

ASG

Activity Safety Guideline

Dive



June 2016 Version 1.2

SupportAdventure.co.nz

SAFETY SYSTEMS DRIVEN BY SAFETY CULTURE

This Diving Activity Safety Guideline project is managed by the Tourism Industry Aotearoa (TIA) with support from WorkSafe NZ. The guideline development was facilitated by TIA and technical content was informed by diving experts. More information about the guideline development process can be found at www.supportadventure.co.nz/activity-specific-good-practice-information/activity-safety-guidelines.

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

Activity Safety Guidelines are the result of a recommendation from the final report of the 2009/10 government review of risk management and safety in the adventure and outdoor commercial sector in New Zealand. The wide variety of activities provided by these sectors is referred to broadly as adventure activities and includes activities provided by adventure tourism operators and outdoor education centres.

TIA, WorkSafe NZ, and the New Zealand commercial diving community have made every effort to ensure that the information contained in this guideline is reliable. We make no guarantee of its accuracy or completeness and do not accept any liability for any errors. We may change, add to, delete from, or otherwise amend the contents of this publication at any time without notice.

Development facilitated by Tourism Industry Aotearoa
www.tia.org.nz

With the support of WorkSafe New Zealand
www.business.govt.nz/worksafe

Document control

Version 1.2

Changes from version 1.1	Where
Updated the health and safety regulator's name	Throughout document
Revised references to the health and safety legislation	Throughout document

ISBN 978-0-9941265-7-3 (Online)

Published: Version 1.2, June 2016; Version 1.1, July 2015; Version 1; April 2015.

Cover photo: Dive! Tutukaka

Acknowledgements

Other Publications

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

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Parts of this guideline specifically refer to the Australian/New Zealand standards (AS/NZS) 2299.3:2003, the Department of Labour Guidelines for Occupational Diving 2004, the New Zealand Underwater Association Code of Practice for commercial vessels used for recreational and occupational scuba diving and related diving activities 2002 (NZUA COP), Maritime New Zealand Rule Part 40A design, construction and equipment for passenger ships that are not SOLAS ships, and the training standards issued by the various recognised diver training organisations. It is recommended that the reader of this guideline familiarises themselves with these documents.

Operators may also find helpful information on good practice in the Workplace Health and Safety Queensland - recreational diving, recreational technical diving and snorkelling code of practice 2011 (Queensland COP 2011).

Content of this guideline was developed in consideration of and alignment with the International Organisation for Standardisation (ISO) standards 24801, 24802, 24803* and the Australian/New Zealand standards (AS/NZS) 2999.1:2007.

*at the time this guideline was published these ISO standards were under review, users of these standards should ensure they are referring to the most current versions.

Consultation

The guideline was developed in consultation with the dive sector and other relevant experts. The following dive experts comprised the working group and are acknowledged for their support and advice on technical content:

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The following groups are also acknowledged for their input and support for this particular guideline or for the overall activity safety guideline project:

Dive Activity Safety Guideline support group; New Zealand Mountain Safety Council; New Zealand Outdoor Instructors Association; New Zealand Underwater; Outdoors New Zealand; Outdoor Safety Auditors; Professional Association of Diving Instructors, Scuba Diving International/Technical Diving International, ServiceIQ Industry Training Association; the Tourism Industry Aotearoa; Water Safety New Zealand.

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Definitions

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

For the purposes of this document the following definitions apply:

Boat based dives

Diving from a boat, vessel or platform where the planned exits are also to a boat, vessel or platform.

Chartered dive – non-guided dive

Is when divers hire an operator to take them to a dive site but not to accompany them in-water.

Competent person (at a specific task)

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

Confined water

Any body of water offering swimming-pool like conditions with respect to clarity, calmness, depth and adequate access to water shallow enough to stand up in.

Deep dives

There is no specific depth at which a dive becomes a 'deep dive'. Many dive training organisations limit the scope of open water qualifications to 18 or 20 meters, with anything deeper than that requiring specialised 'deep diving' training. Essentially the deeper the dive the higher the risk of narcosis and decompression related illnesses.

Direct supervision

Is when the person supervising is in-water with the participant. There are two types of direct supervision:

Proactive direct supervision – the person supervising is in-water and actively monitoring the participant and in a position (within reach or within visual contact) to readily render assistance and proactively manage anticipated hazards.

Reactive direct supervision – the person supervising is in-water and may not be actively monitoring the participant but is in a position to provide assistance when sought.

Note: the dive sector's definition of direct supervision is different from that of other adventure activities.

Dive site

Area where the dive is taking place.

Dive team

Those divers with the same dive plan – this includes staff and participants.

Diver training organisations

Organisations engaged in the certification of recreational divers in accordance with the ISO 24802 series and the Recreational Scuba Training Council standards. Organisations recognised in New Zealand include CMAS, PADI, SDI, SSI, TDI, NAUI and IDEA and any others that meet or exceed the Recreational Scuba Training Council standards.

Good practice

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

Guided dive

Where participants are accompanied, and usually led, in-water (guided) on a dive activity for which they are already qualified. Note operators should seek clarification from WorkSafe NZ if they are unsure if they offer guided trips as defined by the adventure activity regulations.

Health and safety – explanation of terms

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

Incident

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

Indirect supervision (non-guided dives)

Is when the person supervising is not in the water with the divers but is on the boat, vessel or platform (boat based dives) or shore (shore based dives). They are actively monitoring the dive site and are in a position to proactively manage surface hazards and readily render assistance. Note: the dive sector’s definition of in-direct supervision is different from that of other adventure activities.

Instructed or training dive

Where participants are being taught or assessed for competency in-water (instructed or trained) in new dive skills or refreshed in existing dive skills.

In-water

Is when a diver is either underwater or on the surface of the water, such as when swimming or floating.

Master of a vessel or skipper

Is the person responsible for the safe operation of the boat and all on board at all times.

Lookout

Is the person positioned out of the water who is solely engaged in monitoring the dive site whenever there is a diver in the water.

Open water

Any body of water which is subject to wind, swell, current or waves and which can be used for diving.

Operator

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

Participant

A person for whom staff are responsible and who takes an active role in an adventure activity but is not in a leadership or supervisory role. This person is often referred to as a client or student.

Qualified

A person who holds a current nationally recognised qualification.

Resort dive or try dive

Is when un-qualified participants are taken on an introductory SCUBA experience where the aim does not include providing a dive certificate. For the purposes of these guidelines resort dives are treated as an instructed dive unless otherwise stated.

Risk

Effect of uncertainty on objectives.

Risk assessment

A process undertaken by a competent person to identify risks and to assess them according to their significance.

Safety critical task

A task which if performed incorrectly will likely lead to serious harm.

Safety management plan (SMP)

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

Safety management system (SMS)

The overarching management system for directing and controlling an operation in regard to safety, including emergency management plans.

Sector

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

Shore dives

Dives where planned dive exits are to the shore or a structure attached to the shore — this could include a boat moored to a jetty. Note: there could be times where dives with exits on boats moored very close to the shore may be managed as a shore dive, this should only occur on the basis of a risk assessment, and emergency plans must include shore and boat based scenarios.

Staff

Employees, contractors or volunteers who are responsible for the safety of participants undertaking dive activities.

Standard operating procedures (SOPs)

Written information outlining how an operator plans to conduct a particular activity or task.

Technical expert

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

Section 1

Introduction, Purpose, Scope and Application

This is an Activity Safety Guideline for dive activities. It is split into 13 sections.

In Section 1 you will find:

- an explanation of the scope of this guideline
- a description of the New Zealand dive sector
- an introduction to the safety context for dive activities in New Zealand
- an explanation of the purpose of this guideline and how it relates to the laws around health and safety
- an explanation of the application of this guideline: how to use it to build standard operating procedures and pass safety audits.

Section 2 is about the hazard management process. Sections 3 through 12 provide dive specific safety recommendations and Section 13 gives information about reviewing your safety systems.

1.1 Scope: what this guideline covers

The guideline describes what dive operators and technical experts consider is good practice for actively managing safety in commercial guided, instructed or chartered dive activities in New Zealand.

Dive activities referred to in this guideline include:

*Guided, instructed and chartered recreational and technical dive activities using compressed gas**

This guideline covers activities that meet this diving definition, whether or not they are advertised specifically as dive activities. The guideline also offers recommendations for the rental of diving equipment, see Appendix 2.

This guideline is written for operators providing commercial guided, instructed or chartered dive activities (the primary audience) and also for safety auditors (the secondary audience) as a benchmark for current good practice. It will also be useful for:

- Other people involved in dive activities, such as people involved with dive clubs and educational institutions providing dive activities**
- Activities other than diving that involve similar risks, hazards and techniques.

This guideline focuses on preventing death or other serious harm. It identifies common significant hazards that participants, and the guides or instructors who lead them, may be exposed to during diving activities. It makes recommendations for managing these hazards.

Activities associated with taking participants to and from dive activities are outside the scope of this guideline. Operators who provide these activities or services need to manage the associated hazards.

*the dive activities in this guideline do not specifically include snorkelling, although much of the guidance could help inform snorkelling safety management. Operators can also find guidance for snorkelling activities in the:

- Maritime New Zealand (MNZ) guidelines for commercial swimming operations.
- Workplace Health and Safety Queensland; recreational diving, technical diving and snorkelling code of practice 2011.
- Australian/New Zealand Standard 2299.3:2003 Occupational diving operations Part 3: recreational industry diving and snorkelling operations.

**to ensure you are clear on whether you fall within the scope of the Adventure Activity Regulations, refer to the Health and Safety in Employment (Adventure Activities) Regulations 2011 Guidance for Operators.

1.2 The purpose of this guideline and the SupportAdventure website

This Diving Activity Safety Guideline (referred to as ‘the guideline’) aims to provide practical recommendations for commercial guided, instructed and chartered dive operators in New Zealand to actively manage the safety of the dive activities they provide.

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

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

An investigation into an accident may look at how well an operator followed this guideline.



1.3 Using this guideline to build safety into your SOPs

As an operator you need to have a documented safety management system that you use to manage health and safety in your operation. You also need to have standard operating procedures (SOPs) for each activity you provide.

This guideline provides good practice safety recommendations to help you develop your SOPs. Many of the section titles in this guideline will correspond with headings in your SOPs document, it is however important to consider all the recommendations in this guideline as you develop your SOPs. A significant hazard is often managed by a number of different strategies and, like your SOPs, using a section of this guideline in isolation could lead to missing important safety recommendations.

When developing your SOPs conduct a site specific hazard assessment, consider the recommendations in this guideline and add the relevant procedures to your SOPs. Note that where

this guideline gives examples they are not exhaustive — think of other examples that could apply to your specific activity.

It is acknowledged that hazards can be managed in ways other than those recommended in this guideline and achieve at least the same level of safety. Before operating in ways other than those recommended in this guideline, seek advice from a dive technical expert or other competent person. You will need to be able to justify why you use a different method from the guideline.

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

The responsibility for making safe decisions remains with the operator.

“Safety management systems are made of a safety management plan underpinned and driven by a positive safety culture.” www.SupportAdventure.co.nz

For information on building a safety management system go to

www.SupportAdventure.co.nz

1.4 A description of the New Zealand diving sector

New Zealand’s instructed, guided or chartered dive activities are provided through dive shops, private training establishments (PTE’s), and dive tour operators.

There are estimated to be at least 400,000 recreational divers in New Zealand, dive instruction caters predominately for this market. Dive instruction is offered through many small dive shops and a few large PTE’s. Guided and chartered trips cater for both domestic and international markets, with the larger operators in the upper North Island providing the bulk of the guided tours. There are estimated to be at least 30 chartered dive operations spread throughout the country. The instructional and guided parts of the dive sector also include a number of sole operators, however this may decrease as the adventure activities regulations come into force.

The dive sector has been supported by qualifications run by international training organisations since the early 1970’s. These qualifications are broadly consistent across providers and have almost 100% uptake including with recreational divers. New Zealand law requires all occupational divers to hold a current certificate of competence (COC). The COC outlines minimum levels for qualifications, medical fitness and experience. WorkSafe NZ holds and manages the COC register.

The international diver training organisations provide some operational guidance for their award holders and expect them to be followed.

Their guidance applies predominately to

instructed dives, with a small amount for guided dives and next to none for chartered services. This ASG adds to the guidance provided by the training organisations.



Photo: Dive! Tutukaka

New Zealand has many dive clubs who run organised trips for their members. While these clubs are not covered by the adventure activity regulations it is hoped that they will use the guidance in this ASG to inform their safety systems.

While the dive sector is united in its support of qualifications it has not been particularly well connected in other aspects of sharing safety information. Currently there is no national industry body for the dive sector. The development of this guideline was welcomed as an opportunity to come together and establish good practice benchmarks.

1.5 The legislative context for diving activities in New Zealand

Commercial dive operations, as are all workplaces, are subject to health and safety legislation. Dive training organisations also have standards by which dive operators offering instruction under their schemes are required to operate, and those offering guiding are encouraged to operate.

Boats and boat operation are subject to Maritime New Zealand rules. Boat operators need to check which rules apply to their operation; likely rules include rule 21, 31B, 40A and rule 40E.

Health and safety legislation that applies to commercial guided, instructed or chartered dive operations includes:

- the Health and Safety at Work Act 2015 — this guideline refers to this as ‘the Act’
- the Hazardous Substances (Compressed Gases) Regulations 2004.

Health and safety legislation that applies to operators of chartered boats are MNZ rules and the requirements of the Maritime Operator Safety Systems (MOSS). MOSS requires operators to have a documented safety system relevant for the use of their boat. For dive charters this will include supporting the safety of divers. MNZ rule 40A references the New Zealand Underwater Association (NZUA) code of practice 2002; operators of chartered boats for dive trips should reference both the NZUA code of practice and this guideline as they develop their safety systems.

Health and safety legislation that applies to commercial guided or instructed dive operations includes:

- the Health and Safety at Work Act (Adventure Activities) Regulations 2016 — this guideline refers to this as the Adventure Activities Regulations
- the Health and Safety at Work Act Regulations 1995 — particularly the associated Guidelines for Occupational Diving 2004 and the requirement for dive instructors and guides to have a certificate of competence.

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

The Adventure Activities Regulations

Guided and instructed dive activities expose the participant to risks of the kind defined in the Adventure Activities Regulations. The Adventure Activities Regulations cover activities where:

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

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

For more information go to the SupportAdventure website:

<http://www.supportadventure.co.nz/registration-and-audits#Regulation>

1.6 se this guideline to help you pass independent safety audits

The Adventure Activities Regulations and Maritime New Zealand Operator Safety Systems (MOSS) require dive operators to obtain and pass safety audits.

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

- the general standards and requirements for all operators
- that an operator's SOPs must conform to good practice for the activity.

This guideline sets out recommended good practice for commercial guided, instructed and chartered dive activities and will therefore help operators and safety auditors to assess whether an operator's SOPs conform to good practice.

To view the Adventure Activities Regulations safety audit standard go here:

<http://www.business.govt.nz/healthandsafetygroup/information-guidance/all-guidance-items/safety-audit-standard-for-adventure-activities-2013-requirements-for-a-safety-audit-of-operators-march-2013>

Section 2

The Hazard Management Process

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

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

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

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

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

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

2.1 Identifying and assessing hazards

Identify significant hazards both systematically and dynamically. The systematic part of identifying hazards should use a variety of methods such as:

- inspecting sites physically
- consulting with other users
- reviewing standard operating procedures
- reviewing past incident reports and 'lessons learned', both internally within the operation and externally within the sector.

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

2.2 Managing hazards

Manage hazards according to the 'eliminate, minimise' hierarchy of action. Due to the inherent risk of dive activities some hazards cannot be eliminated and can only be minimised.

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

Managing hazards includes monitoring them for changes in their significance. A higher level of management — such as moving from minimising to eliminating — may be necessary if a hazard increases in its likelihood to cause serious harm. For example, strong currents or poor visibility may mean that a dive trip should not take place, or a change in participant group may require a shift from one dive site to another.

2.3 Managing the hazard of drugs and alcohol

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

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

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

2.4 Using competent persons

Use suitably competent people to identify, assess and manage hazards. For more information on staff competence see section 8.

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

2.5 Incident reporting and learning

Report, record and analyse all incidents and concerns that affect safety or have the potential to affect safety. This is done to enable learning and to help stop the incident happening again and is also a legal responsibility. Use dive training organisation reporting systems and consider using national and international reporting systems such as the Divers Alert Network Asia-Pacific (DAN). Act on anything you learn.

Operators have legal responsibilities to report serious harm incidents to appropriate regulatory agencies within a given time period. More information can be found from WorkSafe NZ and Maritime New Zealand.

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

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

For more information on hazard management processes go to

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

For more information on incident reporting go to

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

Section 3

The Hazards Most Likely To Contribute To Serious Harm

This guideline focuses on preventing death or other serious harm. The recommendations in this guideline apply to recreational and technical dive activities; however it is important to note that technical dives and those involving overhead environments involve heightened risk. Hazard management for these activities requires a higher level of diver skill competence and judgement.

While all significant hazards need to be managed, it is acknowledged that there are some that are more likely to be associated with serious harm than others. Ensure safety management strategies are focused on managing these hazards and that this includes highlighting them in staff meetings and regular hazard management reviews.

Note that serious harm for diving specifically includes decompression illness where it results in permanent loss, or temporary severe loss, of bodily function, any loss of consciousness from lack of oxygen, and any loss of consciousness or acute illness requiring treatment by a registered medical practitioner from absorption, inhalation, or ingestion of any substance.

The most likely serious harm injuries in the dive sector are drowning and decompression sickness. The factors considered most likely to contribute to these are:

- participant pre-existing medical conditions — including issues with diver fitness
- narcosis — including participant's general lack of understanding and monitoring of narcosis signs and symptoms
- participants diving beyond their competence levels
- divers becoming separated from each other or surface support, particularly when limited visibility is involved
- participants not controlling their buoyancy effectively
- participants not managing their gas effectively, particularly running out of gas
- ineffective pre-dive safety checks
- participants using equipment incorrectly
- hypothermia.

Another significant hazard that has contributed to several serious harm injuries is the propeller of powered craft.

Good practice for managing each of these hazards involves a number of different strategies. When developing your safety system ensure you consider all the relevant recommendations in this guideline —using a section of this guideline in isolation could lead to missing important safety recommendations.

Section 4 The Dive Environment

There are particular aspects of the dive environment that are associated with serious harm. This section identifies good practice hazard management strategies for dealing with these factors:

- 4.1 The dangers of the open water environment
- 4.2 The dangers of unexpected limited visibility
- 4.3 The dangers of being separated from your buddy, the dive team or surface support
- 4.4 The dangers of diving around powered craft and of multiple users at a dive site
- 4.5 The dangers of exceeding planned depths or actual bottom time or total bottom time
- 4.6 The dangers of entanglement
- 4.7 The effects of extreme temperatures on people
- 4.8 Changes to the hazards of a dive site

The information in this section should not be considered all-inclusive. The significance of environmental hazards varies from one site to another. It is essential to carry out site and activity specific hazard management processes, and for guides and instructors to conduct on-going dynamic hazard identification, assessment and management.

4.1 The dangers of the open water environment

Diving in the open water environment involves the dangers of changing weather, surface conditions, currents and tides. Establish safe operational parameters for environment conditions for each dive site.

Ensure that staff are aware of the indicators of dangerous conditions and the causes of changes to conditions, and that they know how to plan for, monitor and react to conditions. To do this they should know:

- dangerous weather patterns and the best weather forecasting service available for each dive site
- current and tide patterns, and indicators for dive sites where these present a risk
- how and when to cancel a trip or instructional session due to environmental concerns
- procedures for dealing with unexpected environmental changes such as the location of safe harbours or moorings and retreat routes.

4.2 The dangers of unexpected limited visibility

Dives conducted in limited visibility require specific procedures and diver competence. Unexpected limited visibility does not refer to dives deliberately conducted in low visibility environments, such as darkness, wrecks or caves. Divers finding themselves in unexpected limited visibility could become panicked or disorientated, both of which can lead to serious harm.

Some dive sites can be susceptible to rapid changes in visibility or to significantly varying visibility from one day to another. If using these sites for dives other than those specifically designed to be in limited visibility ensure that:

- pre-dive procedures include checking for conditions that indicate changes to visibility are more likely and when to move to an alternative site
- staff are competent to manage low visibility situations
- in-water procedures include staff actively monitoring for changes to visibility and knowing when to call off a dive due to limited visibility concerns

- staff and participants are aware of the risks
- participants are briefed on what to do if visibility becomes limited.

Consider using underwater navigational aids such as lines with marked orientation points.

For recommendations on managing the risk of divers becoming separated from each other, including other hazards likely to contribute to that situation, see section 4.3.

4.3 The dangers of being separated from your buddy, the dive team or surface support

Becoming separated from your dive buddy, the dive team or surface support can result in a diver not receiving sufficient support to manage hazards or emergencies underwater, becoming lost at sea or drowning of complications suffered while spending prolonged periods on the surface.

Drift dives, those using diver propulsion vehicles (DPVs) over long distances and dives with limited below surface visibility have an inherently high risk of separation.

Identifying the hazards

Before every dive assess the risk of divers becoming separated from each other or surface support.

Environmental factors that can increase the risk include:

- poor below surface visibility
- strong currents at the dive site
- poor surface conditions such as swell or chop
- poor surface visibility, particularly with low sun angles or light at dawn or dusk.

Human factors that can increase the risk include:

- participants who are not experienced in diving in the conditions of the day
- participants who are less likely to acknowledge the importance of the supervision aspects of the dive plan
- members of the dive team having different objectives for the dive
- buddy teams being unfamiliar with each other
- participants who are not experienced at navigation or judging distance underwater — note that participants often overestimate their skills in these areas
- when the master of a vessel is not used to working with divers.

Managing the hazards

Ideally use dive sites and conditions that minimise the environmental hazards. Where a risk of separation remains, ensure that the risk is still manageable and:

- the rescue and navigation skills of the dive team and master of the vessel are suitable
- participants understand the risk of separation and their responsibilities in helping to manage the hazards
- participants are briefed on what to do if they become separated from each other or surface support and that their understanding of the plan is confirmed
- dive lookouts are briefed to be extra vigilant
- emergency planning and practising includes scenarios for missing divers — both underwater and on the surface
- consider equipping dive team members with an electronic signalling device such as radio beacons or personal locator beacons and consider a secondary signalling system, ensure participants know how to use these devices.

Consider additional safety management strategies based on the associated risk*. Options include using:

- SMBs to track driver location during the dive – particularly for drift dives or those using DPVs over long distances
- high visibility signalling devices such as safety sausages, flags, flares and water dyes
- audible signalling devices such as air horns or whistles
- reflective or high visibility dive equipment
- radar reflective devices
- light sources such as strobes and high powered torches — note that light sticks have limited range and should not be relied on to support more than close range visibility.

If signalling devices are used, ensure they are fit for purpose and that participants know how and when to use them.

*Do not rely solely on technology to manage the risk of separation.

Multiple users at a dive site can also increase the risk of divers becoming separated from their dive team due to accidentally joining another group. Strategies for managing this risk include:

- briefing participants on the risk of joining another group and ensuring they understand their responsibility for keeping with their group
- ensuring that participants know how to identify their instructor or guide — often this is by the colour of their fins or other equipment.

4.4 The dangers of diving around powered craft and of multiple users at a dive site

The dangers of diving around powered craft are primarily related to injuries caused by being hit by a boat or a boat's propeller. This can cause very serious or fatal injuries. Divers are particularly at risk when surfacing and entering or exiting the boat.

This section looks at managing the risk of propeller strike from the dive operators' craft and managing the risk presented by other powered craft.

Managing the risk of propeller strike from the dive operator's craft

Ensure there are procedures in place to manage this risk and that divers are protected from moving propellers at all times.

Ensure procedures include the preference for propellers to be disengaged when divers are entering or exiting the water or otherwise near the propeller area and that:

- participants are briefed on the location and danger of propellers
- the skipper has a clear visual* of the propeller area and diver entry and exit route, or has one designated person to watch this area who communicates directly to them
- dive team members and on-board crew know and use signals for when divers are clear to approach or leave the boat
- on-board crew have designated responsibilities on who is able to signal divers to approach or leave the boat, the dive team know who this is, and this person has direct communication with the skipper — note that for smaller craft this may be the skipper themselves
- the importance of these systems is emphasised during staff training and participant briefings.

*establishing clear visual systems may require the use of mirrors.

Other preventative measures that should be considered include:

- propulsion alternatives (for example, water jet propulsion, as the risk of injury to swimmers from the boat's propulsive unit is lower when water jet propulsion is used)
- propeller guards (of durable material and construction and designed so that a swimmer cannot contact the propeller)
- ringed propellers
- cut-off switches
- interlocks
- sensors
- anti-feedback steering.

When assessing the risk to divers in your operation, you should also think about non-routine situations the vessel may operate in, such as rescues, and ensure your procedures are appropriate to those circumstances. Non-routine situations should not increase risks to safety (for example, if manoeuvring the vessel is the only means to collect a diver, it must be conducted without increasing the danger from propeller strike or being run over by the vessel to any divers). Brief participants on these scenarios and emphasise the importance of the use of signals for when to approach or leave the boat.

Freeing a stuck anchor

Freeing a stuck anchor underwater involves an increased risk of entanglement and propeller strike. The preferred approach for managing this risk is to drop the anchor and move away. If this is not possible ensure that propellers are turned off. Do not use participants to assist and be aware of reverse dive profile and nitrogen burdens on any divers involved.

Note: freeing a stuck anchor is not referring to anchor salvaging. Salvaging an anchor is a construction task and requires specialist skill sets.

Managing the risk presented by other powered craft

Ensure dive boats use signals, lookouts and other systems to indicate that divers are in the water as per MNZ rule 91, including using light signals at night.

Do not assume others will see or understand signals. Ensure the dive look-out understands that they play a crucial role in managing the dangers of other users at the dive site and actively attracts their attention when required. Be particularly aware of users who may not understand dive signals such as jet skiers and other recreational craft.

Consider the visibility of signals when choosing the dive site, the position of the boat, vessel or platform and of participants in the water— consider using support stays in signal flags.

When conducting shore-based or river dives, conduct a risk assessment on the likelihood of other boats being in the area and use signals as necessary — for dives on rivers ensure any signals and signage can be understood by recreational river users and is located where it is most likely to be seen.

Mistakenly surfacing under a moving propeller, either of the operator's boat or another vessel, is also a risk. Brief participants to monitor their ascent rates, to ensure they are in control as they surface, and to check that the surface is clear before surfacing. At sites with high numbers of powered craft or low visibility consider using surface marker buoys or similar to mark safe surfacing points



4.5 The dangers of entanglement

Entanglement hazards range from environmental factors such as snags to equipment issues such as SMB lines or poorly placed site setup lines. The effects of narcosis can also greatly increase the chance that a diver will mismanage their gear and become entangled.

Strategies for managing the risk of entanglement include:

- choosing drift dive sites that minimise entanglement hazards — if possible source information from other users for new sites
- checking sites for entanglement hazards before approving them as dive sites
- briefing participants on the location of known entanglement hazards
- ensuring that divers' equipment is suitably secured and streamlined
- considering whether towing a dive flag is advisable if there is a high probability of entanglement
- ensuring that dive team members, including staff, carry a knife or other cutting tool as per section 7
- monitoring and managing the signs and symptoms of narcosis – see section 5

Drift dives in river environments involve a higher risk of entanglement due to the likelihood of snags in the river and the consistency of the river current. See section 11 for information on managing drift dives in rivers.

4.6 The effects of extreme temperatures on people

Temperate water or cold air temperatures can lead to participants becoming hypothermic, leading to poor decision making and impaired physical function. Particularly hot temperatures can contribute to dehydration and heat stroke which similarly affect safety.

Ensure the participants are suitably equipped for the temperatures above the surface, and that their dive equipment is suitable for managing their temperature in the water. Manage the risk of dehydration as per section 5.

NZ waters are generally temperate water dives, and many participants will not have dived in these temperatures before. Temperate water can impact on peoples' judgement and anxiety levels, and the equipment involved can change the management of the dive itself. Assess whether participants have dived in temperate water before. If their experience in temperate water is minimal, brief them on the differences of diving in warm and temperate water and consider an orientation dive before dives with additional challenges such as deep dives or those with overhead environments.

Consider increasing participant supervision levels for those who are inexperienced in diving in temperate water.

Base other strategies for managing possible hypothermia or over-heating on the associated risk.

Options include:

- ensuring there is sufficient shelter available on-board or on-shore (as relevant)
- managing the start time and duration of activities to suit the temperature
- carrying extra clothing, food and heat sources.

4.7 Changes to the hazards of a dive site

The hazards at dive sites can change over time. This is particularly the case for dives in overhead environments, for dive sites with strong currents and those with a lot of human activity such as fishing or mooring of boats.

Ensure that staff know to monitor for changes to hazards and to use dynamic risk assessment every time they dive. Ensure systems are in place to check for changes to hazards for sites infrequently visited — systems could include asking other operators for information or staff diving at a site or a particular part of a dive, before taking participants.

Record changes to significant hazards and notify relevant staff and other dive site users.

Section 5

The Physical Requirements of Diving

The risk of serious harm due to medical or physical issues is a significant concern when diving. Understanding and managing the associated hazards is a critical aspect of running a dive operation.

This section looks at:

- 5.1 The dangers of exceeding planned depth, actual bottom times or total bottom times
- 5.2 Medical issues associated with diving
- 5.3 Managing the effects of altitude
- 5.4 The dangers of dehydration

Dive physiology is an area of considerable research and information is improving all the time. It is recommended that dive operators stay abreast of current information through sources such as dive training organisations and the Diver Alert Network (DAN).

5.1 The dangers of exceeding planned depths or times at depth

Exceeding planned dive depths or spending longer than planned at depth can lead to running out of gas, decompression sickness and narcosis.

Ensure divers understand and agree to the planned depth and times of the dive and are supervised as suitable for their qualifications and experience.

Ensure all dives are completed with a safety stop when practical to do so. Note that this also encourages divers to better manage their ascent rates and to be more in control when they surface.

Ideally use sites where the depth of the site is not deeper than the planned depth of the dive or the participants' certification depth.

Sites where the depth of the site is deeper than the planned depth of the dive pose an increased risk. Ensure participants know if this is the case, and are aware of the location of any specific areas associated with sudden increased depth, such as edges and drop-offs.

For instructed dives at sites deeper than the planned dive depth use ascent and descent lines and depth indicators as per dive training organisation standards. These should also be considered for guided dives depending on the experience and competence of the participants and the hazards of the dive site — particularly if there is low visibility.

If running a chartered dive trip where the depth of the site exceeds that of the dive plan, ensure that participants are briefed on the increased risk, are suitably experienced and have discussed how to manage it.



5.2 Medical issues associated with diving

This section looks at decompression illness (DCS and barotrauma), nitrogen narcosis, panic, asthma and diabetes.

Decompression illness

Decompression illness (DCI) is the main medical risk associated with diving. It describes a range of symptoms arising from decompression of the body. DCI can be caused by two different mechanisms, one involving gas bubbles in your blood and resulting in decompression sickness (DCS – also known as the ‘bends’) and the other involving un-equalised pressure in diver’s air cavities resulting in a Barotrauma (pressure related injury).

This section looks at managing the risk of DCS and Barotrauma.

DCS - identifying the hazards

The most common participant errors that lead to DCI are:

- lack of buoyancy control
- missing decompression stops — often associated with failing to check dive computers
- out of gas emergencies due to inadequate monitoring of depth, time and gas supply.

Personal indicators of increased likelihood for susceptibility to DCI include:

- poor physical condition, illness or fatigue
- chronic injuries or recent bruises or strains
- women are usually more susceptible than men
- age – older people are at higher risk
- previous incidents of DCI
- previous cardiac medical history.

Other factors that could increase the likelihood of DCI include:

- cold conditions
- dehydration
- heavy physical exertion before, during or soon after a dive
- drinking alcohol or taking of certain drugs
- prolonged hot showers after a dive
- depth – generally the deeper the dive the more the risk
- decompression diving
- free or buoyant ascent training
- multiple ascent dives
- multiple dives over multiple days
- prolonged dive times
- carbon dioxide excess
- diving at altitude or travelling to altitude after diving - see section 5.

DCS - managing the hazards

Many of the hazards that contribute to DCI are contributing factors to other possible serious harm and are dealt with in other sections of this guideline e.g. managing extreme temperatures, client information and pre-dive planning.

The primary tools used to manage the risk of DCS are pre-dive planning (including client screening), and staff awareness and monitoring of DCS signs and symptoms.

Ensure that staff are aware of DCS signs, symptoms and contributing factors and that they monitor for these things. Ensure they know when to intervene and change dive plans or stop participants from diving, and know how to manage decompression sickness should it occur.

Ensure staff know that decompression sickness can occur even when dives are carried out within limits of standard decompression tables and that susceptibility varies among individuals.

Ensure medical advice is sought if a person shows signs or symptoms of decompression sickness — note that the primary response is to administer oxygen.

Ensure staff know the location and contact information of diving emergency services, the nearest hyperbaric facilities and designated diving doctor*, and how long it is likely to take to get a person to suitable secondary care in the event of a decompression illness emergency. Note: include this information in the dive site emergency plan as per section 12.

*The number of Diving Emergency Services (DES) is 0800 4DES 111 or 0800 4337 111. Information on designated diving doctors can be found at <http://www.business.govt.nz/worksafe/notifications-forms/registrations/occupational-diving/designated-diving-doctors>.

Barotrauma - identifying and managing the hazards

The most notable Barotraumas are arterial gas embolisms (AGE), ear, lung or sinus problems. Prevent barotrauma by managing ascent rates and equalising of pressure within diver's air containing cavities.

Ensure that staff are aware of the factors that are known to increase the likelihood of barotrauma and how to monitor and manage them. These factors include:

- a cold or the flu
- eustachian tube blockages
- sinus blockages
- shortness of breath
- using decongestants
- having repeated trouble clearing air spaces.

The primary tools for managing the risk of barotrauma are client screening and information, and staff awareness and monitoring of signs and symptoms.

Where participants are using additional equipment that could affect their ascent rates, such as line-reels, ensure they are competent to manage them and aware of the importance of managing ascent rates and equalising pressure in their air cavities.

Gas narcosis

The deeper the dive, the higher the risk of gas narcosis (narcosis). Narcosis is particularly dangerous in that it acts like a drug and affects a diver's reasoning, judgement, memory, perception, concentration and coordination. A major risk associated with narcosis is that the person may not be aware they are affected and are unlikely to manage their own recovery.

Lack of participant awareness of the signs and symptoms of the onset of narcosis can be a significant hazard. Ensure participants are briefed on the signs and symptoms of narcosis before diving — for chartered dives (non-guided groups) place particular emphasis on the responsibility of participants to manage this risk.

Ensure that staff are aware of the factors that are known to increase the likelihood of narcosis and how to monitor and manage them. These factors include:

- depth — the deeper the dive, the higher the risk

- incorrect gas choice for depth and carbon dioxide excess
- poor gas management
- recent alcohol intake or sedative drugs (including seasickness medications and marijuana)—read medication labels carefully and consult a doctor if you are unsure
- fatigue or heavy work
- anxiety, inexperience or apprehension.

The effects of narcosis do not necessarily decrease as the diver decreases depth – monitor divers suspected of narcosis all the way to the surface.

Participant pre-dive assessment plays a key role in managing these hazards. For more information see section 9.

Panic

Panic while diving diminishes a person’s ability to think rationally which can lead to dangerous decision making and behaviour. Typically this includes focusing on reaching the surface at the expense of ascending safely.

Ensure that participants are briefed to dive within their qualifications and experience and to let staff know if they have any concerns. Ensure that staff are aware that seemingly confident participants may be concealing their real capabilities and concerns.

Ensure staff monitor for and know how to manage the factors that are known to increase the likelihood of panic. These factors include:

- equipment problems including low gas
- temperate water, deep diving, marine animals and poor visibility
- fatigue, physical unfitness, seasickness, alcohol intake, anxiety, phobias, previous diving accidents, dizziness, disorientation.

Asthma and Diabetes

There is concern about the advisability of allowing individuals with asthma or insulin dependent diabetes mellitus to dive. After a careful evaluation by their doctors some individuals with a history of asthma may be permitted to dive. Diabetes and many other medical conditions must be evaluated on a case-by-case basis by an appropriate medical specialist.

Ensure staff are aware of the risk of asthma and diabetes and seek medical confirmation that affected participants are fit to dive.

5.3 Managing the effects of altitude

This section looks at diving at increased altitude and travelling to altitude after diving.

Exposure to changes in altitude affect the ambient atmospheric pressure and therefore needs to be considered when planning how to manage the exposure of divers to pressure and decompression sickness.

When diving where effects of altitude are involved consider all the other factors that can contribute to decompression sickness and follow the associated recommendations in section 5.2.

Diving at increased altitude

For guided or instructed dives ensure that guides or instructors are qualified in altitude diving. For chartered dives ensure that participants are qualified in altitude diving.

Consider time at altitude prior to the dive and ensure that dive site altitude is taken into account when establishing maximum dive depths and planning ascent rates – these will need to be slowed down.

Travelling to altitude after diving

Travel to altitude after diving is a well-known predisposing factor to the onset of decompression sickness*. Travel to altitude after diving includes flying and could include driving — two drives involving traveling to altitude include the Desert Road (1074 m) and the Milford Sound road (940 m).

Ensure participants are informed of:

- the dangers of travel to altitude after diving
- the importance of following suitable dive plans and waiting before traveling
- the importance of monitoring themselves and each other for signs of DCS, and of communicating any concerns to staff
- that individual physiologies vary and therefore DCI may still occur.

Plan dives conservatively and ensure that:

- dives are planned with consideration of the increased altitude the diver will be travelling to, and include reduced depth and reduced bottom time — use recognised dive tables or computers
- planning includes contingencies for immediate evacuation — for non-decompression dives stay within non-decompression limits relative to the altitude you're ascending to
- plans have multilevel ascent profiles including extending dive times at consecutively shallower depths to slow maximum ascent rates and minimise rapid off-gassing and include extended safety stops
- divers who have long exposure dive at mixes over 21% nitrox to limit on-gassing
- delay times are included after diving and before travelling to altitude, see the below information on establishing delay times.

Where operators are driving participants to altitude after diving ensure oxygen is carried in vehicles.

Delay times before travelling

Parameters for delay times before travelling to altitude after diving are outlined in AS/NZS 2299.1:2007 Appendix H, see Appendix 3 of this guideline. Follow these parameters while taking into account the recommendations in this section.

Factors to consider that may require an increase in wait time include decompression dives or technical dives and:

- the depth and time exposure of previous dives — modern dive computers show residual tissue saturation and if available can help with accurate risk assessment
- high numbers of dives, particularly over multiple days
- the gas mix used on dives — use mixes that reduce on-gassing
- the time that will be spent at altitude
- participants with a prior history of decompression sickness.

Note: Delay times for driving to altitude after diving are currently being researched. Any information that affects good practice guidance will be incorporated into this guideline.

5.4 The dangers of dehydration

Dehydration can significantly increase the likelihood of decompression sickness and increase the effects of pre-existing medical conditions, injuries or low levels of physical fitness.

Dehydration is commonly associated with physical exertion and wearing dive equipment, alcohol consumption, hot temperatures and seasickness. Ensure that staff:

- know the signs and symptoms of dehydration and how to manage them
- monitor divers (participants and staff) for signs of dehydration and know when to prevent a person from diving due to hydration concerns.

Brief participants on the dangers of dehydration and the importance of drinking fluids; ensure there are sufficient and suitable fluids on board to manage the risk. Note that people already suffering from dehydration take some time to re-hydrate and should be encouraged to begin hydration processes several days before diving.

Section 6

Dive Trip and Site Management

This section looks at six crucial aspects of dive trip management:

- 6.1 Pre dive planning
- 6.2 Post dive records
- 6.3 Staff knowledge of the site and operation
- 6.4 Strategies for using new and seldom used sites
- 6.5 Trip monitoring
- 6.6 Communications systems

Note: this section does not cover diver supervision – for information on supervision see section 10.

6.1 Pre dive planning

Plan all dives to ensure they are managed within the operator’s safety management system and in line with industry good practice.

The person in the role of managing the dive related aspects of the supervision system is responsible for planning the dive and ensuring the plan is followed. This is one of the most important safety roles within a dive operation. Ensure this person is suitably competent — for more information on verifying competence see section 8.

For guided and instructed dives ensure that all instructors and guides working the trip are involved in developing the dive plan. This could range from assisting during the plan’s development to being asked for feedback after having been informed of the dive plan.

For non-guided (chartered) dives the role of developing the plan may be delegated to a participant. However it remains the operator’s responsibility to ensure that it meets the recommendations in this section and that all members of the dive team have had the opportunity to consider and give feedback on the plan. Note that it is not uncommon for the operator to state maximum dive times after which a diver will be considered missing.

Ensure the development of the dive plan takes into account the operator’s safety management system, dive training organisation recommendations, goals for the dive and a risk assessment.

Ensure the risk assessment includes:

- dive site known hazards
- water entry and exit options
- dive site conditions including currents, weather, surface conditions, visibility and maximum depths
- for each member of the dive team – physical, medical and psychological factors including any history of adverse responses to changes in pressure
- the participant assessment information as per section 9
- ease of access to emergency support.

Tables or computers used to inform dive plans should be used in conjunction with the information from the risk assessment. Ensure that any tools used are fit for purpose. Recognised tools include:

- dive computers used in accordance with manufacturers’ recommendations
- dive tables approved by dive training organisations.

Ensure the dive planning addresses at least the following:

- verification of the diver's certification level
- the safety responsibilities of each person involved
- the diving equipment, breathing gases and gas management procedures to be used including intended bottom times and decompression profiles
- gas management
- specific significant hazards and how they should be managed
- emergency procedures.

Ensure all people on the dive are informed of, and agree to follow, the dive plan. For more information on participant information see section 9.

Adjust the dive plan if assessments of divers between dives indicate that their response to exposure to pressure requires a change of subsequent dive profiles.



Clarity of roles – instructed or guided trips using chartered dive boats

It is not uncommon for dive operators providing instructed or guided dives to use a chartered boat.

The provider of the instructed or guided trip needs to be confident that any safety tasks delegated to the chartered boat operator will be performed to good practice, and that the dive provider and boat operator are clear on who is responsible for performing which safety roles.

The chartered boat operator needs to be confident that dive good practice is followed by the dive operator as per the recommendations in this guideline — where the dive operator is within scope of the adventure activity audits this confidence may be supported by them having been audited and being on the WorkSafe register for adventure activity providers.

6.2 Dive records

Ensure dive information is recorded for every person who dives, no matter whether they are a participant or staff member.

Ensure records include the information recommended in dive training organisation protocols and cover at least the following:

- date of dive
- location and nature of dive site e.g. boat or shore dive, ocean, river or lake
- environmental conditions of dive site such as visibility, water temperature, surface temperature, wind direction and strength — for guidance on environmental hazards see section 4
- names of the person managing the supervision system*, the diver and where relevant the diver's buddy
- diver's time in and time out
- maximum depth of dive
- any incidents or problems suffered by the diver — formal incident reporting procedures may need to be followed, see section 2
- a verification signature that the information is correct and complete — see below for more information.

*for information on roles and competence requirements see section 8.

Consider recording the following:

- gas remaining
- repetitive dive group if using dive tables
- where divers are using mixed gas — information on the oxygen content of the breathing gas and the maximum operating depth
- stage decompression information — if applicable.

Verification of dive records

The person in the role of managing the dive related aspects of the supervision system is responsible for ensuring that the dive records contains the correct information. Information can be recorded in a variety of ways and commonly includes safety logs, dive rosters or manifests and ships logs.

Instructed dives have dive training organisation protocols for the signing of dive records, if operating instructed dives follow these protocols. For guided or non-guided dives ensure the person signing off the records has the information to do so. Options include:

- a signature from the diver themselves
- a signature from the diver's guide
- a signature from the person managing the dive related aspects of the supervision system who has verbally checked the information with the diver themselves or their guide.

6.3 Staff knowledge of the site and operation

This section looks at staff knowledge of the dive site and operation for instructed and guided dives and for non-guided dives. Generally dive trips are run at sites that are well documented and have extensive historical hazard information.

Instructed or guided dives

Ensure that guides and instructors are familiar with the known hazards of the site as well as the operator's standard operating procedures. The number of dives at a site and amount of site specific training this requires will vary. Factors to consider include:

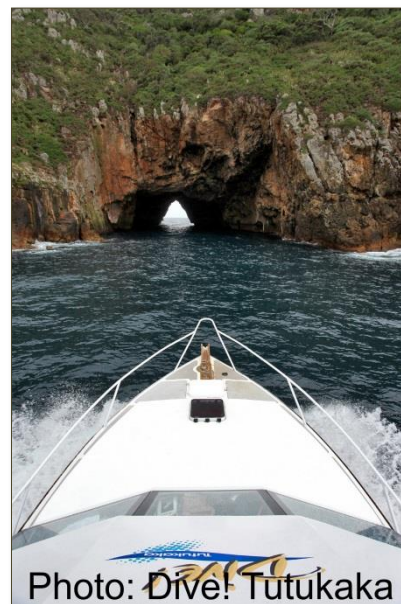
- the specific hazards associated with the site
- the competence and experience of the guide or instructor
- the familiarity of other co-workers with the site and its hazards.

If taking participants into an overhead environment or river drift dive ensure that the guide or instructor has actually dived at the site before.

Operators should consider requiring the instructor or guide to have dived at the site before taking participants on deep dives (any dive over 18-20 metres and particularly those over 30 metres), dives with strong or unpredictable currents, or dives with limited visibility. Factors to consider include the environmental conditions on the day and the experience and competence of the instructor or guide and participants. Guides/instructors should at least be experienced at diving in similar conditions.

Non-guided dives

If staff are not familiar with the known hazards of the site ensure that participants are informed of this during the pre-trip risk disclosure.



If nobody on the trip is familiar with the known hazards of the site ensure that participants are experienced divers in the specific dive activity and in similar dive site conditions.

Other strategies for managing new or seldom used sites

Sites that are new to the operation or seldom used sites may not have much historical hazard information and dive plans will necessarily evolve in the field. Identify this as a significant hazard. Ensure that hazard information for new sites is gathered from other known users of the site or people who operate in similar sites with transferable information.

Do not use a new site for the first time on an instructional dive. Other hazard management strategies for new or seldom used sites could include:

- ensuring that staff are familiar with the known hazards of the site, this could include a conversation with someone who knows the site
- making conservative dive site condition decisions
- using more than one in-water guide or instructor and ensuring decisions on hazard management are made together
- using very experienced guides or instructors
- increasing participant assessment criteria — such as dive qualifications and experience and physical ability
- limiting numbers of participants
- increasing in-water supervision levels, such as from reactive to proactive direct supervision.

Note that all dive sites require an emergency management plan as per section 12.

6.4 Trip back-up monitoring

Ensure there is a person providing back up monitoring for the dive trip. This person is responsible for initiating emergency response procedures if a trip is overdue and for assisting on-trip staff with other emergency response procedures as required.

Ensure the backup person is not on the dive trip and is as contactable as is practicable while the dive trip is underway.

Ensure that this person is adequately trained and has access to the correct resources to initiate emergency response procedures.

6.5 Communications systems

This section looks at communicating on the boat, between and with divers in-water, with other users of the dive site and with external support.

Communicating on the boat

Both the person responsible for ensuring the trip following the operator's standard operating procedures and the master of the vessel need to ensure that there is a clear communication system in place to manage hazards on-board. These include hazards when divers are entering and exiting the boat from the water.

Pay particular attention to communication required to manage the risks of propellers and anchor retrieval. For information on these topics see section 4.

Ensure the system is known by the other staff on-board the boat, and as relevant by participants.

Communicating between and with divers in-water

Communication options between divers in-water are very limited. Ensure the dive team know and understand the dive plan before entering the water.

Ensure that all the divers, the diver supervisor and lookouts are trained in the use of an agreed set of signals. Usually these will be the signals taught by dive training organisations but may include additional signals specific to the site.

If visibility is likely to be limited ensure that torch signals are used and consider audible devices.

For dive activities requiring more complex in-water communication use slates.

Communicating with other users of the dive site

Ensure boat-based trips comply with MNZ Regulations Part 91 for displaying signals to indicate that there are divers in the water*, and that lookouts are proactive in gaining the attention of other users. Do not assume that other users will see or understand the MNZ signals.

Shore-based trips should consider their communication needs based on a risk assessment of the number and type of other users at the dive site. Ensure that as a minimum, signage such as dive flags are used to indicate that divers are in-water and consider meeting the same dimensions and colours as those required for boat based dives.

It can be difficult to accurately indicate the location of divers for dives involving a large degree of underwater travel, such as drift dives and those using DPVs over long distances. Choose sites where other users are not a significant hazard and give careful consideration to placement of signals indicating that divers are in the water. Consider requiring divers to use surface marker buoys and using the dive boat to follow/indicate the general path of the divers or to patrol the area.

Communicating with external support

Vessels used by dive operators' are regulated by MNZ and are all required to have VHF radios when operating beyond closed water limits. Vessels of 6 metres or less have several options for communication devices within enclosed waters and under the MNZ regulation could operate without a two-way communication device.

This guideline recommends that operators carry the most effective communication device practicable including when within enclosed waters or on shore-based dives. Ideally this should be two-way. Two-way options include VHF radios and cell phones.

Where a communication device is used that relies on coverage, ensure that the people using the devices and monitoring the trip are aware of coverage and non-coverage areas.

See section 12 for information on contingencies for limited access to emergency support.



Section 7 Equipment

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

This section does not look at equipment related to the safe use of the vessel. This is covered by MNZ regulations, either MNZ rule 21 or 40 depending on the size and use of the vessel, and the NZUA code of practice. For information on MNZ rules see www.maritimenz.govt.nz.

For information on the hire of dive equipment see Appendix 2.

7.1 General use equipment

Use equipment according to manufacturers' instructions and ensure that equipment is fit for purpose and in good condition.

This section looks at 4 key areas of general use equipment:

- Equipment selection
- Participant equipment
- Guide or instructor equipment
- Gas cylinders

Equipment selection

Make equipment choices based on the recommendations within diver training organisation standards, AS/NZS 2299.3:2003 and factors such as:

- the dive activities on the trip
- activity and site hazards and associated management strategies
- emergency scenarios and response plans
- other equipment within the system – ensure equipment is compatible
- factors such as staff skills, participant ability, the requirements and parameters of the supervision system, and environmental conditions.

Pay particular attention to ensuring that:

- regulators are suited to the temperature of the water and the flow rates for which they will be used
- buoyancy compensation devices (BCDs) give sufficient support to a fully kitted out diver in the conditions of the site, such as salt water versus fresh — sufficient support being head above the surface of the water
- surface support stations are fit for purpose taking into account whether their use includes being a surface marker, ascent /descent line or a surface support system.

Ensure that dive entry and exit areas enable divers to enter and exit the water safely, that they are suited to the dive site and equipment in use and for emergency scenarios such as bringing an unconscious diver back on board. This includes entry and exit areas of boats, platforms or the shore.



Participant equipment

Ensure participants are suitably equipped as per the dive training organisation standards, and that participants other than those on resort dives have a cutting tool. Participants on guided or chartered trips are highly recommended to have a timing device.

Ensure their thermal protection is sufficient for the conditions and suitable for their competence, note that diving in dry suits requires specific competencies.

Ensure that equipment fits the participant correctly as per manufacturers' instructions.

Participants using their own dive/safety equipment

This section looks at participants using their own equipment in guided or instructed dives and for non-guided (chartered) operations.

Guided or instructed dives

Most guided dive trips and some instructional dives involve some participants using their own dive/safety equipment.

When deciding whether to allow a participant to use their equipment pay particular attention to their experience, both in diving and with that particular equipment. Where relevant ensure that their qualifications are aligned with the type of equipment they are using.

Operators are responsible under health and safety legislation to take all practicable steps to ensure the safety of people at their workplace. This responsibility exists when the operator provides safety equipment as well as when a participant uses their own.

Methods of meeting this responsibility will be operation specific. Factors to consider include:

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

It is acknowledged that participants may have personal equipment that is specialised and not well known to staff. In this case ensure that the second and third bullet points above are strongly emphasised.

Non-guided (chartered) dives

Non-guided dives often involve participants using their own equipment or renting from the operator. For information on rental equipment see Appendix 2.

The expectation of operator oversight of participant equipment is significantly lower for non-guided dives than for guided or instructed dives. Ensure that participants are informed of the degree of oversight taken by the operator and understand the responsibility this places on them to use fit for purpose equipment that they are competent to operate.

Staff equipment

Ensure dive instructors and guides are suitably equipped as per the dive training organisation standards and that they carry a cutting tool of a type suited to, and accessible for use in, identified emergency scenarios.

Gas cylinders and gas blending

Ensure the use of gas cylinders complies with the Hazardous Substances (Compressed Gases) Regulations 2004 and the accompanying guideline on using gas cylinders. The guidance document can be found at:

http://www.epa.govt.nz/WS_archive/Documents/Guide_to_Gas_Cylinders_2013.pdf.

These documents set out the requirements for cylinders, aerosols, non-refillable containers and cylinder fittings as well as the labelling, marking, testing, filling and storage.

Section 7.11 of the guidance document gives detailed recommendations on filling cylinders with mixed gas, including that the person filling the cylinders has received training to do so through a suitable training provider.

The regulations require gas filling stations to be audited and accredited by an Environmental Protection Authority approved accreditation provider, and hold a current clear air certificate.



7.2 Emergency equipment

Ensure that emergency equipment is sufficient for managing group safety, is chosen based on identified emergency scenarios, meets the recommendations in

AS/NZS 2299.3:2003 and the NZUW COP 2002, and includes:

- oxygen resuscitation equipment on the boat, vessel or platform (or on-shore for shore based dives) as per AS/NZS 2299.3:2003, including oxygen supply sufficient to support a patient until they reach secondary support or are evacuated
- where emergency scenarios include a difficulty with locating divers on the surface, use surface marker buoys (SMBs)* and consider using life lines such as radios, signalling devices and GPS's — examples of these scenarios include divers surfacing a long way from the boat or conditions with low surface visibility
- boat based dives — a floating line or device suitable to reach and support a diver on the surface.

*consider adding strobes or light sticks to SMBs.

Consider having an automated external defibrillator (AED) device available. Make decisions on the basis of a risk assessment. Factors to consider include:

- accessibility of secondary medical support
- temperatures of the dive site
- physical requirements of the dive
- the typical participant profile including fitness, age and gender.

Assess the risk of dehydration and hypothermia and consider bringing additional drinking water, thermal protection and heat sources such as shelter, thermal clothing, space blankets, heat packs and high energy food.

Note that AS/NZS 2299.3:2003 states that emergency procedures shall include the provision of a tender for use in rescues when the main vessel is not capable of being rapidly deployed to do so.

7.3 Equipment maintenance, inspection and testing

Maintain, inspect and test equipment as per manufacturer's recommendations, AS/NZS 2299.3:2003 and the recommendations in this section. Ensure that staff equipment is also suitably maintained and serviced.

This section looks at regularity and types of checks, equipment hygiene, and using suitable staff to conduct maintenance, testing and inspection.

See section 7.1 for information on participants using their own safety equipment and on gas cylinders. See Appendix 2 for information on rental equipment.

Regularity and types of checks

Ensure maintenance, inspection and testing techniques and schedules for operator and staff gear reflect factors such as:

- normal operational wear and tear
- frequency of use
- operational incidents
- the mechanical nature of devices
- environmental factors such as sun, salt water or dirt from shore-based dives
- time elapsed since the last check.

Pay particular attention to safety equipment that is permanently at the dive site and not already subject to checks under MNZ or local government requirements, examples include mooring lines.

Equipment hygiene

The washing and disinfecting of equipment is an important aspect of safety management. Follow the recommendations in AS2299.3.2003 and pay particular attention to manufacturers' instructions, such as ensuring that mouthpiece of regulator second stages and snorkels are disinfected after each use.

Using suitable staff to conduct maintenance, testing and inspection

Ensure that staff conducting maintenance, testing and inspections are competent to do so. Options for verifying competence include qualifications that cover knowledge of the equipment being inspected, attendance at equipment manufacturers' training courses or in-house training and assessment conducted by a suitably competent person. For more information on verifying staff competence see section 8.

Section 8 Staff

Incompetent staff are a significant hazard — using competent staff is one of the mainstays of ensuring safety. This section looks at seven key aspects of staffing your operation:

- 8.1 Identifying safety responsibilities and competence requirements
- 8.2 Verifying competence
- 8.3 Dive staff competence
- 8.4 Fulfilling supervisory and rescue roles
- 8.5 Using assistants to help manage safety
- 8.6 Managing the safety of staff working alone in-water
- 8.7 Identifying and dealing with unsafe staff

8.1 Identifying safety responsibilities and competence requirements

Ensure the safety responsibilities and competence requirements of each job within the operation are correctly identified. These jobs should include operations management, diver supervisor, and dive instructors and guides. When identifying a job's competence requirements, factors to consider include:

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

*ensure the number of staff with first aid qualifications and the type of qualifications they hold are suitable for the likely first aid scenarios of the dive activities and site, and that all dive supervisors, instructors and guides are first aid qualified and know how to administer oxygen.

8.2 Verifying competence

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

The Health and Safety Regulations 1995 require that dive guides and instructors hold a limited certificate of competence (COC) issued by the Department of Labour (DOL, now WorkSafe NZ). The COC is issued if a person meets the qualification and experience requirements outlined in the DOL Guidelines for Occupational Diving 2004. For more information on the COC see section 8.3.

Using qualifications

Many of the roles in a dive operation are legally required to have specific qualifications, however where a qualification matches a skill set needed for any job that carries responsibility for managing high levels of risk it should be used. Operators should ensure they know which skills and knowledge a qualification actually measures and check these against those required for the job.

Verifying competence in skills not covered by qualifications

Ensure that skills or knowledge not covered by the qualification are verified by other suitable means, use a measure that suits the degree of safety responsibility associated with the skills.

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

Keep records of competence verification processes and results.

Establishing equivalency between qualifications

To establish equivalency of one qualification with another an operator should contact the benchmark qualification provider and enquire as to the process they recommend.

Qualifications currently under review

Qualifications on the New Zealand Qualifications Authority (NZQA) Framework are currently being reviewed. The Dive Activity Supervisor (DAS) programme managed by New Zealand Underwater (NZU) is also under review.

Results of these reviews that affect the recommendations of the dive sector for verifying competence will be included in this guideline as they become available.

For more information on the NZQA qualifications review go to www.skillsactive.org.nz, for information on the DAS programme review contact New Zealand Underwater.

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

8.3 Dive staff competence

This section looks at safety related roles on dive trips. It specifically looks at:

- certificate of competence
- recommendations for competency and competence verification.

Certificate of Competence – the legal requirements for dive instructors and guides

The Health and Safety Regulations 1995 require that dive guides and instructors hold a limited certificate of competence (COC) issued by the Department of Labour (DOL, now WorkSafe NZ). The COC is issued if a person meets the qualification and experience requirements outlined in the DOL Guidelines for Occupational Diving 2004.

The COC recognises qualifications administered by dive training organisations.

COC's require revalidation every five years and are only valid if accompanied by a current medical clearance issued by diving hyperbaric medical services. The medical clearance is usually valid for five years and requires an initial physical check followed by the diver submitting a mandatory medical self-check questionnaire on an annual basis. For more information and to view the DOL guidelines for Occupational Diving 2004 go to <http://www.business.govt.nz/worksafe/information-guidance/pdf-documents-library/diving-2004/diving-1008.pdf> .

Good practice alert for dive staff competency

This guideline recommends a higher level of qualification for dive instructors and guides than that required by the COC.

Dive operators are expected to ensure their staff meet these recommendations as soon as possible. For more information see the recommended competencies for specific roles in this section.

Competency and verification recommendations

This section identifies the technical safety responsibilities, competence requirements or competence verification recommendations for the following roles:

- master of the vessel
- dive instructors and technical dive instructors
- dive guides and technical dive guides
- managing the in-field and dive related aspects of the trip's standard operating procedures
- managing the in-field and dive related supervision system and emergency response
- performing rescues
- performing first aid
- trainer for competencies not covered by qualifications
- assessor for competencies not covered by qualifications.

Several of these roles could be fulfilled by the same person, and some may require more than one. For information on whether roles should be in-water or not and whether they can be delegated to a participant see section 8.4 table 1.

This section does not address broader safety related roles such as overall operations management. Ensure that all the operation's safety responsible roles are identified and staff are competent. For more information see sections 8.1 and 8.2.

Role 1: Master of the vessel

Purpose: to manage the safe operation of the boat and the safety of all people on board. Note: the master of a vessel or skipper is also responsible for complying with all the relevant boat related rules and regulations.

Competence verification: as legally required by Maritime New Zealand. For more information go to www.maritimenz.govt.nz

Role 2: Dive instructor

Purpose: to teach participants how to dive to a particular skill level or in a particular type of recreational diving.

Competence verification: as legally required to meet the relevant COC requirements with the addition of a minimum qualification of dive instructor or equivalent dive training organisation requirement.

Role 3: Technical dive instructor

Purpose: to teach participants how to dive for a particular technical diving activity.

Competence verification: as legally required to meet the COC requirements with the addition of a dive instructor qualification relevant to the specific technical diving being taught.

Role 4: Dive guide

Purpose: to guide already competent divers on recreational dives.

Competence verification: as legally required to meet the relevant COC requirements with the addition of a dive qualification relevant for the environment of the dive.

Role 5: Technical dive guide

Purpose: To guide technical dives for participants who are qualified for that particular type of dive.

Competence verification: as legally required to meet the COC requirements with the addition of a dive qualification relevant for the specific technical dive.

Role 6: Ensure the dive related aspects of the trip follow the operator’s standard operating procedures

Purpose: To ensure the trip follows the operator’s standard operating procedures. Note that this role and role 7 are often combined and performed by one person called a “Dive Supervisor”.

Competence verification: Although predominately verified in-house operators may find NZQA unit standard 4404 ‘Manage a Small Dive Boat’ or the Dive Activity Supervisor (DAS)* programme managed by New Zealand Underwater (NZU) useful for verifying some of the competencies for this role. To find providers of the unit standard and for more information on its content go to www.nzqa.govt.nz. For information on the DAS programme contact NZU - note that the DAS programme is currently under review.

Safety Responsibilities	Safety Functions	Safety Competencies
Ensure this role is fulfilled on every trip — for more information on participant supervision requirements see section 10.		
Manage the application of the trip’s standard operating procedures	Oversee the application of the trip’s standard operating procedures, including allocating responsibility for developing the dive plan, delivering safety briefings, and use and completion of dive safety logs/dive rosters	Can apply and oversee the trip’s standard operating procedures
Supervise people with designated safety responsibilities	<p>Delegate tasks to suitably competent people</p> <p>Monitor people with delegated safety responsibilities and ensure tasks are effectively carried out</p>	<p>Can demonstrate knowledge of the competencies required for safety responsible roles including developing the dive plan, giving safety briefings, dive supervision, managing in-field dive related emergency response, first aid and performing rescues</p> <p>Can identify and correct dangerous application of safety responsible roles</p> <p>Has good visual scanning skills</p> <p>Has strong communication skills</p>

Role 7: Manage the in-field dive related supervision system and emergency response

Purpose: To manage the dive supervision system and in-field dive related emergency response processes as per the requirements of the operators safety system.

Note that this role and role 6 are often combined and performed by one person called a “Dive Supervisor”.

Competence verification: Although predominately verified in-house operators may find NZQA unit standard 4404 ‘Manage a Small Dive Boat’ or the Dive Activity Supervisor (DAS)* programme managed by New Zealand Underwater (NZU) useful for verifying some of the competencies for this role. To find providers of the unit standard and for more information on its content go to www.nzqa.govt.nz. For information on the DAS programme contact NZU – note that the DAS program is currently under review.

Safety Responsibilities	Safety Functions	Safety Competencies
Ensure this role is fulfilled on every trip — for information on participant supervision requirements see section 10.		
Manage the effective application of the operator’s supervision system	Apply and oversee the operator’s supervision system including developing the dive plan, safety briefings, participant assessment, use of safety logs/dive rosters, and any dive lookouts.	<ul style="list-style-type: none"> Is a qualified diver (although may not be fit to dive) Can identify and evaluate dive site conditions and hazards Can apply a process to oversee the operator’s supervision system including ensuring that sufficient lookout is maintained Can demonstrate knowledge of creating and using a dive plan and of using safety logs/dive rosters Can demonstrate knowledge of the use of dive computers or tables as relevant to the operation Has knowledge of dive qualifications
Manage the in-field aspects of dive related emergency scenarios	Oversee the operator’s in-field emergency response process for dive related emergencies	<ul style="list-style-type: none"> Can apply a process to manage the operator’s in-field dive related emergency management procedures

Role 8: Dive Lookout

Purpose: To maintain a lookout for surfacing divers or any surface signals, to scan for surface hazards and to alert other users that there are divers in the water.

Safety Responsibilities	Safety Functions	Safety Competencies
Ensure this role is fulfilled on every trip — for information on participant supervision requirements see Section 10.		
Provide effective lookout for surface activities and hazards	<p>Perform visual scanning of the surface of the dive site</p> <p>Perform visual scanning of the entry and exit of divers to the boat</p>	<p>Can identify surface hazards , including environmental hazards</p> <p>Can identify dive and relevant maritime signals</p> <p>Has good visual scanning skills</p> <p>Can identify entry and exit hazards including those related to propellers</p>

Role 9: Perform rescues

Purpose: To perform in-water rescue and emergency procedures

Safety Responsibilities	Safety Functions	Safety Competencies
Ensure this role is fulfilled on every trip— for information on participant supervision requirements see section 10.		
Note: for deep dives or technical dives the capacity to rescue may be very limited, ensure this risk is disclosed to participants.		
Resolving emergency scenarios in the field	Perform the practical aspects of in-water rescues for identified emergency scenarios	<p>Has a current COC and a dive qualification aligned with the type of dive activity taking place</p> <p>Can demonstrate the practical skills to resolve identified on-trip emergency scenarios</p>

Role 10: Perform first aid

Purpose: To perform first aid for dive related injuries

Safety Responsibilities	Safety Functions	Safety Competencies
Ensure this role is fulfilled on every trip— for more information on participant supervision see section 10.		
Managing dive related first aid scenarios in the field	Perform the practical aspects of first aid for dive related injuries for identified emergency scenarios	Has a current first aid qualification relevant for the identified emergency scenarios including administering oxygen

Role 11: Trainer for competencies not covered by qualifications

Purpose: To train staff for safety responsible roles for a particular operation

Key Areas	Key Safety Functions	Key Safety Competencies
Deliver staff training	Train staff to perform job role functions	Can demonstrate knowledge of job role functions Can apply a system to deliver staff training

Role 12: Assessor for competencies not covered by qualifications

Purpose: To assess competence in safety responsible roles for a particular operation

Competence verification: Although predominately verified in-house operators may find NZQA unit standard 4098 useful for verifying some of the competencies for this role. To find providers of the unit standard, and for more information on its content go to www.nzqa.govt.nz.

Key Areas	Key Safety Functions	Key Safety Competencies
Assess staff	Assess staff performance against a standard (internal or external)	Has knowledge of the standard applicable for the skills being assessed Can demonstrate skills and knowledge in the competencies that are being assessed, to at least the level that they are assessing Can assess competence and provide feedback

8.4 Fulfilling supervisory and rescue roles

How supervisory and rescue roles should be fulfilled varies for guided or instructed dives versus non-guided and for boat based versus shore based dives. Principle differences are whether the person should be in or out of the water, and whether the role needs to be performed by staff or can be delegated to a competent participant.

If a participant is assigned a safety role ensure they understand the responsibilities of the role and the relevant aspects of the operator's safety system.

On smaller trips with simple supervision requirements more than one supervisory role may be fulfilled by one person. For example the master of a vessel may fulfil the roles of manoeuvring of the boat and managing the safety of all people on board, ensuring the trip follows standard operating procedures, managing the supervision system and emergency response, and acting as a lookout. Note that the master of a vessel cannot fulfil the role of performing rescues as they need to remain on board the boat.

On larger trips or those with challenging supervision requirements, some of the roles may require more than one person, such as using multiple lookouts.

Although there is a significant difference in who should fulfil these roles for guided or instructed trips versus non-guided (chartered) dives, it remains the operator's responsibility to ensure that all roles are competently filled.

Follow the recommendations in Table 1 (below) when deciding how to fulfil these roles. Where a risk assessment is recommended ensure it considers:

- the competence of the participants
- the competence of instructors and guides,
- dive site environmental conditions
- the hazards of the dive activity itself
- the need for diver surfacing times to be recorded
- emergency scenarios.

For information on the competencies required to fulfil each role see section 8.3.

Table 1: Fulfilling safety roles

Role	Boat based dives - instructed or guided	Shore based dives - instructed or guided	Non-guided dives (chartered)
1. To manage the manoeuvring of the boat and the safety of all people on board - in compliance with MNZ requirements (master of a vessel/skipper)	On-board	N/A	On-board
6. Ensure the dive related aspects of the trip follow the operator’s standard operating procedures	On-board or in-water as per the result of a risk assessment	On-shore or in-water as per the result of a risk assessment	On-board or in-water as per the result of a risk assessment
7. Manage the in-field and dive related aspects of the supervision system and emergency response (within the requirements of the operator’s safety system)	On-board or in-water as per the result of a risk assessment	On-shore or in-water as per the result of a risk assessment	On-board or in-water as per the result of a risk assessment <i>Where staff are not qualified divers this role will need to be delegated to a suitably competent participant</i>
8. Dive Lookout	On-board	On-shore – if required Establish if this role is required by conducting a risk assessment; include consideration of current, surface conditions, surf, ease of entry and exit of water, ease of communication with secondary support.	On-board
9. Perform rescues	On-board or in-water as per the result of a risk assessment	On-shore or in-water as per the result of a risk assessment	On-board or in-water as per the result of a risk assessment <i>Where staff are not qualified rescue divers this role will need to be delegated to a suitably competent participant. If there is nobody suitably qualified as a rescue diver disclose this increased risk to participants.</i>

10. Perform first aid	On-board	On-shore or in-water as per the result of a risk assessment	On-board
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8.5 Using assistants to help manage safety

An assistant is responsible for managing some tasks within a safety responsible role, but not all. Assistants are sometimes used by dive operators to help manage safety on-board a boat or shore and assistant instructors or trainee dive masters to help manage safety in-water.

Skills required will vary depending on the tasks to be managed. Using assistants involves the risk of hazards not being managed competently, to help manage this risk ensure that:

- tasks, safety responsibilities and required skills are clearly identified and understood by the assistant and the dive supervisor
- the assistant is verified as competent in the required skills
- the assistant manages only the tasks for which they are verified as competent and is otherwise suitably supervised for their level of competence.
- when using assistants in-water, follow diver training organisation or Recreational Scuba Training Council (RSTC) standards.

8.6 Identifying and dealing with unsafe staff

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

Do not permit a staff member to undertake any safety related tasks if they are impaired and therefore may be a hazard to themselves or to any person on the activity. Impairment could be due to factors such as alcohol, drugs, injury or fatigue.

Ensure that management strategies suit the significance of the hazard and are outlined in the operator's safety management system.

Ensure that initial hazard management for dealing with unsafe staff includes removing the person from the role requiring performance of safety tasks.

Note that the Adventure Activities Regulations require that drug and alcohol hazards are specifically addressed through an explicit drugs and alcohol policy.

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

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

Section 9

Participant information and screening

Managing safety is more effective if participants are suited to the activity and well informed of its risks and participation requirements. This section looks at:

- 9.1 Ensuring participants are suited to the activity
- 9.2 Delivering safety information and checking for understanding
- 9.3 Pre-activity risk disclosure
- 9.5 General safety information
- 9.6 Identifying and dealing with unsafe participants

9.1 Ensuring participants are suited to the activity

Ensure all dive operations assess participants to check that they are suited to participate in the dive activity. This should happen before the activity begins and be on-going during the activity itself. This section looks at assessing participants, establishing age guidance, and identifying and dealing with unsafe participants.

Assessing participants

Use information gathered while assessing participants to inform the dive plan including activity options, participant supervision levels and safety management techniques.

Clearly identify what to assess in the operator's safety management plan. Staff other than guides or instructors, such as front of house staff, drivers or skippers may be involved in assessing participants. Ensure participant assessment is consistent and reflects the requirements of the activity.*

Ensure those conducting participant assessments are suitably familiar with dive qualifications, particularly in relation to the dives provided by the operation.

Where operators of non-guided (chartered) trips have delegated the role of responsibility for 'in-field and dive related supervision system and emergency response' to a participant, ensure this person is involved in the assessment process — for information on supervisory roles see section 10.

Medical factors are a major concern for diving and there are specific dive training organisation requirements for participants to provide pre-trip/training medical information. Other factors to consider when assessing participants include:

- dive qualifications
- participant's log book** — pay particular attention to the level of current experience and recent dives/exposure to pressure/dive depth
- fitness, physical ability — particularly any indicators of increased likelihood for decompression sickness, for more information see section 5
- previous experience diving in temperate water — if this is minimal consider an orientation dive before dives with additional challenges such as deep dives or those with over-head environments
- age
- psychological factors such as the ability and likelihood to follow instructions, fears and phobias and confidence in-water.

Ensure the results of participant assessment are communicated to the person responsible for the in-field and dive related supervision system and emergency response, guides, instructors and lookouts — usually this will occur during discussion of the dive plan.

*operators of non-guided trips should pay particular attention to ensuring that staff involved in participant assessment know which dive qualifications and experience levels are required for each trip.

**assessing participant's log books is particularly important. Do not rely solely on qualifications as they may not correctly represent the diver's current competence, e.g. a diver may be qualified to dive to 30 metres but may previously only have dived to 20m. In this case additional supervision or instruction may well be required for dives over 20m..

Additional assessment requirements for guided and non-guided dives

These dives involve certified participants diving within the scope of their qualification.

Ensure that the participant is suitably qualified and competent to participate under reactive direct supervision — this will usually be achieved by sighting current qualifications and suitable logged experience. If in doubt options include conducting an assessment dive to establish the participant's competency.

If the participant is not suitably qualified and competent ensure they do not take part or that the dive activity is changed into an instructional dive. Note – ensure that staff members are familiar with dive organisation qualifications in order to ascertain if qualifications will meet the dive demands.

Establishing age guidance

Instructed dive and instructed technical dive activities have dive training organisation minimum age recommendations. The recommendations are usually associated with depth limitations. Guided dive activities may not.

Operators of guided and chartered dive trips should use minimum age and depth guidance supplied by training organisations. Where this is not available use the same recommendations as those given for instructed dives.

Where dive training organisation age recommendations do exist they should be viewed as a minimum and may need to be increased for a particular trip. Note that dive training organisations may have other recommendations applicable to minors participating in diving activities. Where this is the case ensure they are followed.

Establish minimum age guidance for each dive activity and site. Factors to consider include:

- dive training organisation recommendations
- supervision type and levels – is the trip non-guided, directly or indirectly supervised and what are the ratios?
- the specific hazards of the activity and the site
- the ease of site access and escape
- the ability to access external emergency support
- qualifications, experience and skill of guides and instructors and other on-trip staff.

Note: Most training organisations state that parental consent is necessary for those less than 18 years of age. It is common practice for adventure activity operators to require children aged less than 16 to have guardian consent to participate in adventure activities — New Zealand law does not give clear guidance on this topic.

Splitting participants into ability groups — instructed and guided dives

Instructing and guiding participants in groups of similar ability is an important tool in ensuring they are suited to the activity.

Use the results from the participant assessment process to group participants into dive teams and to inform the dive plan including equipment choice, which dive activities they should do and the degree of supervision they require.

Identifying and dealing with unsafe participants

Do not permit a person to participate in a dive activity if they are in such a state of impairment that they may be a hazard to themselves or to any person. Impairment could be due to factors such as alcohol, drugs, seasickness, injury or fatigue.

Identify as a hazard any participant who is unable to perform safety procedures as outlined in the safety instructions. Management strategies should suit the associated risk and include options such as increasing supervision levels or removing them from the activity.

9.2 Pre-activity risk disclosure

Before beginning dive activities inform every participant of the following information:

- this is an adventure activity involving risk of serious harm or death
- participants should be aware that the dive operator cannot totally guarantee the participant's safety
- the activity may be mentally and physically demanding and requires the participant to be in-water (emphasise these points to suit the particular activity)
- the participant needs to follow staff instructions at all times and understand that this is critical to their safety and that of others
- it is the participants responsibility to inform staff if they are un-fit to dive
- for dives with buddies — the expectation that participants will support their buddy
- for guided and chartered dives — participants must dive within their experience and qualifications at all times.



Mention significant hazards that cannot be avoided or place extra responsibility on the participant. These include activities under reactive direct or in-direct supervision, any deep dives or technical dives where capacity to provide in-water rescue is limited, sites with limited access to external emergency support.

Non-guided (chartered) dive operations place additional responsibility on participants. Ensure this is clearly described and understood, including:

- that participants will not be accompanied in-water and the general increased responsibility this places on them
- outlining any safety roles and associated responsibilities that have been delegated to participants and the specific increased responsibility this places on them
- for trips where nobody is qualified as a rescue diver – declaring this and emphasising the associated increased risk for participants.

Ensure pre-activity risk disclosure occurs with ample time for people to make informed choices on participating in the activity. For dive activities involving children take particular care to ensure that pre-activity risk disclosure information is given to the correct people, such as parents or care givers. This may mean the information needs to be delivered twice.

9.3 General safety information

Before participants take part in the activity ensure they are informed of general dive site and activity safety awareness and techniques. Chartered boat operators may delegate some aspects of dive safety briefings to a suitably competent participant; however they remain responsible for ensuring that a suitable briefing has occurred. (See section 8 for more information on safety roles and responsibilities.) Include the following points:

- the dive plan
- the importance of effective gas and buoyancy management
- awareness of the site including its boundaries, and warnings about the hazards
- safety responsibilities of participants, particularly as related to diving within their qualification (where relevant) and competence levels, moral responsibility to their dive team/buddy, the risk of peer pressure and, when relevant, any expectations that they will be providing assistance in an emergency
- communication systems for on boat and in-water, particularly those for divers entering and exiting the water from the boat
- the signs and symptoms of narcosis and what to do if they arise — where relevant
- emergency procedures for the site
- warnings not to adjust safety equipment if it has been specifically fitted and checked by staff
- the importance of maintaining hydration levels
- methods of maintaining body temperature when relevant.

Note that dive training organisations may differ in how they approach dive procedures and emergency response. Ensure participants have a common understanding of the above points.

Ensure participants understand the supervision system and staff roles including:

- the dive's supervision level e.g. chartered non-guided dives versus proactive or reactive direct supervision
- roles and relevant responsibilities of the person managing the dive plan and safety logs, lookouts, staff member responsible for signalling when to enter and exit the water from the boat, instructors and guides and any assistants
- how to identify any in-water staff and, where relevant, any parts of the dive where supervision levels change
- the importance of maintaining awareness of their location relative to the rest of the dive team and the boat or shore
- the importance of staying with their dive team/buddy.



Before participants leave the care of the operator ensure they have been informed of the dangers of travelling to altitude following diving. State the importance of waiting until their bodies have adjusted after the exposure to pressure during the dive and give guidance on time frames as per section 5.

Pre-dive safety checks

Failure to perform suitable pre-dive safety checks has been identified as a common cause of diving incidents.

Ensure that participants are briefed on the importance of pre-dive safety checks procedures and check that they do actually occur before each dive.

Ensure pre-dive safety checks cover topics as recommended by dive training organisations.

Safety information for specific significant hazards

For parts of the activity involving a significant hazard, or requiring technical skill to participate safely, include the briefing points taught in the dive training organisation standards and those recommended within this guideline — see the participant briefing information for specific hazards in sections 4, 5 and 11.

Ensure participants are informed of:

- the hazard and warned of its dangers
- any options for avoiding the hazard, such as not going into a certain part of a wreck
- any site specific techniques required to negotiate the hazard
- applicable emergency procedures and, where relevant, how to use emergency equipment such as radios and signalling devices.

9.4 Delivering safety information and checking for understanding

Ensure those who are delivering safety information are verified as competent to do so.

Ensure, as best as is practicable, that the participant has understood the safety information. This could be via techniques such as asking questions or watching participant actions — do not rely solely on a signature.

Ensure a safety information aid is readily available if there are participants who have difficulty understanding the initial briefing; examples include videos, pictures and diagrams, practical demonstrations or written instructions in the participant's language.

Section 10 Supervising participants

Supervision systems are a vital tool for managing hazards and ensuring that staff and participants correctly carry out their safety responsibilities. This section looks at:

- 10.1 Establishing a supervision system
- 10.2 In-water supervision levels (ratios) – instructed and guided dives
- 10.3 Open water - parameters for trips with only one in-water guide or instructor

For information on fulfilling supervisory and rescue roles including competence requirements, participants versus staff and in-water or out of water locations, see section 8.

10.1 Establishing a supervision system

All trips require a supervision system. This section looks at what to take into account when establishing a supervision system and what to include in a supervision system.

Establish a supervision system that supports both staff and participants to manage themselves and others safely. Participants are responsible for safety critical tasks during all dive trips, although much more so on non-guided trips.

What to take into account when establishing a supervision system

Assess the level of risk that participants or staff will make errors leading to serious harm and the risk presented by other hazards of the dive site. Factors to take into account when assessing the level of risk include:

- whether the dive is instructed, guided or non-guided
- the competence of participants, the likelihood that they will follow instructions and their acceptance of responsibility for managing hazards
- the number and competence of staff
- the number of people exposed to increased risks at any one time — can participants be managed so that only a few are undertaking the more risky tasks at one time?
- the nature of staff safety tasks including the number of participants they are managing and over what period of time — consider hazards such as task repetition and fatigue
- the general hazards of the dive activity and the site.

What to include in a supervision system

Ensure there is a suitably competent person at the site clearly designated as responsible for managing the dive related aspects of the supervision system and that they are a person whom the operator is confident will exercise good judgement. For more information on who should fulfil this role and where they should be positioned see section 8, table 1.

Consider the information listed above under ‘what to take into account when establishing a supervision system’ and ensure the supervision system is based on the associated risk.

This section looks at the key components of a supervision system, when to adjust the supervision system, key factors that are managed via supervision and operations where staff perform repetitive tasks or manage a high number of participants.

Key components of a supervision system

Ensure all supervision systems include:

- clarity on supervision type for each site and its activities, e.g. proactive or reactive direct supervision, non-guided

- clarity on supervision roles, competence required and whether they are fulfilled by staff or participants, for chartered trips this will require careful explanation to participants and a check to ensure they understand and are comfortable with their responsibilities
- maximum participant numbers
- clarity on procedures for ensuring supervision levels are maintained during unplanned lookout breaks, such as toilet stops
- strategies to enable staff to maintain the level of focus required to supervise effectively, such as timely breaks or moving from one area of responsibility to another.

Ensure supervision systems for guided or instructed trips also include:

- maximum supervision levels (ratios) for the site and its activities — for information on supervision levels see section 10.2
- guided or instructed trips — clarity on in-water staff supervision responsibilities, such as participant groups, site areas or activities — this is particularly important for guided trips involving more than one guide
- clarity on any parts of the dive that require a change in supervision level, such as when participants are required to re-group or areas where only one buddy pair may go at a time.

When to adjust the supervision system

Ensure there is guidance on when the supervision system may need adjustment, such as from non-guided to guided or reactive to proactive direct supervision. Consider factors such as changes in:

- competence or fitness of participants
- ability and likelihood of participants to understand and follow instructions – consider language barriers
- the number of children
- environmental conditions
- the number of other users at a dive site
- less experienced or confident staff.

Key factors to manage via supervision

Ensure all supervision systems focus on:

- monitoring divers as they enter and exit the water
- ensuring pre-dive safety checks are carried out
- checking that divers have sufficient gas for the dive
- checking that the dive team understand and are following the agreed dive plan
- monitoring for signs and symptoms of narcosis as per the constraints of the supervision level of the trip - instructed, guided or chartered
- monitoring for signs and symptoms of participants becoming dangerously cold
- ensuring that the dive safety log is completed and signed off for every member of the dive team.

Ensure that supervision systems for guided or instructed trips also focus on:

- monitoring that participants are managing their buoyancy and gas appropriately
- ensuring that divers do not become separated from the dive team, and on trips using buddy systems from their buddy
- guides/instructors knowing the location of the in-water participants within their supervision ratio at all times
- boat based dive supervision covering the recommendations in AS/NZ 2299.3:2003 section 2.

Operations where staff perform repetitive tasks or manage a high number of participants

Use additional supervision strategies and keep systems simple and consistent for operations where staff are managing a high number of participants or performing particularly repetitive tasks. Options include:

- using checklists
- using staff to check on each other
- using an overall safety supervisor to monitor staff performance and provide backup safety checks.

10.2 In-water supervision levels (ratios) – instructed and guided dives

This section looks at supervision levels (ratios) on trips using in-water instructors or guides.

Instructed dive activities have dive training organisation in-water supervision level recommendations, however guided diving activities may not. Where dive training organisation recommendations do exist they should be viewed as a maximum and may need to be decreased for a particular trip or participant.

Ensure that each dive activity and site has clear operating procedures on maximum trip numbers, maximum supervision ratios and in-water supervision type – proactive or reactive direct supervision. Consider dive training organisation standards, the dive's significant hazards and technical difficulty, and likely participant abilities.

This section specifically looks at:

- In-water trip monitoring
- In-water supervision for instructed dives
- In-water supervision for guided dives
- When to increase supervision levels on guided and instructed dives

In-water trip monitoring

Where there is more than one in-water instructor or guide, ensure that one is designated as responsible for monitoring general trip safety and ensuring the trip follows the dive plan and the operator's standard operating procedures.

This person should be an experienced dive instructor or guide and be someone whom the operator is confident will exercise good judgement under stress.

Note: This does not remove the responsibility for each individual instructor or guide to follow the dive plan and manage the safety of participants under their supervision.

In-water supervision for instructed dives

Ensure that supervision types and ratios for all instructed dives are as per the guidance given by the dive training organisations.

In-water supervision for guided dives

Good practice alert for in-water supervision of guided dives

This guideline makes recommendations on in-water supervision levels for guided dives. Diver training organisation standards do not give clear consistent guidance on this topic and nor does AS/NZS 2299.3:2003.

To view the recommendations see the information below on in-water supervision of guided dives. The recommendations reflect the fact that certified divers using a guided service, rather than simply chartering a vessel, are unlikely to manage risks as they would if they were without an in-water guide — particularly in an emergency situation.

Meeting these supervision recommendations does not involve re-training of staff or purchasing new equipment and therefore should not take significant time to implement. Dive operators are expected to meet these recommendations as soon as possible.

Establish maximum ratios for guided dive activities as per the ratios for the corresponding instructed dive activities — follow the recommendations for instructional diving given by the dive training organisations.

Participants in guided dives are usually under reactive direct supervision. Ensure that participants understand that they may not be proactively supervised and agree to this level of supervision.

Guiding certified divers does not absolve the responsibility of the operator to inform and screen clients as per section 9.

Participants who want to dive solo

Ensure that participants who dive solo (without a buddy) are competent to do so, and that they have the equipment to do it safely, for example pony bailout cylinders. Verifying competence could include holding a solo diver qualification, staff knowledge of the diver's competence or staff assessment of the diver's log book.

Ensure that solo dive participants discuss their dive plan with staff including depth, time, direction of travel and purpose.

When to increase supervision levels on guided and instructional dives

The operator's standard supervision levels for a site and activity are minimum supervision levels. Supervision may need to be increased for a particular trip.

Establish the actual supervision levels for each trip when developing the dive plan and increase supervision levels when operational situations are less than optimal. Examples of these situations include:

- challenging environmental conditions such as poor visibility or strong currents
- less experienced or less confident guides
- participants who are less physically able, younger, older, less confident, less experienced or less likely to follow instructions
- participants who, despite their qualifications, are not experienced in a particular environment or with managing a particular hazard — this could include an inexperienced wreck diver on a complex wreck, warm water divers in temperate water, or entry level divers at sites where depth could easily be exceeded.

Supervision levels may also need to be increased during a trip, for instance if participants show a lower level of competence or confidence than was originally planned for and are no longer safe under the previously agreed level of supervision.

Ensure that guides and instructors conduct on-going risk assessment and know what to consider and when to move to higher levels of supervision.

Techniques for increasing supervision levels include:

- staying closer to the participant
- instructing the participant to stay in a particular position relative to the guide or instructor, or another more able participant
- stopping and re-grouping more frequently
- placing a participant in a smaller group — higher guide or instructor to participant ratio
- reducing the boundaries of a dive site
- separating participants into different groups if they are likely to encourage each other to behave unsafely.

10.3 Instructed or guided trips - parameters for open water trips with only one in-water guide or instructor

Many guided or instructed open water dive trips are run with only one in-water instructor or guide. If this person also fulfils the perform rescues role there is a risk that participants could be inadequately supervised in the event of an in-water emergency.

Inform clients of this risk and how they can help to manage it. Options include:

- emphasising the heightened responsibility that this situation places on them
- emphasising the importance of knowing and following the dive plan
- training them in what to do if the guide or instructor becomes unable to assist them, such as reminding them of surfacing protocols and how to alert the out of water supervisor or trip monitoring person if assistance is required
- consider allocating a participant to be in charge in the event that the guide or instructor is incapacitated.

Operators should consider increasing participants' dive competency and fitness requirements for dives with only one in-water instructor or guide when the site, the activity itself or environmental conditions present an increased risk; examples include advanced technical dives, remote areas, strong currents, high entanglement risks and limited visibility.

Requirements for guides and instructors

Ensure that guides and instructors working alone in-water and fulfilling the perform rescues role are competent to do so and follow diver training organisation standards. Factors to consider include:

- their level of experience and ability in the skills required for leading the dive, including managing emergency scenarios
- their degree of familiarity with the hazards of that activity and site
- their degree of familiarity with the operator's standard operating and emergency procedures.

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

Section 11 Diving Activities

Good practice for managing safety for specific dive activities is outlined in diver training organisation standards and. This section supplies additional recommendations where information was deemed necessary to support those standards. Specifically it looks at diving activities with heightened risk and drift dives in rivers.

The recommendations in diver training organisation standards and the information in this section should not be considered all-inclusive. The other sections in this guideline make additional recommendations for managing particular significant hazards. It is essential to carry out site and activity specific hazard management processes, and for staff to conduct on-going dynamic hazard identification, assessment and management.

11.1 Diving activities with heightened inherent risk

Technical dives, dives in overhead environments and deep dives (any dive over 18-20 meters and particularly those over 30 metres) are acknowledged as having heightened risk. They all have less tolerance for factors such as diver error or equipment failure and generally involve emergency scenarios that require more complex support.

Follow all the recommendations in this guideline and pay particular attention to:

- ensuring that guides and instructors are competent as per the recommendations in section 8
- ensuring suitable assessment of participants for dive competence and experience and medical and physical fitness.
- ensuring that participants are aware that these activities involve heightened risk.

Operators of chartered dive services should be aware that unless they are diving with the participants their ability to assess them once they are in-water is nil. Operators need to be particularly diligent at checking participant qualifications and experience levels before agreeing to take them on these dives.



Photo: Go Dive Marlborough

Give careful consideration to possible emergency scenarios and emergency management plan development and practice — ensure that surface support is sufficient. In-water rescues may be very difficult if not impossible to conduct.

Emergency scenarios are likely to require decompression facilities and the level of risk to participants is higher if conducting dives in locations from which access to decompression facilities is slow. See section 12 for more information on emergencies.

Operators of trips involving dives over 30 metres should consider selecting sites that do not allow depth to be exceeded beyond the participant's training.

Only provide guided or instructed dives in overhead environments if the guide or instructor has dived at the site before.

11.2 Drift diving in rivers

Drift diving in river environments (with water flowing downstream) involves heightened risk largely due to the consistent force of the river current and the proximity of objects underwater, including the river bottom itself, snags and river banks. This risk increases with stronger currents and shallower rivers. These risks result in an increased likelihood of impact injuries, entanglement and of divers becoming separated from each other or from surface support.

River drift dives can also involve interacting with other river users, such as jet boat and jet-ski drivers who are not accustomed to operating around divers and may not understand maritime signals indicating divers are in the water.

Ensure the instructor or guide has dived the river section before and has knowledge of the river currents, bottom and obstacles. Non-guided (chartered) trips are discouraged in river environments unless participants are qualified, experienced and have dived the section before.

When developing in-water supervision levels for trips involving significant impact hazards ensure that guides or instructors are close enough to be able to see their clients at all times.

Follow the recommendations on managing entanglement hazards in section 4.4.

Brief participants on impact hazards, how to avoid them and what to do if they are likely to have a collision, including rock deflection techniques such as keeping one hand palm forward in areas of high impact hazards.

Ensure participants know how to work in with safety support systems – such as check-in locations or navigation indicators, signals and what to do if they pass the agreed finish point of the trip.

Use surface marker buoys unless their use presents a significant entanglement hazard.

Use signage containing common language or diagrams at places where other river users may launch to indicate that divers are in the water. Inform known commercial river users or clubs about the river dive operation and about how to know if divers are in the water, such as where to look for signage or the meaning of signals and surface markers.

Section 12 Emergencies

Ensure that all dive sites have a documented emergency management plan. Ensure the plan covers the requirements in the Department of Labour Guidelines for Occupational Diving 2004 section 4.2. Note that emergency plans are only a part of the over-all safety management system and documented operating procedures. For more information on documenting safety systems see www.supportadventure.co.nz

Develop clearly documented and practised procedures for the full range of emergencies relevant to the operation, from incident management through to crisis response, including protocols for surfacing divers requiring medical or other attention — including the requirement to surface the entire dive team where necessary. Ensure that emergency plans include the location of the nearest hyperbaric treatment facility, the contact details of any local diving doctors and the NZ diver's emergency contact free phone number.

Operators of non-guided (chartered) dives will need to place particular emphasis on ensuring that any participants delegated into the roles of 'managing the in-field and dive related supervision system and emergency response' and 'performing rescues' understand the relevant parts of the operator's safety systems and emergency management plan, and where necessary inform them of any details relevant to their dive — see section 8 for more information on safety roles and responsibilities.

This section looks at dive computer information collection, good practice for lost diver procedures and for accessing suitable external emergency support. Other important factors that contribute to effective emergency management are covered within each specific section of this guideline.



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

Dive computer information collection

Ensure that if an incident occurs the relevant information is preserved from dive computers. Ensure relevant dive computers are safely secured and downloaded where practicable. Note that this should be done in communication with police and other investigating authorities in keeping with requirements not to interfere with an accident scene, including dive equipment.

Missing diver procedures

Missing diver situations are extremely serious and can easily result in the death of the diver. Successful resolution is very time dependent. It is also crucial to manage the safety of the rest of the dive team.

Develop an emergency management plan for in-water and on-surface missing diver scenarios, and where necessary customise it for each dive site. Practise the plan with staff.

Ensure the plan includes consideration of:

- time frames for the initial in-water search before surfacing the rest of the dive team
- the competence and qualifications required for in-water searchers/rescuers
- the time when the missing diver was last seen and by whom, and last known location
- the missing diver's qualifications and competence
- the missing diver's medical and physical condition
- the likely size of the search area — take into account the dive plan, the topography of the site, currents and surface conditions
- known hazards of the site
- components of the dive plan such as expected diver depth and time on the bottom
- the amount of gas the missing diver had left when they entered the water (see dive safety log) and is likely to have left at time indicated missing
- all diver's equipment, including signalling devices.

The competence of available searchers and their dive profiles are important considerations when searching for lost divers or initiating any in-water emergency response. Never allow people in the water unless they are competent to be there and their dive profile allows a safe dive. Note that in some cases this may mean an in-water response cannot be undertaken using the people present at the dive site.

Accessing suitable external emergency support

Ensure that suitable external emergency support is available as soon as is practicable and within a planned period of time — ideally within daylight hours. Indicate this period of time in the operation's emergency procedures.

When conducting emergency planning and developing emergency procedures consider factors that could impact on the availability of suitable external emergency support. These include:

- the ability to call for external support from the site
- the type of external emergency support required by each emergency scenario
- site access and evacuation options
- the location and travel time to the nearest hyperbaric treatment facility or other appropriate medical facility
- capacity and ability of local rescue resources including community rescue agencies and other dive operators.

Contingencies for limited access to emergency support

Where sites are at locations with limited access to suitable external emergency response, injured participants may spend longer without secondary emergency care. This risk needs to be managed. Management strategies should be based on the associated risk. Options to consider include:

- informing participants of the risk of a prolonged wait for emergency support in the event of an accident
- using more experienced guides or instructors and ensuring they are competent to manage identified emergency scenarios for an extended period of time
- finishing dives early in the day to allow time for external emergency response
- considering accessibility when determining participant supervision systems and levels, assessing participants and setting competence requirements for staff
- taking extra care and considering the exclusion of avoidable higher risk activities
- informing local rescue response personnel about site and activity access and rescue options
- having resources available to manage an injured participant for longer periods of time, such as additional first aid equipment and shelter.

Section 13 Safety System Reviews

Regular internal and external safety system reviews or ‘audits’ are a crucial part of running safe dive operations.

Instructed and guided dive operations are required by the Adventure Activity Regulations to undergo an external audit before they begin operating, and at regular intervals as defined by the WorkSafe NZ adventure activities audit standard. To view the audit standard go to:

[www.business.govt.nz/safety-audit-standard-for-adventure-activities – requirements for a safety audit of operators](http://www.business.govt.nz/safety-audit-standard-for-adventure-activities-requirements-for-a-safety-audit-of-operators).

All dive operations should conduct an internal, and potentially external, safety system review after an incident that caused serious harm, or might have.

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

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

One person should have responsibility for ensuring that reviews take place, but everyone in the operation is responsible for being part of the process.

Record the process and the results and share any relevant learning with staff and other dive operators.

For more information on safety system reviews go to

www.supportadventure.co.nz/safety-management-plans/checking-your-systems

Appendix 1 Explanation of Terms

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

The terms are:

- practicable steps
- hazards and significant hazards
- serious harm.

What are ‘all practicable steps’?

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

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

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

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

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

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

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

What are ‘hazards’ and ‘significant hazards’?

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

‘Hazard’ describes a danger or a potential source of danger. A hazard may cause or contribute to an incident. So a hazard may be:

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

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

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

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

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

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

What is 'serious harm'?

Serious harm is death, or harm of a kind defined to be serious for the purposes of the Health and Safety at Work Act 2015. The Act does not give a simple definition of serious harm, but gives examples including:

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

Operators should also manage hazards that could result in harm other than serious harm. Managing these hazards reduces the likelihood of both minor injuries and unexpected serious harm.

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

Appendix 2

Rental of Equipment for Diving

Rental of diving equipment should follow the recommendations of ISO 24803:2007, section 7. The essence of that section is repeated here:

7.1 Service

The service comprises rental of any items of diving equipment in accordance with 3.3 to participants who may use such equipment both for supervised and unsupervised diving activities.

The service provider shall ensure that participants are advised on choosing the proper diving equipment taking into account the envisaged diving activity and the qualification and needs of the participants, e.g. the proper fit of buoyancy control devices and suits.

Diving equipment rented to participants shall be subjected to an inspection by the service provider prior to delivery in order to ascertain that it is fully operational.

Participants renting equipment shall be informed that use of the equipment requires specific training.

Note: for the rental of all diving equipment listed in 3.4, with the exception of mask, fins, snorkel and wet suit, it is recommended that the service provider ensure that each individual participant meets one of the following criteria:*

- *has a certificate of qualification of at least level 2 in accordance with ISO 24801-2; or*
- *has a certificate of qualification of level 1 in accordance with ISO 24801-1 and is under the supervision of a dive leader; or*
- *if unqualified, is under the supervision of an scuba instructor at level 2.*

* Essentially this means that divers need to be suitably qualified to rent equipment – the ISO standard levels are aligned with dive training organisation qualification

7.2 Diving equipment

Diving equipment rented to participants shall conform to the relevant international, regional or national standards.

Diving equipment rented to participants shall be subjected to an inspection by the service provider prior to delivery in order to ascertain that it is fully operational. Diving equipment shall be cleaned, maintained and serviced in accordance with the manufacturer's instructions, and records of maintenance, servicing and inspection shall be kept.

7.3 Staff

The service provider shall ensure that their staff understand the characteristics and function of the diving equipment rented to participants. Staff shall be competent to advise participants about the proper fit and use of the diving equipment in specific diving activities.

Appendix 3

Delay times for travel to altitude after diving

These recommendations come from AS/NZS 2299.1-2007 Appendix H.

GUIDELINES REGARDING EXPOSURE TO ALTITUDE FOLLOWING DIVING

(Informative)

H1 SCOPE

This Appendix provides recommendations regarding the period which should elapse after diving and before a diver ascends to altitude or is otherwise exposed to reduced atmospheric pressure. These recommendations are intended to provide guidance for operations where no specific alternative protocol has been established.

H2 RECOMMENDATIONS

The minimum delays should be as set out in Table H1. These recommendations are for divers who find themselves in normal health following diving. If any signs or symptoms of illness or injury are present, individualized advice should be sought regarding the need for either emergency medical evacuation or a prolonged stay at sea level altitude.

TABLE H1 RECOMMENDED DELAY BEFORE EXPOSURE TO ALTITUDE

Altitude m	Minimum delay before travel to altitude h		
	Category of dive (see Legend)		
	1	2	3
0-150	Nil	Nil	2
150-600	Nil	2	12
600-2400	12	24	48
Greater than 2400	24	48	72

LEGEND:

Category 1 = A single dive to $\leq 50\%$ of the DCIEM no-decompression limit or two short dives within 18 h with a total, combined bottom time of $\leq 50\%$ of the no-decompression limit for the depth of the deeper dive. No decompression diving or repetitive dives in previous few days.

Category 2 = Dives exceeding Category 1 but not included in Category 3, e.g. one or more dives to $\geq 50\%$ of the no decompression limits or a single decompression dive a day.

Category 3 = Repetitive deep diving over multiple days, multiple decompression dives on one day, extreme exposures; omitted decompression; or other adverse events.

NOTES:

1 The altitude referred to is the effective altitude. In pressurized aircraft the relevant environment is the effective altitude of the aircraft cabin and not the flying altitude. Commercial aircraft are usually pressurized to achieve an effective cabin altitude of 2400 m or less.

2 The recommendations given in Table H1 are drawn from expert opinion regarding what should be safe for routine diving operations. The risk of decompression illness varies substantially with differing dive profiles, and data regarding risks associated with altitude exposure after diving is limited. Specialist advice is recommended whenever altitude exposure following diving is planned.