communications equipment
- specific activity context equipment required
- emergency shelter where appropriate for the context
- emergency equipment to keep a patient warm (*e.g. mat, sleeping bag*) where appropriate for the context

Activity Leaders

- communications equipment (standard communication rather than emergency communication where this differs) and spare batteries or backup “power banks”
- relevant maps and navigation information
- a waterproof method of storing and carrying maps and navigation information
- compass and/or other navigation aids (*e.g. GPS*)
- pen/pencil and blank writing paper

- watch or equipment suitable to tell and measure time for first aid purposes
- head torch and spare batteries
- as for participant below.

Participant

- personal medications (including for asthma and anaphylaxis)
- personal hygiene requirements
- clothing appropriate to the weather conditions
- sun hat
- sunglasses
- spare prescription glasses
- sunscreen

Group

- backpack to carry equipment
- trowel for toileting
- toilet paper
- hand sanitiser
- water purification 'system'
- repair kit
- food for duration plus spare
- rubbish bags
- multi-tool with knife
- sunscreen
- insect repellent
- first aid kit (see *Core Good Practice Guide -First aid equipment and medication*)

Multi- pitch activities

- small personal backpacks to carry personal equipment
- inter-group communication equipment (*e.g. portable two-way radios*).

Appendix 3 Equipment related standards list of references

A3.1 Helmets – climbing related

EN 12492 Mountaineering Equipment – Helmets For Mountaineers – Safety Requirements And Test Methods

A3.2 Helmets – water related

EN 1385:2012 Helmets for canoeing and white water sports

Considerations for helmets *must* include:

- provide ample protection to the head from impacts
- have a good system to absorb the shock from impacts
- be adjustable to provide a good fit and remain comfortable
- have an effective fastener to secure the helmet in place
- have enough positive buoyancy to float
- be made of a suitable, strong, lightweight material.

A3.3 Life jackets

AS 4758.1:2015 Lifejackets General requirements

Considerations for life jackets *must* include:

- the appropriate type is used for the activity
- provides sufficient additional buoyancy for the type of water environment
- does not restrict essential movement.

A3.4 Vertical equipment

Equipment and the relevant standards:

- Accessory cord (EN 564)
- Braking devices (EN 15151-1, EN 15151-2)
- Carabiners or other connectors (EN 362, EN 12275, AS/NZS 1891.4 or ISO 10333-5)
- Chocks (EN 12270)
- Descending devices (EN 341)
- Energy absorbing systems EN 958
- Frictional anchors EN 12276
- Helmets (EN 12492)
- Harnesses (EN 358, EN 361, EN 813, EN 12277, AS/NZS 1891.4 or equivalent)
- Lanyards (EN 354)
- Rock anchors (EN 959)
- Rope clamps EN 567
- Rope – dynamic (EN 892)
- Rope – static (EN 1891, AS 4142.3, CI 1801)
- Personal fall protection equipment – anchor devices (EN 795)
- Pitons (EN 569)
- Pulleys (EN 12278)
- Slings (EN 566, AS 1353 (series) or AS/NZS 1891.4)

List of relevant standards

AS/NZS

- 1353 Flat synthetic-webbing slings Product specification
- 1891 Industrial fall-arrest systems and devices
- 1891.4 Part 4: Selection, use and maintenance

- 2512 Methods of testing protective helmets
- 2512.1 Methods of testing protective helmets Part 1: Definitions and headforms

CI

- 1801 Low Stretch And Static Kernmantle Life Safety Rope

EN

- 341 Personal protective equipment against falls from a height—Descender devices
- 354 Personal protective equipment against falls from a height—Lanyards
- 358 Personal protective equipment for work positioning and prevention of falls from a height—Belts for work positioning and restraint and work positioning lanyards
- 361 Personal protective equipment against falls from a height—Full body harnesses
- 362 Personal protective equipment against falls from a height—Connectors
- 564 Mountaineering equipment—Accessory cord—Safety requirements and test methods
- 566 Mountaineering equipment—Slings—Safety requirements and test methods
- 567 Mountaineering equipment—Rope clamps—Safety requirements and test methods
- 569 Mountaineering equipment. Pitons. Safety requirements and test methods
- 795 Personal fall protection equipment. Anchor devices
- 813 Personal fall protection equipment—Sit harnesses
- 892 Mountaineering equipment—Dynamic mountaineering ropes—Safety requirements and test methods
- 958 Mountaineering equipment. Energy absorbing systems for use in klettersteig (via ferrata) climbing. Safety requirements and test methods
- 959 Mountaineering equipment. Rock anchors. Safety requirements and test methods
- 12270 Mountaineering equipment. Chocks. Safety requirements and test methods
- 12275 Mountaineering equipment—Connectors—Safety requirements and test methods
- 12276 Mountaineering equipment. Frictional anchors. Safety requirements and test methods
- 12277 Mountaineering equipment—Harnesses—Safety requirements and test methods
- 12278 Mountaineering equipment—Pulleys—Safety requirements and test methods
- 12492 Mountaineering Equipment – Helmets For Mountaineers – Safety Requirements And Test Methods
- 15151-1 Mountaineering equipment. Braking devices. Braking devices with manually assisted locking, safety requirements and test methods
- 15151-2 Mountaineering equipment. Braking devices. Manual braking devices, safety requirements and test methods
- 1891 Personal protective equipment for the prevention of falls from a height—Low stretch kernmantel ropes

ISO

- 10333 Personal fall-arrest systems
- 10333-5 Part 5: Connectors with self-closing and self-locking gates

Appendix 4 Equipment load ratings

A4.1 Discussion

Proper understanding and use of equipment load ratings (*stated strength*) is needed to allow for an appropriate safety margins (*safety factors*) to be used. This ensures that equipment is never overloaded to a point it is in danger of breaking or being damaged.

Care is required as some types of material will have a reduced *Safe Working Load* (SWL) once it becomes wet (*e.g. nylon*).

Manufacturers provide details of the load ratings for equipment either stamped on the equipment or in available documentation. This is called the *stated strength*. *Stated strength* is the magnitude of load that is either the *Safe Working Load* (SWL) or *Minimum Breaking Strength* (MBS).

It is critical to understand the difference between *Safe Working Load* (SWL) and *Minimum Breaking Strength* (MBS) because **SWL** has a safety factor already applied to it, while **MBS** does not.

Safe Working Load (SWL): is the magnitude of load that does not permanently distort, weaken, damaged or break equipment. It is safe to load equipment to 100% of the **SWL**.

Minimum Breaking Strength (MBS): is the magnitude of a load that may permanently distort or damage a piece of equipment but not cause it to break. An appropriate *safety factor* needs to be applied to the *MBS*. The *MBS* is a load, determined by the manufacture, that might not break a piece of equipment but may make it unusable or unsafe to use. Equipment *should* never be loaded to the *MBS*, even for testing purposes. Some equipment may be in danger of being overloaded even at less than half the *MBS*. It *should* be noted that the stated *MBS* value is calculated from tests on a selection of items, not on each individual item. It is therefore likely that a small percentage of similar items, (usually less than 1%) will break slightly below their stated *MBS* value.

Safety Factor: The ratio between the *Minimum Breaking Strength* (MBS) and *Safe Working Load* (SWL) which is used to provide a safety margin. It is expressed as a ratio for example 8:1. An appropriate *safety factor* is chosen based on the type of equipment and intended use. The *safety factor* applicable may be specified in relevant standards or manufactures instructions. It is recommended to follow known safe practices, manufacturers recommendations, relevant standards or calculated assessments when determining safety factors.

A4.2 Examples

Rope

Recreational 'climbing/abseiling' rope may have the Stated Strength provided as a Minimum Breaking Strength (MBS). In use, it requires a suitable Safety Factor to be selected and applied to the MBS to calculate appropriate SWL.

Static rope:

- stated strength: 30kN MBS
- safety Factor: say 8:1
- safe Working Load (SWL): 3.75kN (30 divided by 8 = 3.75)

Flat lifting sling:

A flat lifting sling may have the Stated Strength provided as a Safe Working Load (SWL). In use, it can be loaded to 100% of the SWL.

- stated strength: 2,000 kg SWL
- safety Factor: may or may not be provided by manufacturer
- safe Working Load (SWL): 2,000 kg (No calculation required as Stated Strength given as SWL)

The Australian Standard AS1353 states that a 2,000 kg SWL flat lifting sling should have a 8:1 safety factor. If this is the case, then the MBS is 16,000 kg (2,000 times 8 = 16,000).

Connectors

Recreational 'climbing/abseiling' connectors may have the Stated Strength provided as a Minimum Breaking Strength (MBS). In use, it requires a suitable Safety Factor to be selected and applied to the MBS to calculate appropriate SWL.

In-line loaded carabiner:

- stated strength: 24kN MBS
- safety Factor: say 4:1
- safe Working Load (SWL): 6kN (24 divided by 4 = 6)

All equipment needs to have its Safe Working Load (SWL) estimated using an appropriate safety factor for the context it is being used. They are not to be loaded above their SWL.

Case example

On the 4th of May 2014, in Rhode Island USA, a 45kN carabiner was overloaded and failed with a 6.8kN three-way load, causing 8 circus performers to fall 10m. The subsequent investigation showed that similar carabiners, in new condition, also failed when similarly loaded but easily held 50kN when in-line loaded.

A4.3 Kilonewtons (kN) of force vs kilograms (kg) of load (mass)

Newtons, (abbreviated to N) are the metric units of force. A 102kg object applies, approximately, 1,000 N, (1kN) downward force at the surface of the earth, (due to its mass and gravity). One Kilonewton (1 kN) is 1,000 N.

In a simple vertical loading situation, it is generally accurate enough to convert a load mass of 100 kg to a force of 1kN. Forces can exist in any direction, not just up and down. Force is calculated by multiplying mass by acceleration. Gravity at earth's surface produces approximately 10m/s² of acceleration, (the exact value varies and is slightly less).

Therefore, equipment rated 1 kN of force equals equipment rated approximately 100kg of load (1,000N divided by 10 = 100kg of load). So 1kN of force = approximately 100kg of load. Note that peak loads can vary and allowance for these *should* be made.

Examples:

SWL 3.75kN force equals approximately 375kg load

- calculation: 3.75 times 1,000 = 3,750N with 3,750N divided by 10 = 375 or
- calculation: 3.75 times 100 = 375

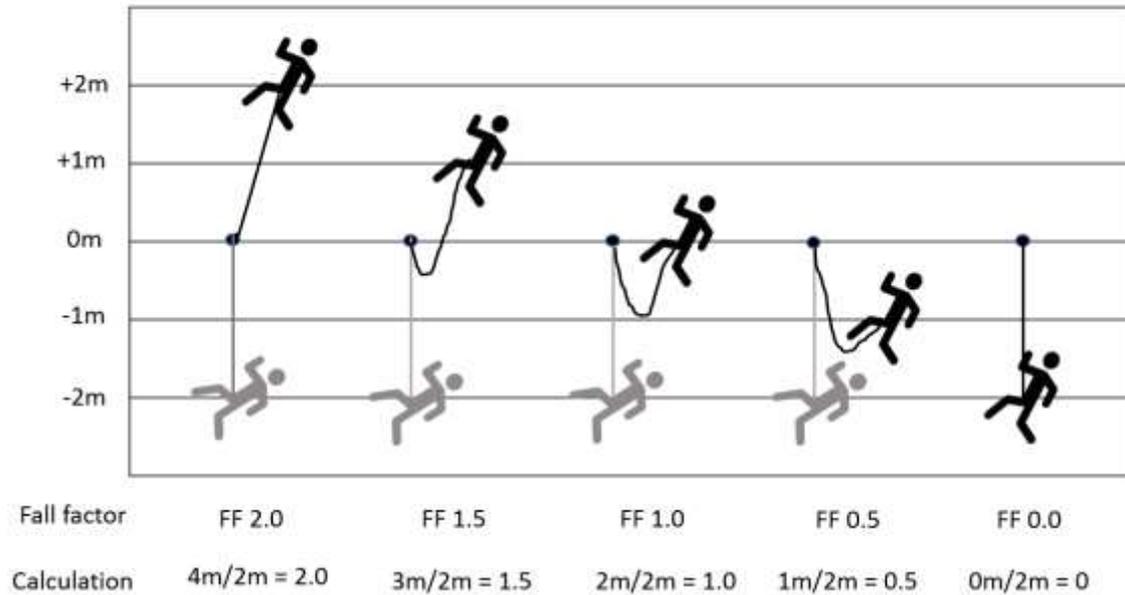
SWL 2,000kg load equals approximately 20kN force

- calculation: 2,000kg times 10 = 20,000N with 20,000N divided by 1,000 = 20 or
- calculation: 2,000kg divided by 100 = 20

Appendix 5 Fall factors

Fall factor: is the ratio of the height of a fall (h) (measured before the rope or lanyard begins to stretch) and the rope or lanyard length available to absorb the energy of the fall (L). It is used as a representation of the severity of a fall when arrested by a belay system. It is calculated by (h) divided by (L).

Fall factor diagram and calculations.



Appendix 6 Weather information and warnings

The Bureau of Meteorology also provides a range of services. For details refer to:

<http://www.bom.gov.au/weather-services/WeatherGuideLand.pdf>

The following table details the:

- current Australian weather warnings
- associated weather for each warning
- mainland warning trigger points for issuing warnings for strong winds and hail.

Bureau of Meteorology weather warnings and associated weather Table:

Severe Weather Warning	Severe Thunderstorm Warning	Coastal Waters Wind Warning	Tropical Cyclone Advice: Watch or Warning
High tides			
Large surf			
Blizzards			
Heavy rain/flash flooding	Heavy rain/flash flooding		
Strong winds Wind >63 km/h Gusts >90 km/h	Strong winds Gusts >90 km/h	Strong winds Wind >48 km/h or >26 knots	Strong winds Wind >62 km/h or >=34 knots
	Tornadoes		
	Hail (>=2cm)		
	Lightning		

Appendix 7 Water landings

The higher the distance of a fall or jump into water, the faster the person is travelling when they hit the water. The faster the person is moving the more potential for injury.

Consideration of the water entry speed and potential for injury *should* be assessed for water landings.

A7.1 Water impact - information to consider

Table: Water entry speed

Height of Jump	Water entry speed (approx.)	Potential for injury considerations caused when hitting the water
3m	27 km/hr	<ul style="list-style-type: none"> Known injuries have occurred at about these heights that include perforated ear drums, bruising, dislocations. There is potential for other injuries, but specific data could not be located for these height ranges.
5m	36 km/hr	
10m	50 km/hr	
Approx. 16.8m and above	66 km/hr and above	Possible severe bruising (internal and external), strains to connective tissue securing the organs, haemorrhage to lungs/other tissue, rib and basala skull fractures, compress fractures of spine/injure disks, break bones, dislocated joints and/or concussion. (See: <i>Survival of high-velocity free-falls in water</i> April 1965, Office of Aviation Medicine Federal Aviation Agency USA)

A study *Survival of high-velocity free-falls in water* April 1965, Office of Aviation Medicine Federal Aviation Agency USA (<https://apps.dtic.mil/docs/citations/AD0620021>) of 44 survived impacts (note 1) of free falls of 16.8m (55 feet) or above found that:

- “No correlation between velocity (or distance of fall) and the degree of trauma found; rather, injuries appear to be more dependent upon body position at all levels of force.” (p.6)
- “The pattern of impact injuries in the feet and buttocks-first position showed a high incidence (68%) of fractures...” (p.6)
- For face first (belly flopping) and supine (back first) “...impacts in water, all individuals received injuries with 100% incidence of internal trauma... and 100% body contusions.” (p.6)

Note 1: In the study, “the total population that fell under these conditions is not considered here since fatal cases are not included. Therefore, the actual incidence of survival is not shown...” (p. 2).

Appendix 8 Activity leader competencies

Also refer to the *Core Good Practice Guide - Competencies* section.

Base canyoning competencies recommended for all canyoning *activity leaders*:

Base canyoning competencies for activity leaders Units describing skills and knowledge	Code (or equivalent)
All units listed in Core Good Practice Guide, plus	
Operate communications systems and equipment	PUAOP013A
Apply navigation skills in an intermediate environment	SISONAV302A
Plan for minimal environmental impact	SISOOPS304A
Demonstrate horizontal canyoning skills	SISOCAY201A

Aquatic competencies recommended for canyoning guides operating in still water (approximate grades A2 or A3):

Still water aquatic competencies for Guides Units describing skills and knowledge	Code (or equivalent)
Perform basic water rescues	SISCAQU202A
Apply river crossing skills	SISOBWG404A

Aquatic competencies recommended for canyoning guides operating in moving water (approximate grades A4 or above):

Moving water aquatic competencies for Guides Units describing skills and knowledge	Code (or equivalent)
Apply river crossing skills	SISOBWG404A
Demonstrate self rescue skills in white water	SISOWWR201A
Demonstrate white water rescues and recoveries	SISOWWR302A

Vertical competencies recommended for canyoning guides (approximately grade V2 or above):

Vertical competencies for Guides Units describing skills and knowledge	Code (or equivalent)
Apply vertical canyoning skills	SISOCAY302A
Establish belays in canyons	SISOCAY303A
Perform vertical rescues	SISOVTR301A
Guide single pitch canyoning trips	SISOCAY304A

Vertical competencies recommended for canyoning guides operating in complex or multi-pitch vertical canyons (relevant grades approximately V3 and above):

Complex or multi-pitch vertical competencies for Guides Units describing skills and knowledge	Code (or equivalent)
Apply vertical canyoning skills	SISOCAY302A
Establish belays in canyons	SISOCAY303A
Guide single pitch canyoning trips ?	SISOCAY304A
Apply advanced vertical canyoning skills	SISOCAY405A
Establish complex belays in canyons	SISOCAY406A
Guide multi pitch canyoning trips	SISOCAY407A
Perform complex vertical rescues	SISOVTR402A
Manage risk in an outdoor activity	SISOODR404A
Coordinate emergency responses	SISXEMR402A

Competencies recommended for canyoning instructors:

Instructor competencies Units describing skills and knowledge	Code (or equivalent)
Base canyoning competencies listed above	See above
Still water (approximate grades A2 or A3) aquatic competencies listed above	See above
Moving water (approximate grades A4 or above) aquatic competencies listed above	See above
Complex or multi-pitch vertical competencies listed above	See above
Instruct canyoning skills	SISOCAY508A

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