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1. PURPOSE

The purpose of this document is to provide the standard requirements and approval processes for research; scientific and educational diving whilst using SCUBA, snorkelling or any other approved diving equipment, under the auspices of the University of Western Australia.

2. SCOPE

The contents of this manual apply to all people who carry out scientific diving activities at or for UWA. This includes people who take part in research or a recognised programme of study at the University including undergraduate, postgraduate studies and collaboration with outside agencies. Scientific diving is diving performed for the purpose of scientific, research, natural resource management whose purpose for diving is to carry out such tasks. And to be assessed scientific diving research as an educational activity by persons.

3. INTRODUCTION

It defines the criteria and requirements for carrying out all diving activities. It is to be used in conjunction with the Scientific Diving Procedures Manual. Following the requirements and approval processes detailed in this document will minimise the risk of injuries and/or illness. It should be considered the minimum standard needed to ensure safe operations. The document also provides details supporting reciprocity in training and certification to allow a working reciprocity between scientific institutions. The procedures seek to meet the requirements of local environments and conditions as well as to comply with national and state scientific diving regulations and standards. All forms associated with this manual can be accessed via the http://www.safety.uwa.edu.au/topics/off-campus/boating-diving.

UWA Diving activities that can be applied for are strictly limited to non-decompression diving as follows:

- Snorkel activities to a maximum dive depth of 5m;
- Self Contained Underwater Breathing Apparatus (SCUBA) to a maximum depth of 30m;
- SCUBA using Enriched Air (EANx) to a maximum depth of 30m and a maximum partial pressure of O2 of 1.5atmospheres absolute (ata);
- Semi Closed Circuit Rebreather (SCCR) diving to the Maximum Operating Depth (MOD) of the EANx mix (to a maximum of 30m) and a maximum partial pressure of O2 of 1.5ata;
- Surface Supply Air diving / SSBA to a maximum depth of 30m.

UWA employees, students and all other persons engaged in scientific diving operations are prohibited from undertaking or participating in diving activities not covered by the diving types detailed above.

Persons participating in diving activities managed and/or coordinated by an external organisation shall:

- Seek approval for the activity from the University Diving & Boating Safety Officer (DBSO) 3 weeks prior to the activity occurring;
- Ensure that the diving activities fully comply with the relevant local legislation, regulations and codes of practice;
- In absence of formal compliance requirements, adhere to the guidelines and protocols contained within this policy and procedures manual as a minimum requirement.
- Not operate in contrast to these procedures (outlined here), maintaining all UWA minimum requirements.

4. LEGAL REQUIREMENTS AND IMPLICATIONS

Liability

In adopting the requirements set forth in this manual, the University of Western Australia assumes no liability not otherwise imposed by law. Outside of those University employees diving in the course of their employment, each diver is assumed under this policy to be voluntarily performing activities for which he/she assumes all risks, consequences and potential liability. The University also assumes no responsibility for the validity of the information supplied by persons wishing to gain acceptance on the University’s dive register.

Consequences of Violation of Procedures
5. DEFINITION OF TERMS

ADAS
The Australian Diver Accreditation Scheme, the Commonwealth Government not-for-profit diver training and accreditation scheme developed under the auspices of the Petroleum sub-committee of the Australian and New Zealand Minerals and energy council (ANZMEC).

Atmospheres absolute (ata)
Atmospheres absolute is the combination of atmospheric pressure and hydrostatic pressure

Buoyancy Control Device (BCD)
A buoyancy compensator (or buoyancy control device, BC or BCD) is worn by divers to provide lifesaving emergency buoyancy both underwater and on the surface. It also provides the ability to adjust and control the diver's overall buoyancy and control whilst descending, remaining at depth and ascending.

Bottom time (BT)
This is the total elapsed time from when a diver leaves the surface to the time (next whole minute) at which the final ascent to the surface is commenced, measured in minutes.

Breathing hoses
Hoses attached to a regulator to supply breathing gas to the diver and operate at near ambient pressure.

Buddy diver
A member of a group: two or three divers.

Competent person
A person who through training, qualifications or experience (or a combination of these), has acquired the knowledge and skills to enable them to perform specified tasks safely.

Compression (recompression) chamber
A pressure vessel at the surface designed and equipped for human occupancy which enables persons to be subjected to increased pressure for therapeutic, decompression or training purposes.

DAN
Diver’s Alert Network

DBSO
Diving and Boating Safety Officer for UWA who is responsible for overseeing the activities of the scientific diving, boating and snorkelling via approving Fieldtrip applications. DBSO provides guidance on operational practicalities, regulations, policy and procedures.

DBSC
This is the Diving and Boating Safety Committee. The DBSC is an administrative body comprising dive and occupational safety and health practitioners with the overarching responsibility to administer the UWA Scientific Diving Procedures and approve diving activities via delegated DBSO.

DCIEM
The Defence and Civil Institute of Environmental Medicine (DCIEM) organisation changed its name in 2002 to Defence Research and Development Canada (DRDC).

DCIEM tables
Decompression tables: developed by DRDC. These tables are to be used for all diving operations (Appendix DV5: DCIEM Sport Diving Tables). These tables shall be used to calculate all dive times for UWA.

Decompression illness (DCI)
A generic term for acute illness: resulting when pathological consequences arise from decompression. This term covers the condition known as ‘decompression sickness’ (also known as ‘bends’) and arterial gas embolism, but does not include barotrauma of ascent.

Decompression schedule
A specific decompression procedure for a given combination of depth and bottom time as listed in a decompression table; it is normally described in terms of maximum depth (MSW) and bottom time (minutes).
Decompression stop
The specified length of time which a diver must spend at a specified depth to allow for the elimination of sufficient inert gas from the body to allow safe ascent to the next decompression stop or the surface.

Delegate (of DBSO)
An individual appointed by the DBSO in writing to perform nominated duties.

Dive controlling position
A single designated location on the surface, adjacent to where a diver enters the water, from which the diver’s safety is monitored.

Dive Coordinator
A person who is assigned in writing by the DBSO to coordinate for specific diving activities. With responsibility supervise and coordinates the approved dives: is responsible for the safety of the dive team.

Dive Leader
The “in-water” leader of a dive team: is trained and experienced in accordance with dive leader category described in the section DIVER CLASSIFICATIONS AND REQUIREMENTS. Is nominated by the Dive Coordinator.

Diver
A person, who performs diving work underwater and who, for the purposes of this manual, is trained and experienced in accordance with one of the categories described in the section DIVER CLASSIFICATIONS AND REQUIREMENTS.

Diver (Standby) Standby Diver
A diver kited up at the ready to enter the water for safety purposes immediately at the dive controller’s signal

Diver’s attendant
A person, who remains at the surface during a dive, maintains a constant vigil of the diving operation and assists the divers entering and exiting the water & in the case of SSBA diving in charge of umbilical control.

Diving program
One or a series of dives: related by their purpose, the place or by time.

Diving Science and Technology (DSAT) Oxygen Partial Pressure and EAD tables
Oxygen partial pressure table indicates percent of allowable exposure to oxygen based on exposure time and oxygen partial pressure, while EAD tables calculate equivalent air depths for varying EANx mixes (Appendix DV6: Oxygen Partial Pressure and EAD Tables). It is recommended trained nitrox divers confirm table values with calculated values from learnt formulae.

Diving team
Divers and support personnel operating together.

Diving work
Work in which diving is conducted using (underwater) breathing apparatus, including work by the dive team in direct support of the diver.

Effective bottom time (EBT)
For a diver carrying out repetitive diving, the bottom time calculated after taking into consideration the residual nitrogen from previous dives.

Effective depth
For a dive at altitude, the depth of an equivalent dive at sea level.

Employees and other persons
UWA staff, students, volunteers, visitors, and contracted staff.

Enriched Air Nitrox (EANx)
EANx is air that has been enriched so that it contains more than 21% oxygen. ‘x’ refers to the percent of oxygen contained in the nitrox mix (e.g. EAN36 = 36% oxygen whereas EAN50 = 50% oxygen.

Equivalent Air Depth (EAD)
The EAD for an EANx dive is an adjusted depth that accounts for the reduced nitrogen in enriched air. Each EANx mix has a different set of EADs. These values can be taken from a Diving Science and Technology
(DSAT) table, or determined using the formula: \( EAD = \frac{(1-FO2) \times (D+10)/0.79 - 10; \text{ where FO2 = fraction of oxygen in the mix and D = depth (in metres).} \)

**Exceptional exposure dive**
A dive where the maximum recommended dive time for a particular depth (shown by the limiting line in decompression tables) is exceeded by a diver at that depth.

**Float line**
A buoyant line connecting the diver to a highly visible float on the surface of the water: enables the approximate location of the diver to be known at all times.

**Lazy shot (also see shot rope)**
A rope running vertically from the surface (dive coordinating position) to an attached weight, hanging free and positioned off the bottom or worksite. The rope is marked with depth graduations to facilitate decompression stops at the correct depth.

**Lifeline**
A line attached to a diver which is capable of being used to haul the diver to the surface: can be integrated into an umbilical for SSBA.

**Limiting line**
A line shown in some decompression tables, which indicates time limits (bottom times) beyond which decompression schedules are less safe.

**Marine Research Diver**
A recognized qualification by UWA - A diver with the occupational diver Statement of Attainment covering courses outlined in AS 2299.2 taught to AS2815 qualification. This comes in three levels Restricted, Open and SSBA endorsement. There is also provision for a Dive controller/supervisor.

**Maximum Operating Depth (MOD)**
The MOD of a breathing gas is the depth at which the partial pressure of oxygen \( (ppO2) \) exceeds a safe limit. The MOD for an EANx mix is determined using the formula: \( \text{MOD} = 10 \times (ppO2/FO2 - 1); \text{ where } ppO2 = \text{ partial pressure of oxygen and } FO2 = \text{ fraction of oxygen in the mix.} \)

**Occupational diving**
Diving performed in the course of employment (irrespective of whether or not diving is the principle function of employment or merely an adjunct to it). Comprising all diving carried out as part of a business, as a service, for research or for profit.

**Poor / Low Visibility**
A horizontal visibility of less than 2m is usually considered to require that additional precautions be taken.

**Quick release mechanism**
A readily operated mechanism that enables the immediate release, e.g., of a diver’s equipment, from the secured position by a single operation of one hand, but which is designed to minimise the risk of accidental release.

**Rebreather**
This is a semi-closed or closed circuit self-contained underwater breathing apparatus.

**Repetitive dive**
Any dive conducted within 18 hours of a previous dive or that has a repetitive dive factor greater than 1.0 when calculated using DCIEM tables.

**Repetitive Factor (RF)**
Using the DCIEM dive tables, a figure determined by the repetitive dive group (RG) and the length of the surface interval after a dive. It is used for repetitive diving.

**Repetitive Group (RG)**
Following a dive conducted using the DCIEM dive tables, every diver will fall into a Repetitive Group category determined by the dives they have completed previously.

**Reserve air supply**
The calculated quantity of air that will enable a diver to return safely to the surface from the planned depth of the dive, completing any planned decompression stops.
Residual nitrogen
Nitrogen that is still dissolved in a diver’s body tissues after the diver has surfaced.

Restricted Scientific Diver
This is a trained, certified visiting diver from another state or country who performs tasks relevant to scientific diving in his or her own country. They have a current diving medical certification and are allowed to dive according to this manual during their visit.

Saturation
This is the condition where the person’s body tissues are completely saturated with the particular inert element of the breathing medium.

Scientific diving
Diving performed for the purpose of professional scientific research, natural resource management (or assessment dependant scientific research as an educational activity).

Self-contained underwater breathing apparatus (SCUBA)
This is open-circuit diving equipment which supplies the wearer with breathing gas from cylinders carried by the wearer.

Shall
Where used, this term indicates that a statement is mandatory.

Shot rope
This is a rope running vertically from the surface (dive coordinating position) and fixed to the worksite or bottom with a weight or attachment. The rope is marked with depth graduations to facilitate decompression stops at the correct depth (see also ‘Lazy shot’).

Should
Where used, this term indicates a high recommendation.

Snorkel Diving / Snorkelling
This is defined as a swimming activity assisted by fins, mask & snorkel; (exposure gear) performed for the purpose of scientific research, natural resource management, or as assessed may be scientific research as an educational activity. Snorkel breath hold diving is considered a higher risk activity and UWA has set a breath hold maximum dive depth of 5m.

Standby diver
A diver who remains at the surface during a diving operation but who is ready to enter the water immediately, if required.

Surface Consumption Rate (SCR)
The divers surface consumption rate is the amount of breathing gas, in litres per minute, a diver would consume while using SCUBA equipment at the surface.

Surface interval (SI)
The time which a diver has spent on the surface following a dive, beginning as soon as the diver surfaces and ending upon commencement of the diver’s next descent.

Tethered mode (in relation to SCUBA diving)
SCUBA diving in which a diver is secured by a lifeline and tended by a Diver's Attendant, or is secured to a tended float line.

Therapeutic recompression tables
Tables used for the treatment of decompression injury and other pressure-related injuries.

This section describes the procedures, qualifications criteria and requirements for the conduct of snorkel diving activities undertaken as part of work requirements on behalf of UWA, or as part of a recognised programme of study at the University (including undergraduate, postgraduate studies, and collaboration with outside agencies).
6. RESPONSIBILITIES

This section describes the procedures, qualifications criteria and requirements for the conduct of snorkel diving activities undertaken as part of work requirements on behalf of UWA, or as part of a recognised programme of study at the University (including undergraduate, postgraduate studies, and collaboration with outside agencies).

6.1 Designation of Responsibilities

Review of this and related documents - Any recommendations for modifications or amendments of these procedures should be submitted to the DBSO for assessment where major items are presentation to the DBSC for consideration.

Diving and Boating Safety Committee (DBSC)

The DBSC is an affiliate of the University Safety Committee. Its role is to develop, review and oversee procedures for scientific diving, snorkelling and boating activities. It may be called upon to investigate water related incidents, injuries and violations of procedures and make recommendations of appropriate disciplinary action in the event of unsafe diving or boating activities by any individual or group within the University.

Diving and Boating Safety Officer (DBSO)

The DBSO oversees the implementation of the scientific diving, boating and snorkeling activities. The role is to advise or assist with the planning, preparation and conduct of these activities. DBSO provides guidance on operational practicalities, regulations, policy and procedures. For scientific diving they can assist in establishing diver competencies, approving dives, maintaining the online dive register (see Riskteq) and advice on maintaining equipment, facilities and diving information.

Master of the Vessel

The Master of the vessel must be a commercially qualified Captain as denoted by AMSA for the survey class and area of operation of the vessel used. The vessel Master has specific responsibilities for the vessel and all persons aboard. These are stipulated by AMSA and also defined in the Boating Procedures Manual and the vessel owners Certificate of Operation and Safety Management System (SMS).

The Dive Coordinator (see section 6.2.5) shall brief the Master of the vessel being used for diving, on the diving activity to be undertaken. This raises further responsibilities for the Master of the vessel as follows:

- To constantly monitor the vessel, the conditions and any communications that may impact the vessel or divers safety and freely cancel the dive operations if in their opinion a threat exists.
- Supervise the launching and retrieval of boats and ensure all relevant operational and safety equipment is on-board before the boat leaves the mother ship;
- Cancel diving operations if present or anticipated weather conditions would prevent the rendering of assistance or would endanger the vessel and personnel;
- In conjunction with the Dive Coordinator, post lookouts, hoist signals, warn approaching vessels and maintain radio communications;
- Ensure that no work is carried out on-board the vessel when diving is in progress if there is any possibility that it could hinder the vessel from rendering assistance in an emergency;
- Ensure that propellers cannot turn whilst divers are near the vessel;
- Ensure that fishing is not undertaken and that rubbish and sewage is not jettisoned whilst divers are near the vessel;
- In the event of a diving emergency, assist the Dive Coordinator in accessing all outside assistance required;
- Be competent with respect to the UWA Scientific Diving Procedures and UWA Boating Procedures Manual.

Principal Researcher / Scientist in Charge

The Principal Researcher/Scientist in Charge is the primary senior academic person responsible for the diving operation and dive project. They are typically the UWA research student(s) supervisor and have diving and marine research experience. They do not have to be on site, but would possess the knowledge to provide research collecting techniques, dive site information, project requirements, project protocol, risk assessments and a duty of care to all participants in the diving operations.
The Principal Researcher’s role is to provide support and guidance through the approval process of the application for diving and boating projects. The Principal Researcher also monitors the conduct of appointed participants and is ultimately responsible for enforcing any suspensions deemed necessary by the DBSO if a participant is in breach of these procedures or any other UWA safety and health policies or procedures.

**Dive Coordinator**

For every dive operation there shall be a designated Dive Coordinator. The Dive Coordinator is appointed for a diving operation via application to the DBSO or delegate and may be the Diver’s Attendant or a member of the Dive Team. The Dive Coordinator for the dive operation shall nominate one person as the Dive Leader. This person would normally be the most experienced diver and/or the person in charge of the research project and physically be in the water on the dive.

The Dive Coordinator should be a UWA staff member or UWA postgraduate student unless proof of their knowledge of these procedures is evident.

The Dive Coordinator is responsible for ensuring that the dive team operates within the UWA Scientific Diving Procedures and the dive team is thoroughly briefed prior to every dive (Appendix DV1: Dive briefing and debriefing guidelines). In this situation, the Dive Coordinator is responsible for checking that the DBSO or delegate has not expressly prohibited certain diving activities. The Dive Coordinator is also responsible for ensuring that a float line is deployed if needed and that the anchor is checked upon starting the dive.

Other tasks of the Dive Coordinator include:

- Ensuring that all divers and any boat attendants are competent & sufficiently trained and experienced to perform the required tasks safely;
- Ensure that at or close to every dive site there are adequate means of immediate communication with the appropriate land emergency services (e.g. rescue or medical) in the event of an emergency.
- Ensure adequate means of communication with the divers is present and understood by all members of the team
- Ensuring that each diving operation is performed in accordance with an approved predetermined dive plan [Form 10 (PLANNING) DIVE PROPOSAL] and risk assessment;
- Briefing the dive team members on dive objectives, communications, unusual hazards or environmental conditions likely to affect the safety of the diving operation and addressing modifications to diving or emergency procedures necessitated by the specific diving operation;
- Discussing risk assessed control measures with the dive team and any other person involved with the workplace Restricting or suspending any operation considered unsafe;
- Notifying the DBSO well in advance if a planned dive profile contains any higher risk factors ensuring that a member of the team completes the Record of Dive for every dive [Form 16 (FIELDWORK) FIELD DIVE LOG];
- Notifying the DBSO as soon as practicable of any diving-related incidents or injuries that occur to any member of the dive team and completing a confidential injury/incident report form (see Safety and Health website).

**UWA SCUBA Divers**

Individual SCUBA divers are responsible for:

- Diving safely within the limits of their capabilities (If a diver is uncertain about their ability to safely undertake any proposed diving task they must notify the Dive coordinator and if necessary the DBSO);
- Abiding by the UWA Scientific Diving Procedures and decisions made by the DBSO concerning particular diving operations;
- Conducting a functional check of their diving equipment in the presence of the diving buddy or Diver’s Attendant;
- Maintaining contact with dive buddy at all times;
- Surfacing with at least 50 bar of air remaining in SCUBA cylinder;
- Monitoring air supply and informing buddy at regular intervals of air supply status;
- Not diving with any malfunctioning equipment and reporting the fault if the equipment belongs to the University;
- Maintaining all dive equipment in use by them and submit any proof of service to the DBSO;
- Ensuring that they are medically, physically, and mentally fit for each dive;
- Notifying the Dive Coordinator as soon as possible of any diving-related injury that occurs to him/her or to his/her buddy diver;

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This document is uncontrolled when printed. The current version is available on the Safety and Health website.
- Maintaining an up-to-date personal dive log book and filling out Form 16 (FIELDWORK) FIELD DIVE LOG;
- Maintaining their current status (through uploading current certifications) and submitting all dives via the online UWA dive register (see Divelog) and by submitting field records (signed by dive supervisor) for multiple dives.

**UWA Snorkelers**

Individual snorkelers are responsible for:

- Snorkelling safely within the limits of their capabilities (if a snorkel diver is uncertain about their ability to safely undertake any proposed task they must notify the Snorkel Supervisor and if necessary the DBSO);
- Abiding by the University's Snorkel procedures and decisions made by the DBSO concerning particular snorkelling operations;
- Maintaining appropriate fitness to undertake planned activity and pass UWA snorkeler fitness assessment.
- Maintaining contact with snorkel buddy;
- Limiting their maximum dive depth while breath holding to 5m;
- Ensuring that they are medically, physically, and mentally fit for the expected tasks and demands of the snorkel locations and tasks;
- Notifying the Snorkel Supervisor/Team Leader as soon as possible of any incident or injury that occurs to him/her or to his/her buddy snorkel diver.
- Be able to render assistance to snorkeler buddy.

**Volunteer Divers**

A Volunteer diver is someone who assists on a research dive but is not necessarily directly associated with UWA. The volunteer diver also does not hold any formal occupational dive qualifications such as a scientific diver or restricted scientific diver qualification.

Volunteer divers are responsible for:

- Being registered with the DBSO;
- Diving in accordance with the Scientific Diving Procedures Manual;
- Being certified as medically fit to dive, within 12 months prior to diving, in accordance with the requirements of AS/NZS 2299.1 by a medical practitioner appropriately trained in underwater medicine;
- Supplying documentation demonstrating that their diving equipment complies with the structural and servicing requirements outlined in this manual, if they elect to use their own diving equipment for diving;
- Successfully completing a check out dive to assess their competency (new diver assessment).

**Diver’s Attendant**

Whenever a diver goes underwater the diver shall be attended by a Diver’s Attendant. Standard is one allocated assistant per dive team in the water. The monitoring and assisting of more than one team shall be risk assessed and approved. If conditions do not permit the constant location of the dive team then the use of a surface marker buoy should be considered to mark the site at which the divers are working.

The Diver's Attendant must be competent and have a working knowledge of:

- The dive plan and associated tasks;
- Signals in use;
- Dive tables in use;
- Diving plant and equipment in use.

The responsibility of the Diver’s Attendant is to:

- Hold current first aid and oxygen administration certificates;
- Establish and maintain a constant lookout over the divers;
- Assist with the recovery of divers and equipment.

The Diver’s Attendant whilst diving is being conducted must not:
7. ALCOHOL AND OTHER DRUGS POLICY

Alcohol
A zero blood alcohol limit applies to all vessel operators and divers because alcohol increases:

- The likelihood of an accident through impaired judgment;
- Body heat loss, reducing your survival time if you fall overboard or whilst underwater;
- Pulse rate, leading to quick exhaustion if you have to swim for safety issues.

Prescription medications and other drugs
These can also pose problems. Seasickness, hay fever and other allergy preparations can make personnel feel drowsy or easily confused. Participants are required to check with their doctor or chemist on the possible side effects of any drug they are taking before going boating.

Please note - Seasickness: 2 groups of drugs are used:

- Hyoscine: this is the most suitable drug, however, marked drowsiness can occur, and if possible the drug should be tried initially during a period of non-diving sea travel. Brand name: Hyoscine.
- Antihistamines: these are often more effective against motion sickness, but drowsiness frequently occurs. Considerable individual variation occurs in response to the drugs.

They MUST be tried initially during a period of non-diving sea travel. Medical advice should be sought if a suitable drug is not found. Brand names: Cyclizine and Meclozine

Effect of alcohol or drugs on divers
Diving shall not be undertaken while the diver is under the influence of any intoxicants. Diving cannot be undertaken within 12 hours of consuming any alcohol or if the diver is under the influence of any drugs that may impair his or her mental or physical capacities.

Some drugs/medications may compromise diver safety by impairing judgment and/or concentration. Divers must ensure that any medication they are taking will not compromise their safety while diving. Particular attention should be paid to medications used to prevent seasickness and to assist people to stop smoking.

Individuals under medical orders are unlikely to be diving but the common practice of "self-medication" may present a hazard, particularly in three situations: headaches, upper respiratory tract problems and seasickness.

- Headaches - Pain relieving drugs of all types should be avoided during diving. If pain is sufficiently severe to require drugs then the diver is not fit to dive.
- Upper Respiratory tract problems - Routine self-medication with nasal drops to facilitate ear cleaning may be medically hazardous. Such routine use should only be undertaken under medical supervision. The presence of any form of upper respiratory tract infection (e.g. hay fever, common cold, sinusitis, middle ear infection, tonsillitis, sore throat) imposes an absolute ban on diving until the infection has cleared.

8. SNORKEL DIVING
This section describes the procedures, qualifications criteria and requirements for the conduct of snorkel diving activities undertaken as part of work requirements on behalf of UWA, or as part of a recognised programme of study at the University (including undergraduate, postgraduate studies, and collaboration with outside agencies). UWA limits the maximum snorkel dive depth to 5m.

8.1 Snorkeler
Currently there is no formal qualification certification available for UWA snorkelling. However, every person who undertakes a snorkelling dive must be competent to perform the task and be a support for their buddy snorkeler. Responsibility for being a competent swimmer and snorkeler rests solely with the snorkeler. Competency will also be assessed by the DBSO (or delegate) through a skills assessment [Form 04 (REGISTRATION) NEW] All snorkel divers must undergo a snorkel assessment [Form 04 (REGISTRATION) NEW]
8.2 Supervision of Snorkelling Team

For every snorkelling dive there shall be a designated Snorkel Supervisor. The Snorkel Supervisor is appointed by the DBSO by approval of snorkel plan and is responsible for ensuring that all snorkel teams operate within the University’s Snorkelling recommendations and procedures.

The Snorkel Supervisor is responsible for:

- Nominating one person as the Snorkel Team Leader;
- Ensuring that a dive flag is present at all times and the snorkel team keep within close proximity to the dive flag (boating traffic is only required to stay at least 50m away from a dive flag);
- Ensuring that all snorkel divers and any boat attendants are sufficiently trained and experienced to perform the required tasks safely;
- Ensuring that each snorkelling dive is performed in accordance with a predetermined snorkel plan [Form 11 (PLANNING) SNORKELLING OPERATIONS PLAN];
- Briefing the snorkel team members on research objectives, unusual hazards or environmental conditions likely to affect the safety of the snorkel operation and addressing modifications to the snorkel operation or emergency procedures necessitated by the specific snorkel site or operation;
- Discussing control measures with the snorkel team and any other person responsible for the workplace if snorkel operations contain high risk factors;
- Restricting or suspending any operation considered unsafe;
- Notifying the DBSO well in advance if a planned snorkel operation contains any higher risk factors;
- Notifying the DBSO as soon as possible of any injury that occurs to any member of the snorkel team and completion of an Incident and Injury Report Form (Safety and Health website).
- Ensuring viable First Aid kit is present (and qualified person to administer first aid).

8.3 UWA Snorkel Divers Responsibilities

Each snorkel diver is responsible for:

- Their own safety within the limits of their capabilities - If a snorkel diver is uncertain about their ability to safely undertake any proposed task they must notify the Snorkel Supervisor and if necessary the DBSO;
- Abiding by the University’s snorkel diving procedures and decisions made by the DBSO concerning particular diving operations;
- Maintaining contact with snorkel buddy i.e. should be in water with a buddy one up/one down;
- Ensuring that they are medically, physically, and mentally fit for the expected tasks and demands of the snorkel locations;
- Notifying the Snorkel Supervisor/Team Leader as soon as possible of any injury that occurs to him/her or to his/her buddy snorkel diver.

8.4 Snorkel Medical Requirements

There are no specific medical certificates required to undertake snorkelling, however the snorkeler must have adequate general health and fitness as per Form 05 (REGISTRATION) SNORKEL DIVER REGISTRATION. Snorkelers are required to notify the snorkel supervisor of any relevant medical physical or mental conditions/issues that may affect their ability to help themselves or assist their snorkel buddy to safety.

8.5 Snorkelling Status

It is at the discretion of the DBSO to revoke any active status based on new injuries, breach of conduct, or acting in any unsafe manner. The DBSO may approve a delegate in writing to undertake the Snorkelling skills assessment. The delegate shall have at minimum Dive Masters qualification (from a reputable agency) or higher and is appointed upon application at the discretion of the DBSO. (Justifiable experience may be considered)

8.6 Snorkelling Equipment
Each snorkeler should be equipped with the following:

- Face mask and snorkel (attachable or attached to mask);
- Fins;
- Visual and auditory signalling device (i.e. safety sausage, dive whistle).
- Sharkshields see “Marine Wildlife Aversion equipment”
- Diver’s watch or elapsed-time indicator.
- Divers knife;
- Quick release dive weights, if required for buoyancy control;
- Wetsuit or protective clothing appropriate for the conditions of work and the temperature of the water.

8.7 Snorkelling Team Example

Boat operation

3 persons 5 roles
2 approved snorkelers in the water ie buddy pair
1 Snorkel supervisor (Skipper or one of the snorkelers)
1 Skipper
First aid personnel recommended minimum two

Shore operation is recommended to be the same but change the skipper for shore observer

Tethered operations or other cases may be discussed with DBSO.

9. UWA DIVER CLASSIFICATIONS AND REQUIREMENTS

The following section details the diver classifications recognised by UWA to perform diving operations. The SCUBA diver classifications are:

(a.) WA staff or student divers

- Diver in training
- Restricted Scientific Diver
- Scientific Diver
- Dive Co-ordinator

(b.) Non UWA staff or student

- Visiting Restricted Scientific Diver
- Visiting Scientific Diver
- Volunteer Diver.

(c.) Special endorsements

- Nitrox
- Semi closed circuit
- SSBA (Surface Supply Breathing Apparatus)

9.1 Diver in Training (students only)

“Diver in Training” is not designed for Researchers or Professional staff, these positions must meet the “Restricted Scientific Diver” level. Diver in training is strictly to allow students to gain experience and log scientific dives in relative low risk operations and benign conditions.

Diver in training diver is an “additional member” to the “standard dive team” i.e. a third diver on a compliant buddy pair, this is only by application to DBSO taking into account the overall team experience and qualifications including the operation and environment risk assessment.
Diver level requirements

- Be approved by the DBSO (this is a special case judged on individual application of each dive)
- Be at least 18 years of age;
- Shall hold minimum of Open water
- Have at least 15 hours of underwater diving experience after certification (experience to be recorded as logged dives);
- Have a current dive medical as per AS/NZS 2299.1;
- Not dive deeper than 18 metres;
- Only Dive with an approved UWA “dive team” (i.e. two rescue divers or above);
- Dive only in benign conditions, in clear shallow water.
- Not dive as a Diver in Training - Student Scientific Diver other than for a single initial period of up to 4 months
- Not use powered tools or lift bags;

Progression from diver in training is with additional training - minimum Rescue Diver course:

Ideally it would be nationally recognized training course SISOSCB306A – Perform diver rescues (statement of attainment)

9.2 Restricted Scientific Diver

The Restricted Scientific diver rating is specifically for persons who are involved in research diving but who have limited diving experience. The rating has a number of restrictions attached to it. The restricted scientific diver must:

- Be approved by the DBSO;
- Be at least 18 years of age;
- Shall hold minimum of Rescue Diver qualification is required. And should be – statement of attainment SISOSCB306A – Perform diver rescues
- Have at least 15 hours of underwater diving experience post certification (experience to be recorded as logged dives);
- Have a current dive medical as per AS/NZS 2299.1;
- Not dive deeper than 18 metres;
- Dive with a minimum of Restricted Scientific Diver;
- Not dive as a Restricted Scientific Diver other than for a single initial period of up to 12 months (there should be no time extensions, the diver cannot hold that rating again and therefore they either progress to Scientific Diver or cease diving in a research capacity);
- Not use powered tools or lift bags;
- Only dive when conditions are suitable.

9.3 Scientific Diver

UWA recognises Scientific Diver qualifications that align to the Australian/New Zealand standard AS/NZS 2299.2. There are currently four options available to meet the Scientific Diver rating: Successfully complete or hold:

Registered Training Organisation (RTO) conducted Scientific Diver Training program.

For example ORCA - Marine Research Diver
Registered Training Organisations deliver units of competence from nationally registered training packages. There are a number of units of competence that are required to demonstrate alignment to AS/NZS 2299.2. An acceptable scientific diver qualification from an RTO is a “Statement of Attainment” listing the following units of competence or equivalents as nationally recognized training:

- SISOODR302A Plan outdoor recreation activities
- SISXOHS101A – Follow occupational health and safety policies
- SISOSCB301A – Scuba dive in open water to a maximum depth of 18 metres
- SISOSCB304A -- Navigate prescribed routes underwater
- SISOSCB303A – Complete deep dives to between 18 and 40 metres
- SISOSCB305A - Complete underwater search and recovery dives
- SISOSCB306A – Perform diver rescues
ADAS Sanctioned Scientific Diver Course  ADAS Part II

The Australian Diving Accreditation Scheme (ADAS) offers certification in regard to training programs that align to the 2815 or 2299 series of Australian Standards. ADAS registered training facilities can deliver the training programs to the criteria required by ADAS. Therefore, an appropriate ADAS registered training facility can conduct a scientific diver program in accordance with AS/NZS 2299.2 and a person who successfully completes the training course is eligible for certification under ADAS.

ADAS Part1 Construction Diver

As above the ADAS Part 1 Construction Diver qualification (2815.1 - SCUBA diving to 30 m) If not included on statement of attainment the diver must also hold a Statement of Attainment from an RTO listing the following unit of competence - SISOSCB306A – Perform diver rescues, Previously ‘SCOSCB007A Perform Diver Rescues’

Recreational Divemaster or Dive Instructor

Case by case
These qualifications maybe recognized on application with the DBSO.
“Applicable” experiences must be documented.

9.4 Dive Coordinator (DC)

A Dive Coordinator shall:

- Be at minimum Scientific Diver includes; ADAS Supervisor, MRD Supervisor; (case assessed active Dive Master, active Dive Instructor)
- Provide documented experience in the diving techniques i.e. SCUBA SSBA which may be required and in the use of equipment (and work steps) used in the diving operation for which they will act as the Dive Coordinator.
- Have adequate documented experience equal to or greater than the depth of the operation of which they propose to be the co-ordinator for.
- Be appointed in writing by the DBSO to supervise specific types of dive operations.

10. MEDICAL REQUIREMENTS AND FITNESS TO DIVE

All UWA staff, students and volunteers intending to dive with the University shall have a dive medical, performed by a doctor trained in diving medicine, to the criteria set out in the Australian Standard AS/NZ
2299.1 (Appendix DV2: Diving medical and medical practitioners). All visiting scientific divers shall have a current dive medical to AS/NZ 2299.1 or equivalent. The certificate must show the following:

- The name of the person who holds the certificate;
- The date it was issued; **only valid within 12 months of this date**
- The person is medically fit to dive according to the relevant fitness criteria in AS/NZ 2299.1 - Occupational Diving;
- Any limitations on diving imposed by the doctor (e.g. a depth limitation).

10.1 Frequency of Medical Evaluations

Medical evaluation should be completed annually. A valid medical certificate shall have a “date of assessment” less than 12 months prior to date of dive.

10.2 Fitness to Dive

All divers involved in diving shall ensure that they are fit to dive. Fitness should be maintained by exercise and regular diving. Divers must not dive if they feel unwell or do not believe that their level of fitness or mental preparedness is adequate to perform the tasks assigned. Any noticeable variation in normal feeling of health and fitness should be immediately reported to the dive leader and to a medical practitioner if the variation persists. A valid medical is part of fitness.

If a member of the dive team feels that for any other reason diving would be unsafe, then that person must convey their concerns to the Dive Coordinator.

Members of a dive team must not be pressured or cajoled into diving if they choose, for any reason, not to dive.

11. New Diver Assessments

New divers registering on the UWA dive registers (Riskteq) shall undertake a new diver assessment once prerequisites have been met.


**Prerequisites**

Completion, submittal and approval of dive registration form

This requires DBSO to sight:

- AS2299 occupational Dive Medical by doctor trained in dive medicine (SPUMS doctors preferred)
- Minimum qualifications: rescue diver (except as a temporary trainee diver at DBSO discretion)
- Divers log – minimum 15hrs outside any training
- Creation of a UWA diver record


12. Pre-Dive Operation Planning

No person shall engage in diving operations under the auspices of the University's diving program unless he/she is currently enrolled on the UWA dive register (see Divelog or Riskteq) pursuant to the provisions of these procedures inclusive being approved by DBSO or Delegate.

12.1 Safety Stops

It is highly recommended that wherever possible, the following safety stops be completed at the end of any dive:

- For no-decompression dives less than 20m depth, a stop at 5 metres for 3 minutes;
- For no-decompression dives between 20m and 30 m depth, a stop at 10 metres for 3 minutes.
- Followed by a stop at 5 metres for 3 minutes;

The performance of safety stops by divers, even after short dives to shallow depths, has been proven to reduce the incidence of decompression illness in divers.
12.2 Ascent Rates
It is highly recommended that wherever possible all divers adopt an ascent rate of not more than 9 metres per minute. Reduction in ascent rate to this speed has been shown to be beneficial in reducing the incidence of decompression illness in divers.

12.3 Dive Teams and Dive Procedures (examples)

12.3.1 Normal Dive Teams – 3 people

A normal dive team comprises a group of people who as a unit can perform the duties of the task required. UWA does not allow solo diving. There must be a minimum of two divers in the water at all times.

12.3.2 Dives to depths up to and including 18m (from boat or shore)

The following personnel shall all be present:

- One Dive Coordinator;
- Two Buddy Divers (one of whom must act as the dive leader);
- One Diver’s Attendant.

The Dive Coordinator may act either as the Diver’s Attendant, Dive Leader or as a diver. Thus the minimum dive team for SCUBA diving operations up to 18m is THREE, one of whom shall remain at the surface in a dive supervising position.

If the Dive Coordinator enters the water, then the duties which the Dive Coordinator has at the surface at the dive site shall be transferred to another adequately trained and authorized person who shall remain at the surface and is competent to recognise and manage diving emergencies.

When there are more than two divers entering the water, the divers shall dive in pre-arranged groups of a maximum of three buddy divers with one diver designated as the dive leader for that group.

Buddy divers shall maintain effective two-way (or three-way) communications with each other at all times and shall be able to render assistance to one another if needed.

Important: A Restricted Scientific Diver or a Volunteer Diver must have a Scientific Diver as their buddy.

12.3.3 Dives to depths of 18m to 30m (dives to depths >30m are NOT permitted)

The following personnel shall all be present:

- One Dive Coordinator;
- Two Buddy Divers (one of whom must act as the dive leader);
- One Diver’s Attendant.

The Dive Coordinator may carry out surface duties only. Thus, the minimum dive team for dives to depths of 18 to 30m consists of FOUR persons.

If the Dive Coordinator enters the water, then the duties that the Dive Coordinator has at the surface at the dive site shall be transferred to another person who shall remain at the surface and is competent to recognise and manage diving emergencies.

When there are more than two divers entering the water, the divers shall dive in pre-arranged groups of a maximum of three buddy divers with one diver designated as the dive leader for that group.

Buddy divers shall maintain effective two-way (or three-way) communications with each other at all times and shall be able to render assistance to one another if needed.

Important: A Restricted Scientific Diver or a volunteer diver must have a Scientific Diver as their buddy.
12.3.4 Dive Team Examples

Minimum land based operation 3 people

Person A
- Dive Coordinator (DC)
- surface attendant, look out

Person B
- Dive leader ( diver # 1) e.g. scientific diver

Person C
- Diver (diver # 2) e.g. restricted scientific diver

*Person A and Person B may change out “roles” (as long as person B also has current first aid and oxygen and diver rescue training) and is planned and approved by DBSO.*

Minimum Boat based dive team 3 persons

Person A
- Dive Coordinator (DC)
- Surface attendant, look out
- Skipper (requires Commercial Vessel Operators Qualification i.e. Coxswain)

Person B
- Dive leader ( diver # 1) e.g. scientific diver

Person C
- Diver (diver # 2) e.g. restricted scientific diver

*Person A and Person B may change out roles (as long as person B also has current first aid and oxygen and diver rescue training AND qualified as commercial vessel skipper) and is planned and approved by DBSO.*

12.4 Application for Diving Fieldwork

Before the commencement of a diving field trip, signed approval must be gained from:

- your Supervisor (usually the Principal Researcher)
- the DBSO
- Head of School (or Delegate)
FIELDWORK PLANNING PROCESS

For All participants there must exist:
- Form 1 [REGISTRATION] FIELDWORK PARTICIPATION DECLARATION which is renewed annually and lodged with the school
- Form 6 [REGISTRATION] VOLUNTARY WORKERS INSURANCE

For All voluntary workers there must exist:

For all fieldwork the following must be prepared:
- Form 7 [PLANNING] FIELDWORK SAFETY PLAN
- SAFETY RISK ASSESSMENT whichever below is applicable:
  - Fieldwork Safety Risk Assessment
  - Form 6 [PLANNING] Diving and Boating Safety Risk Assessment

Will fieldwork include diving?

For each diver, Diving “Active status” profile:
- AS2299 DIVE MEDICAL, First aid & Oxygen Provider
- Form 02 [REGISTRATION] AFFIDAVIT OF DIVE EXPERIENCE
- Form 03 [REGISTRATION] NEW DIVER ASSESSMENT

Complete:
- Form 10 [PLANNING] DIVE PROPOSAL
This is assessed using DCEIM tables and as a buddy pair
And has only the life of each trip

Once field work has been completed Forms 16 [FIELDWORK] upload to UWA DIVELOG forward Form 16 to the DBSO.

Will fieldwork include snorkelling?

For each snorkeller there must exist:
- Form 04 [REGISTRATION] NEW SNORKEL DIVER ASSESSMENT
- Form 06 [REGISTRATION] SNORKEL DIVER REGISTRATION

Complete:
- Form 11 [PLANNING] SNORKELLING OPERATIONS PLAN

Will boat(s) be used?

Form 15 [FIELDWORK] ALL BOATS SAFETY INDUCTION
AND
Induction by skipper regarding specific aspects of the vessel

Lodge documents with: Diving Boating Safety Officer
Supervisor
Head of School

Signed approval must be received and kept prior to undertaking fieldwork
Risk Assessment (Risk Control and Hazard Identification)

Dive planning shall incorporate risk assessment methods. It is the responsibility of the Dive Coordinator to ensure, as far as practicable, that diving hazards are identified for all participants and assess possible implications for the University. The DBSO can assist to ensure that suitable measures to control risks are determined [Form 08 (PLANNING) SAFETY RISK ASSESSMENT]. It is the Fieldwork Leader/Dive Coordinator's responsibility for implementing the control measures and ensuring they are capable of being met and are followed. The risk assessment form is part of the Fieldwork Safety Plan and must be available in the field at all times. Risks assessment shall be ongoing given any changes i.e. environment conditions dive profiles changes in circumstance.

The DBSO must be notified if there are events that predict changes to risk unless it is reduction in risk. This includes amended dive profiles.

Emergency Response Plan

In the event of an emergency it is essential to immediately assist the injured person. To assist with this the Dive Coordinator/Principal Researcher should ensure that an emergency response plan exists and is up to date for their area of operation. If an emergency response plan does not exist for that dive site then one needs to be put in place. This may include local/area such items as cyclone evacuation plan where these events are possible.

Dive Plan

Dives should be planned around the competency of the least experienced diver. Before conducting any diving operations under the auspices of UWA, the Dive Supervisor/Principal Researcher for a proposed operation must formulate and submit a dive plan [Form 10 (PLANNING) DIVE PROPOSAL] to the DBSO, which should include the following:

- Divers' names, duties and last dive details;
- Approximate number of proposed dives;
- Location(s) of proposed dives;
- Estimated depth(s) and bottom time(s) anticipated;
- Decompression tables used; generally DCIEM
- Proposed work, equipment, and boats to be employed;
- Any hazardous conditions anticipated;
- An emergency response plan, risk and hazard assessment should have been completed for the dive location (if this hasn't been done the forms need to be attached to the dive plan).

Important: The Dive Supervisor/Principal Researcher must ensure that the dive plan and attached forms have been signed by the DBSO or delegate at least 1 week before undertaking any diving operation.

Decompression Tables and Dive Computers

It must be remembered that dive computers and tables are just guides to the physiological process of breathing compressed gases at depths. They do not take into account variations in age, sex, weight, physical conditioning, recent illnesses or injuries etc., of individuals.

DECOMPRESSION TABLES - The DCIEM Air Diving Tables shall be used for all diving since they are generally more conservative for repetitive and multi day diving than other dive tables (Appendix DV5: DCIEM Sport Diving Tables).

DIVE COMPUTERS - Divers may use dive computers to keep track of or assist with the dive, not to plan or control the dive. DCIEM tables are to be used for both planning and control of the dive. The dive tables and computers are to be used even more conservatively if the diver is subject to conditions which increase the possibility of decompression illness (i.e. dehydration, alcohol consumption, age, excessive fat tissue, injury, tiredness or strenuous exercise before, during or immediately after a dive).
As part of the Health and Safety Field Plan, details of personnel associated with every marine and fresh water field trip conducted by the University will need to be provided. To achieve this, complete the following forms at least 1 week prior to the field trip to allow sufficient time for authorising endorsement to be obtained.

Form 07 (PLANNING) FIELDWORK SAFETY PLAN
Form 10 (PLANNING) DIVE PROPOSAL

The Dive Coordinator of the trip shall conduct an induction detailing the field trip and upon completion have the participants verify that they have read and understood the hazards and risk controls as highlighted in

Form 07 (PLANNING) FIELDWORK SAFETY PLAN
Form 08 (PLANNING) SAFETY RISK ASSESSMENT AND GUIDANCE
Form 09 (PLANNING) METHOD STATEMENT (if this form is prepared, it may be used to substitute the description on the above two forms if it is attached to them and “SEE ATTACHED METHOD STATEMENT” is inserted).

Volunteers on Field Trips Form

Fieldwork procedures require that all persons participating on the field trip have been informed of the remoteness, nature and hazards. It is also important that they acknowledge this and their responsibilities and obligations. They must also have permission to take part via:

Form 06 (REGISTRATION) VOLUNTARY WORKERS INSURANCE PROPOSAL
Form 01 (REGISTRATION) FIELDWORK PARTICIPANT DECLARATION.

13. Pre-Dive Safety

13.1 Dive Briefing

It is important for a successful diving operation that each member of the dive team understands the objectives of the dive, that they understand their role and the other members of the dive team’s roles in the dive. A dive briefing conducted by the Dive Coordinator allows for the exchange of this information. It also allows the Dive Coordinator to slightly modify the dive plan due to environmental conditions or the physical condition of any members of the dive team. The dive briefing should include but not be limited to:

- The objectives of the operation;
- Conditions in the operating area;
- Assignments of each member of the dive team;
- Review of communications (including any special hand signals, use of slates etc);
- Any special equipment or considerations;
- A review of the risk and hazard identification form noting any changes;
- Lost contact procedures (e.g. search for 1 min underwater if no contact, surface to continue search and reunite);
- Conditions controlling the termination of the dive (time, remaining air supply, etc);
- Review emergency response plan and recall procedures;
- Soliciting questions to ensure understanding of task and assignments.

13.2 Diver’s Responsibility

Each diver shall conduct a functional check of his/her diving equipment in the presence of the diving buddy.

It is the diver’s responsibility and duty to refuse to dive if, in his/her judgement, conditions are unfavourable, or if he/she would be violating the precepts of his/her training, or these procedures.

No dive team member shall be required to be exposed to hyperbaric conditions against his/her will, except when necessary to prevent or treat a pressure-related injury.

No dive team member shall be permitted to dive for the duration of any known condition that is likely to adversely affect the safety and health of the diver or other dive team members.

No diver should enter the water within 12 hours of consuming any alcohol or other intoxicants.
13.3 Equipment Evaluations

Each diver shall ensure that his/her equipment is in proper working order and that the equipment is suitable for the type of diving operation. Each diver shall also know the safe operation, capabilities and limitations of any equipment they use.

13.4 Pre-Dive Equipment Check

For all dives an adequate pre-dive check shall be performed on both the diver's and stand-by diver's equipment. The pre-dive checks should include but are not limited to:

- Checking for uninterrupted air flow from tank;
- Checking zeroing of contents gauge before turning on air supply;
- Checking air supply turned on;
- Checking contents of tank;
- Checking for leaking hoses and or gauges;
- Checking the operation of second stages, second stage free-flow, torn mouth piece, ect.;
- Checking depth gauge reads zero and maximum depth indicator is zeroed;
- Checking inflator hose is connected, inflator operation is OK, dump valve operation is OK;
- Check security of tank in BCD harness, etc.;
- Checking the operation of the contents gauge.

13.5 Site Evaluation

The environmental and other conditions: e.g., weather, visibility, tide, currents, temperature, presence of any other craft, shark warnings etc. should be evaluated on site by the entire dive team.

14. Diving Procedures

14.1 Normal Dive Procedures

Normal dive procedures may contain but are not limited to; when the vessel is on site:

- Site evaluation
- Dive flag displayed;
- Equipment and environment checks;
- Control devices deployed (float or shot line etc);
- Dive briefing;
- Surface interval, repetitive factor and time in recorded, maximum bottom time established for the dive plus any contingency times for variations in the dive profile;
- Safe entry and checks with buddy;
- Check that the anchor is secure;
- Compare depth gauge readings with other members of the dive team (any discrepancies shall be checked against an accurately measured depth of water);
- Start in-water operation;
- Dive attendant is on constant lookout where the divers are operating and for any external influences on the dive operation;
- Divers attempt to achieve objectives;
- Dive ends, slow ascent (< 9 m/min), Safety stop/s;
- Time out, bottom time and maximum depth recorded on each individual's field dive log sheet [Form 16 (FIELDWORK) FIELD DIVE LOG];
- Debrief dive;
- Record any problems, divers showing any signs of discomfort after diving shall be assessed and treated accordingly (Appendix DV4: Field Neurological Assessment Test may assist with assessment, when in doubt seek outside assistance);
- Turn in field dive log(s) and login to UWA Dive Log or Riskteq Register and upload dives for the field trip within 7 days of trip completion.
14.2 Shore Diving

In addition to normal dive procedures the following procedures shall be followed for diving from the shore:

Divers operating without a vessel must display the international code flag ‘A’ which must be clearly visible to all vessels operating in the vicinity.

- Diving restricted to 50 metres from the shore (greater distances are subject to DBSO approval);
- Diver’s attendant must have a communication link to emergency services;
- Access to oxygen resuscitation equipment within 5 minutes of point of entry;
- When shore diving is being conducted in an environment of strong currents, strong surge and limited visibility, a rescue tender shall be on standby.

14.3 Night Diving

In addition to normal low risk dive procedures the following procedures shall be followed for night diving:

- The dive site should be marked prior to the night dive
- Familiarity with dive site should be established i.e. prior diving;
- The site entry and exit points shall be marked with an activated light source;
- All divers shall have an activated cyalume (or other suitable light source) attached in a prominent position to their equipment;
- Each Diver must carry a dive torch and a backup light/torch;
- In the case of night diving from a vessel the UWA Boating Procedures must be followed.

During night time a boat must show the international lights to indicate that “a vessel is restricted in her ability to manoeuvre”. These are three lights in a vertical line, the top and bottom lights are red and the middle light is white.

14.4 Things all diver and boat attendants should know

Most incidents, diver distress and panic situations occur at the surface, not underwater.

If a diver surfaces away from the work site, well within the planned dive time, he may not be immediately missed, and there will be less search effort than if he is overdue.

Depending upon surface conditions, the occupants of the attendant boat may be able to follow the diver’s bubbles and keep track of his/her whereabouts. The use of a site marker is highly recommended.

Due to the diver's low position in the water; although at times he/she may be able to see the attendant boat or mother ship, it does not follow that persons in those vessels will see him/her. In conditions where this is possible the diver shall carry a device such as an inflatable “safety sausage”, whistle, etc.

Searchers in a small boat are unlikely to hear a whistle with the motor running. If it is known that the divers carry whistles, searchers should stop the motor at frequent intervals.

14.5 Refusal to Dive (the right to refuse)

The decision to dive is that of the diver. A diver may refuse to dive, without fear of reprisal, whenever he/she feels it is unsafe for them to make the dive.

The ultimate responsibility for safety rests with the individual diver. It is the diver's responsibility and duty to refuse to dive if, in his/her judgement, conditions are unsafe or unfavourable, or if he/she would be violating the precepts of his/her training or the regulations in this manual.

14.6 Termination of the Dive

It is the responsibility of the diver to terminate the dive, without fear of reprisal, whenever he/she feels it is unsafe to continue the dive, unless it compromises the safety of another diver already in the water.

The dive shall be terminated while there is still sufficient cylinder pressure to permit the diver to safely reach the surface, including safety stop time with a reserve of 50 bar of air remaining.
15. Emergencies and Deviations from Regulations

Any diver may deviate from the requirements of this manual to the extent necessary to prevent or minimise a situation that is likely to cause death, serious physical harm, or major environmental damage. A written report of such actions must be submitted to the DBSO explaining the circumstances and justifications.

16. Post-Dive Procedures

Post-Dive Safety Checks

After the completion of a dive, each diver shall report any physical problems, symptoms of decompression illness, or equipment malfunctions. Divers showing and signs of discomfort after diving shall be assessed and treated accordingly. Appendix DV4: Field Neurological Assessment Test, may assist with assessment, when in doubt seek outside assistance.

ALL DIVERS ARE TO ENSURE RECORDING DETAILS OF DIVE ARE CORRECTLY LOGGED
And intern kept and also a copy submitted to DBSO.

Flying or Ascending to Altitude after Diving

To minimise the risk of developing Decompression Illness whilst travelling after diving, a diver should have a minimum surface interval of 24 hours before ascending to altitude or flying.

17. Food and Drink

In most circumstances normal daily food and fluid intake is left to individual discretion. Where diving is to be conducted in remote areas, a balanced diet must be planned and adequate fluid intake to ensure at least 2 litres per person per day.

Diving should be avoided for 2 hours following a heavy meal. Regular light meals should be taken during the day’s diving activities.

18. Supervision of Dives

A UWA Dive Coordinator (DC) shall at all times be responsible for the safe conduct of the diving and shall coordinate and direct the activity of the diving teams. The Dive Coordinator should be

- appointed as per point 9.4
- present onsite on the surface at all times when a diver is in the water.

Special consideration may be granted upon application where a stand in trained surface attendant with current First Aid, Oxygen supply and diver rescue training may act as Dive Coordinator when the assigned DC is underwater. Document in plan & discuss with DBSO.

Rarely a remote based / offsite DC be consider this is deviation and special case presented to DBSO.

19. UWA Dive Register

All persons conducting diving, , and/or boating (Skippering) activities must:

- Create a profile on the online UWA dive register (see Divelog) or UWA Riskteq and present the original hard copy of certifications to the DBSO for sighting;
- Attend an introductory session with the DBSO;
- Participate in a checkout dive/diver assessment if they have not participated in a dive in the past 12 months [Form 03 (REGISTRATION) NEW DIVER ASSESSMENT];
- The DBSO or delegate may impose restrictions on a diver’s activities on the basis of his/her logged experience or assessed skills competency and will assign a diver classification level as per point 9.
20. Equipment Service Technician

Staff and postgraduate students wishing to service/repair dive gear in the field must be trained and certified to perform services to the manufacturer's specification for dive equipment and tanks. Therefore, the person must be a certified Service Technician for the brand of equipment being serviced. There is no generic service technician qualification.

21. Diving Reciprocity with Australian Universities/Organisations

Where UWA divers are operating with divers from another scientific organisation and are working under the auspices of the other organisation (such as with their divers, using their vessel), then the UWA diver/s will normally be bound by that organisation’s diving code as long as it meets or exceeds UWA minimum standards i.e. minimum buddy diver standard rescue diver. In this situation they must meet all certification requirements of that organisation, and gain approval to dive from the organisation's Diving Officer (as required by their diving regulations). The DBSO should be notified of such diving operations, but the divers involved do not need to complete a UWA dive proposal and relevant forms for these dives. They do, however, need to log any dives conducted into the UWA dive register, as dives may impact their surface intervals, flying after diving and future diving.

Where UWA personnel are working with divers from another organisation, but from a UWA vessel, or on any official UWA diving operation, then the divers from the other organisation(s) must be registered on the UWA dive register (see Divelog), meet all minimum requirements of the University, and gain approval to dive from the DBSO. A letter of reciprocity from the collaborators Dive officer will greatly facilitate this process. All UWA procedures and forms must be completed in this situation and approval of such activities granted by the DBSO.

22. Recognition of Overseas Diving Qualifications

International qualifications - please submit queries directly the DBSO to enable comparison assessment. Those in other than English must be accompanied by a certified translation.

All visiting researchers shall submit a letter of reciprocity from their originating institution’s Dive Officer from which they are conducting research through or the organisation that will provide a letter of reciprocity. This is the simplest method an example or template of requirements is in appendix.

Where reciprocity has not been established it is the responsibility of the diver to provide the course curriculum, certified dive logs (signed by a responsible party), and any other relevant information to the level of certification the diver has attained and applying for with UWA. It is at the discretion of the DBSO to approve any divers with qualifications from an agency that has not established reciprocity with UWA.

In the event reciprocity cannot/has not been established, the diver may wish to have an independent The UWA DBSO or delegate shall complete a New Diver/Scientific Diver Assessment [Form 03 (REGISTRATION) NEW DIVER ASSESSMENT] before the start of any UWA dive field trip.

22.1 Visiting Restricted Scientific Diver

The Visiting Restricted Scientific Diver rating is for those divers who conform to Section 13 but cannot supply sufficient documentation to demonstrate their relevant scientific diving experience. Therefore, they must:

- Be at least 18 years of age;
- Shall hold minimum of Rescue Diver qualification is required. And should be – statement of attainment SISOSCB306A – Perform diver rescues
- Have at least 15 hours of underwater diving experience after certification (experience to be recorded as logged dives);
- Have a current dive medical as per AS/NZS 2299.1;
- Not dive deeper than 18 metres;
- Dive with a Scientific Diver;
- Not use powered tools or lift bags;
- Only dive when conditions are suitable.
22.2 Visiting Scientific Diver

Divers registered to dive at institutions within Australia and New Zealand that comply with the AS/NZS 2299.2 standard or a trained, certified visiting diver from another country who performs tasks relevant to scientific diving in his or her own country, will be permitted to dive under the auspices of UWA provided they:

- Dive in accordance with the UWA Scientific Diving Procedures Manual;
- Be approved by the DBSO;
- Be certified as medically fit to dive as per AS/NZS 2299.1 or equivalent;
- Supply documentation demonstrating their relevant scientific diving experience [Form 02 (REGISTRATION) AFFIDAVIT OF DIVE EXPERIENCE]; this
  - Successfully complete a dive to assess their competency [Form 03 (REGISTRATION) NEW DIVER ASSESSMENT].
  - A) Provide a letter of reciprocity from their organisations Dive Officer giving details as per appendix listing and stating currency of the divers Scientific Dive qualifications and competency of that staff member.
  - OR
  - B) Provide copies of their Qualifications

23. Volunteer Diver

The University permits the use of volunteer divers. It is highly recommended that if a person is interested in assisting as a volunteer then the diver should obtain the Restricted Scientific Diver rating. A volunteer diver is someone who assists on a research dive but is not directly associated with UWA. The volunteer diver may or may not hold a Scientific Diver or Restricted Scientific Diver qualification.

There are a number of conditions that must be observed when using volunteer divers:

- The use of volunteer divers is managed by risk. Therefore, a written risk assessment, solely related to the volunteer and the duties they are to perform, is required prior to any duties being undertaken by a volunteer;
- The competency of the volunteer to perform the task is determined by the level of training and experience of the volunteer;
- Shall hold minimum of Rescue Diver qualification is required. And should be – statement of attainment SISOSCB306A – Perform diver rescues
- The volunteer cannot perform a task that is beyond their level of competency;
- The volunteer diver must be ‘buddied’ with a Scientific Diver at all times; (unless suitably qualified i.e. scientific diver or equivalent)
- The competency of the volunteer to perform the nominated tasks must be documented.
- The legal duty of care owed to volunteers is similar to that owed to UWA employee.

24. Underwater Communications

When diving in circumstances in which there is no immediate surface support, such as shore diving, there shall be a means to recall the divers to the surface. This may be done by having an underwater recall siren or a tether line to the diver.

Note: The Dive Coordinator shall also ensure that at or close to every dive site there are adequate means of immediate surface communication with the appropriate land emergency services (e.g. rescue or medical) in the event of an emergency.

Hand signals to be used to communicate while diving
1. Step, hold it, stay there  
2. Something is wrong  
3. OK? OK  
4. OK? OK. (glove on)  
5. Distress, help  
6. OK? OK (on surface at distance)  
7. OK? OK. (one hand occupied)  
8. Danger  
9. Go up, going up  
10. Go down, going down  
11. Low on air  
12. Out of air  
13. Buddy breathe or share air
25. EQUIPMENT

Diving equipment shall comply with the relevant minimum requirements as detailed below. Prior to entering the water it is the responsibility of individual divers to check that the equipment they are using is in good working order. Never use faulty equipment or equipment not subject to regular maintenance.

25.1 Minimum Equipment Requirements

SCUBA divers

For SCUBA diving operations, the underwater dive equipment shall include:

- Open-circuit SCUBA with two demand regulators;
- Face mask;
- Swimming fins;
- Snorkel for surface swimming;
- Diver's knife or cutting tool;
- Weight belt with a quick-release closure;
- Submersible pressure gauge for measuring breathing gas pressure in cylinder;
- Wetsuit or protective clothing appropriate for the conditions of work and the temperature of the water;
- Buoyancy compensator of an approved design that is inflatable orally and from a compressed air cylinder;
- Diver's watch or elapsed-time indicator; **
- Diver's depth gauge which should incorporate a maximum depth indicator. **
- Backup timing device i.e. watch
- Visual and auditory signalling device (i.e. safety sausage, dive whistle).
** A dive computer may be used to fulfil the timing device and depth indicator requirements.

### 25.2 Use of Personally Owned Equipment

Personally owned cylinders, regulators and air gauges may only be used if they comply with all the requirements outlined in this document and regulatory requirements. Personally owned equipment must be included on the UWA dive register (see Divelog). Personally owned equipment must be maintained according to Section 25 and records of maintenance must be forwarded to the DBSO.

### 25.3 Maintenance of Equipment and Servicing Requirements

All equipment used for diving must be well maintained and in good working order serviced and inspected at interval of no more than 12 months. Records of maintenance shall be retained. Additional specific requirements are as follows:

**Air cylinders**

Air cylinders shall be designed, constructed, and maintained in accordance with the applicable provisions of Australian Standards 2030. They shall be hydrostatically tested and serviced at intervals not to exceed 12 months.

All servicing must be carried out by an approved service. The UWA tanks are only for use by people who qualify as divers according to the UWA Scientific Diving Procedures. SCUBA tanks that do not belong to the University may be filled with the University’s compressors provided the tank has passed hydrostatic inspection during the past 12 months and the diver using it has a current certification card.

Checking that tanks are full is the responsibility of the user and should be conducted prior to their trip departure. Tanks should be filled prior to returning them. Tanks with any defects shall be put aside and tagged with the details of the problem and the owners of the equipment shall be notified.

**Regulators**

Diving regulators must be serviced every 12 months or more frequently if required. All servicing must be carried out by an approved service facility records are to be kept by the owner of the equipment.

**Pressure/depth gauges**

The accuracy of depth gauges shall be tested by comparison against a tested gauge or accurately measured depth of water at intervals NOT EXCEEDING 6 MONTHS as per AS/NZS 2299.2 section 4.3.1(e). Faulty gauges shall be removed from service and clearly marked as having a malfunction. This should be recorded in a logged dive as an activity and uploaded to dive log.

**Contents gauges for SCUBA cylinders**

Contents gauges shall be tested at regular intervals to ensure that accurate reporting of cylinder pressure is maintained as the contents drop from working pressure to near empty.

**NOTE:** Comparison with other contents gauges may be used to check a gauge’s operation.
25.4 Breathing gas supplies

Every SCUBA diver shall carry a sufficient quantity of breathing gas to complete the planned dive plus a reserve supply providing a minimum safety margin of 25% for dives to depths of up to 21m and 30% for dives to depths greater than 21m as per AS/NZS 2299.2 section 5.1.3. Individual surface air consumption (SAC) rates of divers should be used if on SCUBA to determine air requirements (else revert to biggest air consumer). Minimum 50 bar gauge reading return for all scuba dives.

25.5 Marine Wildlife Aversion equipment

Sharkshields shall be used for UWA diving operations unless adequate case in a risk assessed manner for not using them is presented and approved by the DBSO. Most sharks are not aggressive and they rarely attack divers. If the diving operation is to be undertaken in an area where aggressive sharks are known to occur, or if tasks undertaken on the dive could attract sharks (e.g. adding burley to water to catch fish or spearfishing) then extra precautions shall be taken.

25.6 Pneumatic tools

Scientific Divers or Visiting Scientific Divers may use hand-held pneumatic tools if they are competent to do so and the process is approved by DBSO. The air supply for the pneumatic tool should be carried by the diver and shall be taken from a source entirely separate from the diver’s breathing gas supply. The use of surface supplied air for pneumatic tools is to occur under special consideration.

Unqualified divers such as Restricted Scientific Divers and Volunteer Divers are not permitted to use pneumatic tools of any form.

25.7 Safety Equipment

First Aid Supplies

For every dive operation there shall be a first aid kit available (Appendix DV3: First Aid Equipment for Diving Operations). There should be at least 2 litres of vinegar and some cold packs for the treatment of jellyfish stings (where appropriate). Supplies for treatment of bites and stings from other marine wildlife should be available.

Oxygen Administration Equipment

Provision of as close as practicable to 100% oxygen via a facemask is recognised as the main first aid procedure for treating diving injuries such as decompression illness, embolisms and shock. In service Oxygen provision kits and cylinders (of adequate volume calculated via time to available assistance number of persons [generally two]) shall be present at all diving operations and are to be used by trained operators or under the guidance of diving medical personnel i.e. ensure current trained administrator other than in water diver team is available. Breathing oxygen should not be seen as a final step in first aid treatment. Improvement in the patient’s condition while being treated on oxygen does not negate the need for proper medical assessment by a doctor trained in diving medicine.

It is the responsibility of the Dive Coordinator to ensure that the dive operation has sufficient oxygen for treatment of a patient until professional medical treatment can be administered. The Australian Resuscitation Council recommends a minimum oxygen supply of 1500 litres.

Other Safety Equipment

Other equipment which may be deemed necessary for safe conduct of a dive, includes:

- Emergency air supplies
- Further exposure protection, such as gloves
- High visibility inflatable position signalling device (e.g., ‘safety sausage™’)
- Compressed air powered signalling device
- Submersible dive tables
25.8 Diver Flag

An ‘Alpha’ diver flag shall be displayed prominently whenever diving or snorkelling is conducted either from shore or a vessel. They must also be positioned immediately adjacent to the dive site when diving in very shallow water (< 3m) where there is danger from boat traffic. When diving from the shore a dive flag shall also be used to mark the position of the dive site and dive buddy pairs.

25.9 Additional Equipment

The following equipment may be used provided diver safety is not compromised:

- underwater slates, measuring tapes, lightweight grids, frames and traps
- sledge hammer or hammer to pound in stakes and pickets
- small hand tools such as screw drivers, pliers, wrenches, etc
- hand held pneumatic tools (see Note A below)
- a small lift bag (see Note B below)
- spear guns used under a permit approved by DBSO or delegate
- personal dive gear and tanks (see Note C below)

Note A - The use of hand held pneumatic tools must be approved by the DBSO. All divers must have sufficient training with pneumatic tools. Air for these tools must be taken from a source entirely separate from the diver's air supply. Pneumatic equipment used underwater shall be specifically approved for this purpose. Pneumatic tools and equipment shall be de-energised before being placed into or retrieved from the water.

Note B - The use of lift bags must be approved by the DBSO. All divers must have sufficient training with lift bags. Air for filling the bag must be delivered from a source that is not the diver's primary regulator, such as an octopus regulator.

Note C - All diving equipment used on University /collaborative dive operations shall be used, maintained and serviced at least to the manufacturer's specifications, regulators, gauges, BCDs, etc, which are in regular use, may require servicing more often e.g., every 6 months. Receipts/proof of servicing must be maintained and presented to the DBSO upon request before commencement/approval of diving operations.

25.10 University Controlled Compressor Systems

Users who have not previously used the University’s compressors must be given detailed operational and safety inductions, by the staff member responsible for that compressor, before being allowed to fill tanks. Procedures for filling SCUBA tanks are to be posted/made available for compressor areas for review purposes only by operators who have already had a detailed induction to the system.

26. Diving at Altitude

When diving is to be conducted at altitude then the decompression tables used shall be modified accordingly. Due to the lower atmospheric pressure a diver planning repetitive dives at altitude must wait more than six hours after arriving before descending to depth. A diver planning a single dive less than six hours after arrival must calculate their pressure group for the ascent to altitude before commencing the dive. In addition, most gauges are set up primarily for use at sea level and therefore will need to be calibrated.

27. Incidents, Injuries and Emergencies

27.1 Reporting

All incident injuries and near misses must be reported Complete and submit a Confidential Injury/Incident Near Miss Report Form:

http://www.safety.uwa.edu.au/__data/assets/word_doc/0004/2710957/INCIDENT-REPORT-FORM-v2-0.doc

How to fill out form:

27.2 Emergency Communications

Volunteer Marine Rescue Groups
Contact details
Western Australia: http://www.vmrwa.org.au/Groups.html

28. Emergency Response Example Plans

28.1 Missing Diver

In the event of a missing diver use the flowchart below and carry out the following:

- If buddy contact is lost under the surface, each diver should circle 360° looking for the buddy or their exhaust bubble trail (often easier to see if looking up slightly);
- If no visual contact is made following the above procedure, each diver should ascend 3-5m and repeat the process;
- If no contact is made following the above procedure, dive buddy or team shall surface and notify the Diver's Attendant of a missing diver (i.e. 5 or more short blasts on a whistle is the International assistance signal);
- Diver's Attendant immediately activates their Emergency Response Plan (ERP) Mark last known position of lost diver on GPS and with an emergency marker buoy (NOTE: if any person sights the missing diver, they should maintain visual focus on that position);
- Continue with ERP detailing situation and requests assistance; (this may include notifying the Volunteer Sea Rescue group, police and DBSO, HoS).
- Divers involved in search must not subject themselves to risks such as decompression illness;
- If divers are still in the water, recall using the agreed recall signal (such as starting the motor and revving 3 times);
- Search should begin where diver was last seen using the emergency marker buoy as reference;
- Search should be conducted in pairs;
- Sink (do not swim) to the bottom to determine effect of current;
- If the diver is located, proceed with appropriate actions and notify appropriate persons;
- Complete and submit a Confidential Injury/Incident Near Miss Report Form

(as per incident, injury and emergency-reporting of this manual)
28.2 Injured Diver

Injuries which divers may be suffering from include decompression sickness, pressure injuries (barotrauma), shock, oxygen deficiency (hypoxia), carbon dioxide (CO₂) or carbon monoxide (CO) poisoning, saltwater aspiration syndrome, injuries from boating traffic and also from encounters with marine life.

During a diving emergency use the flowchart below and carry out the following:

- assist casualties immediately (refer to the next section, “Boating and Diving Emergencies Protocol”)
  - Recall all divers or swimmers to the boat or shore;
  - Ensure that other members of the diving team are not at risk and that all divers are present;
  - Recover the injured diver’s equipment after the emergency (the Dive Coordinator may decide not to recover items if to do so would be unsafe or cause undue delay);
  - Keep injured diver’s equipment separate to other equipment prior to expert examination;
  - Ensure that no equipment has been left in a dangerous condition;
  - Ensure that the diver’s field dive log(s) [Form 16 (FIELDWORK) FIELD DIVE LOG] and log book are available for the doctor, particularly if recompression is required.

In the case of a fatality or serious accident requiring recompression and/or hospitalisation, the Head of School, the DBSO, and Safety and Health Manager must be notified within 2 hours. The Vice Chancellor or delegate should be notified as soon as practicable.
28.3 Boating and Diving Emergencies Protocol

Don’t panic, stay calm and think clearly.

Ensure status of all crew / divers is known.

Treat casualties by following the DRABCD action plan:

**Danger**
Ensure there is no further danger to you, others and the casualty

**Response**
Is the person responding? If not, call for help. See sections headed Emergency Services and Emergency Communications

**Airway**
Is the airway clear and open? If not clear mouth and tilt head back.

**Breathing**
Can you hear or feel the casualty breathing? If not, give 2 initial breaths. If breathing returns, place in recovery position.

**CPR**
If breathing has not returned, commence CPR alternating 30 compressions with 2 rescue breaths. Perform approximately 2 compressions per seconds pressing down 1/3 of the chest depth. 30:2 try to change rescuer every 2 minutes. Only stop CPR if signs of life return, if instructed by an AED, medical help arrives and takes over or you become physically exhausted and unable to continue. If breathing resumes, place casualty in recovery position.
Defibrillation  Attach an Automated External Defibrillator (AED) as soon as possible following the voice prompts.

Provide other First Aid to patient

Provide Oxygen to the patient if it is a diver related incident or they are suffering from shock (using DAN O2 kit which should provide close to 100% oxygen for about 40min with a 'D' size cylinder)

Immediately notify the emergency services Dial 000 (or 112 from mobile) (Ambulance, Police and Sea Rescue)

For advice : Diver Emergency Services 1800 088 200
Fiona Stanley Hospital Hyperbaric Unit (08) 6152 2222

If at sea, return casualties to shore as soon as possible

See next section, “Emergency Services”.

Essential details required are:

- Number of casualties
- Are they conscious and do/did they require resuscitation?
- Is their an obvious major injury or problem?
- What is the progressive state of casualties (e.g. stable, good colour, getting worse)?
- What medical equipment do you have available?
- Where are you exactly

Other relevant information:

- Full diving history for the preceding 48hours
- Previous medical history (e.g. previous injury, head cold, diabetic)
- Medical training of people on board or at the scene

Keep records of details of the incident and advise the DBSO. If the DBSO is unavailable, contact UWA safety and Health office 08 6488 3938.

28.4 Emergency Services

1. Call 000 – (you will be asked if you require Police, Fire or Ambulance) state “Ambulance”, when connected to St John’s Ambulance Communications Centre, state “Diving Emergency”. Mobile phones can also be used to dial 112 for an ambulance. Alternatively, by radio, use VHF (Ch. 16) or 27 MHz radios (Ch. 88).

2. St John’s takes details of location, your telephone number, clinical details and they offer First Aid advice.

3. If casualties are to be returned to shore for overland transfer;

   - arrange to meet the ambulance at a specified location, estimate your time of arrival (ETA) and give the name and description of your vessel
   - The ambulance will transport the patient to the nearest hospital for assessment. NOTE: Direct transfer to Fiona Stanley Hospital Hyperbaric Unit only if authorised!

4. If injuries are severe, St. Johns may make the decision to request helicopter evacuation (see section headed Helicopter Evacuation).

Decompression/Hyperbaric Chamber – Contacts and Advice

Perth metropolitan

St John’s will not contact the Fiona Stanley Hospital Hyperbaric Unit for advice in the event of a diving emergency – this is the responsibility of the receiving hospital. However, it is advised to contact the diving medical specialist at Fiona Stanley Hospital Hyperbaric Unit for advice (08) 6152 2222 on patient care while waiting for an ambulance to arrive.
Alternatively, the Divers Emergency Service at the Hyperbaric Medicine Unit, Royal Adelaide Hospital provides a 24 hour medical specialist cover of the Divers Emergency Service DES telephone. This can be accessed by calling (within Australia) or +61 8 8212 9242 (outside Australia). The service primarily acts as a consultation service for diving-related emergencies.

Evacuation from Rural and Remote Areas

Contact DAN Asia Pacific (DES) on +61-3-98869166 1800 088 200 also known as Diver Emergency Services, immediately for any evacuation services required if a doctor recommends an evacuation procedure or decompression chamber/hyperbaric chamber located in the Fiona Stanley Hospital.

Helicopter Evacuation

The Fire and Emergency Services Association of Australia (FESA) Helicopter Evacuation Services:

- Flies critical care specialists direct to an incident and then transports the injured directly to the hospital that will provide them with the very best of medical care;
- Emergency rescue is available around the clock every day of the year (while the focus of the service is emergency rescue, it also has a secondary role to provide essential hospital transfers);
- The helicopter has an operating range of 200 kilometres from Perth, covering 90 per cent of Western Australia's population
- With a refuelling stop the service can be extended to cover regional areas such as Geraldton, Kalgoorlie and Albany as required

29. REFERENCES

Acts and Regulations

Occupational Safety & Health Act 1984

Occupational Safety and Health Regulations 1996

Western Australian Marine Act 1982

Australian Standards and Codes of Practice

AS 2030 - The verification, filling, inspection, testing and maintenance of cylinders for storage and transport of compressed gases
  Part 1: Gas cylinders - General requirements

AS 2815 - Training and certification of occupational divers
  Part 1: Occupational SCUBA diver—Standard
  Part 2: Training and certification of occupational divers - Air diving to 30 m
  Part 5: Training and certification of occupational divers - Dive supervisor

AS 3848 - Filling of portable gas cylinders
  Part 2: Filling of portable gas cylinders for self-contained underwater breathing apparatus (SCUBA) and non-underwater self-contained breathing apparatus (SCBA)—Safe procedures

AS 4005 - Training and certification of recreational divers
  Part 1: Minimum entry-level SCUBA diving

AS/NZS 2299 - Occupational Diving Operations
  Part 1: Standard operational practice
  Part 2: Scientific diving

Australian Diver Accreditation Scheme (ADAS)
  ADAS Operations Manual

Defence Research and Development Canada
30. APPENDICES

Appendix DV1: Dive briefing and debriefing guidelines

The Dive Coordinator must ensure that all persons associated with the dive operation are thoroughly briefed prior to every dive. All persons involved at the dive site (for example Master of the dive vessel, the divers attendant, site supervisors, relevant Safety and Health Representatives for commercial sites) must be briefed about intended dive operations prior to each dive. The Dive Coordinator must also advise these personnel when the dive has finished.

Topics that must be covered in every briefing include:

- Objectives of the operation;
- Responsibilities of dive team members;
- Review of specific underwater tasks;
- Maximum depths and bottom times for the dive;
- Boundaries and features of the dive site;
- Review of communications (hand / line signals);
- The presence and location of emergency equipment;
- Diver recall procedures;
- Lost buddy contact procedures;
- Procedures to be followed if conditions become unfavourable;
- Any hazards at the dive site;
- Any other safety issues identified in the risk assessment.

Other topics that may need to be covered in the briefing are:

1. Safe methods of entry and exit into the water;
2. Use of emergency signalling equipment;
3. Use of special tools or equipment;
4. Diver rescue procedures;
5. Procedures for reducing the risk of developing decompression illness;
Appendix DV2: Diving medical and medical practitioners

DIVING MEDICAL AS PER AS/NZS 2299.2

INTRODUCTION

These medical standards are directed to the examination of occupational divers and those intending to undertake training for occupational diving. The medical examination shall be conducted by a medical practitioner with appropriate training and experience in underwater medicine.

Diving is a physically taxing activity often conducted at remote locations. Candidates must therefore be physically and mentally robust. Since diving involves work under increased pressure and in a non-respirable environment specific medical standards are required.

The medical examination shall be carried out before a diver first uses compressed gas under water and subsequently at intervals not exceeding 12 months.

The record of examination shall be retained by the medical practitioner. A certificate of fitness, unfitness or temporary unfitness pending further examination shall be entered in the diver’s logbook.

The diver’s logbook and the diver’s employer should hold a record of date, certification of fitness to dive, and the name and address of the doctor who performed that examination.

The examining medical practitioner is to be satisfied as to the identity of the diver presenting for examination.

DIVING RESTRICTIONS

Although medical examination will usually result in a finding of fitness or unfitness for all diving activities:

The examining medical practitioner may, for reasons of age or other factors revealed by the medical examination, elect to impose limitations as to the duration and depth to which a diver may dive or the length of validity of the certificate of fitness to dive

Any such limitation must be clearly identified on the certificate of fitness to dive in the diver’s logbook.

FITNESS CRITERIA

The following bodily systems shall be evaluated from the diver's history and the medical examination:

- **Age:** The minimum age for a diver is 18 years (except under special circumstances as approved by the DBSO)

- **Ear, nose and throat:** Both tympanic membranes must be intact and mobile. The Eustachian tubes must be patent.

- **Dental:** Candidates should have a high degree of dental fitness

- **Central nervous system:** Any history of fits (apart from uncomplicated childhood febrile convulsions), intracranial surgery, unexplained blackouts, depressed skull fracture, or severe head injury shall be cause for rejection.

- **Cardiovascular system:** There must be no evidence of heart disease and all candidates must be assessed for freedom from ischemic heart disease and for adequate exercise capacity to cope with the occasional high demands of underwater work.
  
  This assessment should include:

  - Evaluation of risk factors such as obesity, smoking history, family history, blood pressure and serum lipids;
  - An exercise test to assess exercise capacity;
  - An exercise ECG for candidates over 35 years.
Respiratory system: The respiratory system shall be examined as follows:

- Any condition that might cause retention and trapping of expanding gas in any part of the lungs during decompression;
- Any chronic lung disease;
- Any history of spontaneous pneumothorax, perforating chest injuries or open chest surgery;
- Any past or present evident of obstructive airways disease (e.g. asthma);
- Any fibrotic lesion of the lung;
- A large plate posterior-anterior chest x-ray shall be performed at the initial examination (should be repeated at intervals not exceeding 5 years);
- An annual pulmonary function tests to establish forced expiratory volume;
- Screening for dysbaric osteonecrosis: These investigations are no longer recommended as a routine procedure for all divers.

Other criteria:

- A dipstick test of urine shall be performed;
- Diabetes requiring medication is a contraindication to diving;
- Sickle cell disease is a contraindication to diving;
- Divers taking medication of any type, including non-prescription drugs;
- Cigarette smoking should be discouraged;
- Effects of alcohol are highly dangerous under water and dehydration following alcohol intake is a risk factor for decompression sickness;
- Psychological stability is important in avoiding accidents and coping with emergencies;
- Candidates should be free of contagious diseases;
- Pregnancy is a contraindication for diving;
- Fitness for diving following decompression illness or other diving injuries requires special consideration that will usually include specialist consultation.

### ABSOLUTE CONTRAINDICATIONS:

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<thead>
<tr>
<th>Condition</th>
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<tbody>
<tr>
<td>Conditions causing unconsciousness</td>
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<td>Diabetes where the patient requires insulin</td>
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<td>Inability to auto-inflate the middle ears</td>
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<td>Asthma</td>
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<td>Previous spontaneous pneumothorax</td>
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<td>Lungs which empty unevenly (x-ray appearance)</td>
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<td>Inability to auto-inflate the middle ears</td>
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<td>Previous middle ear surgery with insertion of prosthesis to replace any of the ossicles</td>
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<td>Epilepsy</td>
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<td>Lung conditions</td>
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<td>Obstructive lung disease</td>
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<td>Previous thoracotomy</td>
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### RELATIVE CONTRAINDICATIONS:

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<td>FEV1/FVC ration less than 75%</td>
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<td>Poor physical condition</td>
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<td>Previous myocardial infarction</td>
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<td>Pregnancy</td>
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### MEDICAL PRACTITIONERS WITH TRAINING IN DIVING MEDICINE

Dive medicals must be performed to meet AS 2299.1 for the specific diving activity of “Scientific Diver”. Not acceptable to have recreational diving medical. This can only be performed by a Doctor specifically training in diving medicine many of these are South Pacific Underwater Medical Society (SPUMS) members however this is not mandatory.

For a more comprehensive list of doctors, visit the SPUMS web site: https://www.spums.org.au/diving-doctors-near-you

### Appendix DV3: First Aid Equipment for Diving Operations

First aid provisions for diving operations shall allow for the treatment of specific conditions or injuries that can result from diving or exposure to the marine environment.

**General Equipment**

- A method of providing protection or shelter for the environment (e.g. blankets, towels, dry cloths)
- Drinking water available for the prevention dehydration and the management of decompression illness
Vinegar for the treatment of jellyfish stings
Phone, phone card or coins if required
Note pad and pencil

Oxygen Equipment

At all dive locations there shall be access to adequate supplies of oxygen and suitable equipment for its administration to a conscious and unconscious victim until medical assistance can be rendered.

First Aid Kit - Suggested Contents

As the distance from medical assistance increases so may the contents of the kit need to increase:

- adhesive strips (assorted sizes)
- non-allergenic adhesive tape (e.g. 5m x 2.5cm)
- eye pads (eg 5 single packs)
- triangular bandage (e.g. 2)
- hospital crepe or conforming bandages (various sizes)
- heavy smooth crepe roller bandages (e.g. 6 x 7.5cm)
- wound/combine dressings (assorted sizes)
- non-adhesive dressings (assorted sizes)
- safety pins
- scissors
- kidney dish
- gauze squares (e.g. 2 packets)
- forceps
- disposable latex or vinyl gloves (e.g. 10)
- sharps disposal container
- sterile saline/water (e.g. 250ml bottle or 30 ml single use ampoules)
- resuscitation mask
- antiseptic solution (e.g. Savlon solution)
- antibiotic ointment (e.g. Betadine swabs)
- soft brush for cleaning wounds
- first aid manual
- diving first aid manual
- sunscreen
- ear drops

Items which may be useful but not to be administered by the first aider: analgesics (paracetamol, aspirin, or similar)

Appendix DV4: Field Neurological Assessment Test

FIVE MINUTE NEUROLOGICAL EXAM

Examination of an injured diver's central nervous system soon after an accident may provide valuable information to the physician responsible for treatment. The Five-Minute Neurological Exam is easy to learn and can be performed by individuals with no medical experience. The examination can be done whilst reading from this manual. Perform the following tests in sequence, record the time and the results for each.

1. Orientation
Does the diver know (a) His/her name and age? (b) The present location? (c) What time, day and year it is? Even though an individual may appear alert, answers to these questions can reveal confusion. Include all.

2. Eyes: Have the diver count the number of fingers you display, using 2 or 3 different numbers of fingers. Check each eye separately and then together. Have the diver identify a distant object. Tell the diver to hold head still - or you gently hold it still - while placing your other hand approximately half meter in front of the face. Ask the diver to follow your hand. Now move your hand up and down, then side to side. Diver’s eyes should follow your hand and should not jerk to one side and return (called nystagmus). Check that the pupils are equal in size.

3. Face: Ask the diver to whistle or purse their lips. Look carefully to ensure both sides of the face have the same expression whilst whistling. Ask them to grit their teeth & feel their jaw muscles to confirm they are contracted equally. Instruct the diver to close his/her eyes while you lightly touch your fingertips across their forehead and face. Confirm that sensation is present, and feels the same everywhere.
4. Hearing: Evaluate the diver’s hearing by holding your hand about 60cm from the individual’s ear and rubbing your thumb and finger together. Check both ears by moving your hand closer until the diver hears it. Check several times and compare with your own hearing. NB. If the surroundings are noisy, this test is difficult to evaluate. If necessary, ask any bystanders to be quiet and turn off unneeded machinery.

5. Swallowing Reflex: Instruct a male diver to swallow while you watch their ‘Adam’s apple’ to ensure it moves up and down.

6. Tongue: Instruct diver to stick out their tongue. It should come out straight in the middle of the mouth without deviating to either side.

7. Muscle Strength: Instruct the diver to shrug their shoulders while you bear down on them, to observe for equal muscle strength. Check diver’s arms by bringing their elbows up level with their shoulders, hands level with the arms, and touching their chest. Instruct the diver to resist while you pull their arms away, push them back, and move them up and down. The strength should be approximately equal in both arms in each any direction. Check leg strength by having the diver lie flat and raise and lower their legs while you resist the movement.

8. Sensory Perception: Check on both sides by touching lightly as was done on the face. Start at the top of the body and compare sides while moving downwards to cover the entire body. The diver’s eyes should be closed during this procedure. The diver should confirm the sensation in each area before you move to another area.

9. Balance and Co-ordination: Be prepared to protect the diver from injury when performing this test. Have diver stand up with feet together, close their eyes and stretch out their arms. The individual should be able to maintain balance if the platform is stable. Your arms should be around, but not touching the individual, in case they fall. Be prepared to catch the diver who starts to fall.

   Check coordination by having the diver move an index finger back and forth rapidly between their nose and your finger - held approximately half meter from their face. In another test of coordination, instruct the diver to slide the heel of one foot down the shin of the other leg while lying down.

   Conduct these tests on both right and left sides, and observe carefully for differences between the two sides.

Tests 1, 7 and 9 are the most important. They should be given priority if not all tests can be performed. The diver’s condition may prevent the performance of one or more of these tests. Record any omitted test, and the reason. If any of the tests appear abnormal, injury to the central nervous system should be suspected. The tests should be repeated at frequent intervals while awaiting assistance, to determine if any change occurs. Report the results to the emergency medical personnel responding to the call. Good diving safety habits would include practicing this examination on normal uninjured divers to gain proficiency in use.

Appendix DV5: DCIEM Sport Diving Tables
### Appendix DV6: DSAT Oxygen Partial Pressure and EAD Tables

#### A: AIR DECOMPRESSION TABLES

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<thead>
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<th>Depth</th>
<th>No-Decompression Bottom Times (minutes)</th>
<th>Decompression Required Bottom Times</th>
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<td>180 K 180 M 200 215</td>
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<td>90 D 150 I 240 M 480 Q</td>
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#### B: SURFACE INTERVALS

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#### C: REPEETITIVE DIVING

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Add Depth Correction to Actual Depth of Altitude Dive.
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**Note:** Depths/EADs with O₂ p.p. greater than 1.4 ata for contingency planning only.