

Diving or snorkelling provide those working in or visiting MPAs with the means to see underwater and, in the case of SCUBA diving, to breathe underwater, thereby providing a significant opportunity to experience the marine environment first hand. Snorkelling and SCUBA equipment needs careful maintenance and there are a number of safety issues to be aware of in their use. This sheet provides a brief overview of the key points.

MPA staff, visitors and researchers may need to snorkel or dive for monitoring, research, recreation, underwater guiding and for a range of management activities such as installation and maintenance of mooring and boundary buoys, or even finding items that have been lost overboard.

Snorkelling, sometimes called skin diving, requires minimal skills and training, and just three main pieces of equipment: mask, fins and snorkel.

SCUBA diving requires specialised training so that the diver is fully aware of the dangers associated with this activity. Standard training courses include PADI (most common in the region), BSAC, and NAUI. The equipment includes mask, fins and snorkel, as well as all the additional components to allow the diver to spend time underwater at depth. Most MPA activities will only require shallow-water diving, that is dives of around forty minutes to depths of up to about 20m using compressed air. Decompression dives, and even dives approaching this limit, should always be avoided in accordance with PADI certification guidelines especially in MPAs far from any re-compression chamber, as is the case in most WIO MPAs. More advanced forms of diving, as practised by commercial or salvage divers, involve different mixtures of gas, and depths and duration of dives are much longer. Re-compression chambers in such diving may be essential.

EQUIPMENT

The main items required for diving are mask, fins and snorkel; wetsuit and booties; cylinder, regulator, pressure gauge and octopus rig; weight belt and weights, buoyancy jacket; watch and depth gauge; dive computer, knife, decompression tables, compass; surface marker buoy (SMB) and safety sausage; torch, glow sticks and a goody bag.

A slate (plastic sheet), and pencil (attached) are useful for both snorkelling and diving, and are essential if data are being collected.

Prices of individual items vary throughout the region. The only country in the WIO that manufactures diving equipment is South Africa; other sources are Australia, USA, Italy, France and other European countries. The following are details of the more expensive and technical equipment.

Cylinders or bottles - There are two sorts: steel and aluminium, and they often come in sizes of 10 or 12 litres. Both have a steel or bronze pillar valve screwed into the top of the bottle, for attachment of the first stage of the

regulator. The Test Date (TD) should be stamped into the metal around the upper curved sides, as should the Working Pressure (WP), which is usually 200 bar, although in some countries 300 bar is common. Steel bottles are heavier, may rust internally as well as on the outer surface, but last for a long time if well cared for. Aluminium bottles are lighter and (become positively buoyant underwater when almost empty) do not rust, but the surface may corrode and become pitted.

Cylinders, valves and valve O-rings must be checked and serviced regularly, preferably every year, and tested under Test Pressure (TP). The maximum period between tests varies from country to country, but is usually 3-5 years. The minimum period is one year as it is important to avoid over-stressing the cylinder.



M. Richmond

Underwater cameras are increasingly becoming an important tool for coral reef research.

Regulators - There is now a vast range of regulator models, from at least five international companies. Most regulators are fitted with a console, which contains the depth gauge, pressure gauge, and compass. Two main systems of first stage valve/fitting are common (K-valve and DIN), and the appropriate model of first stage should be bought for the tanks in use. Regulators often have a spare second stage, called an octopus, and this is

mandatory for divers using the PADI certification system. Regulators must be serviced every year by the manufacturer or a certified specialist. The first stage, in particular, is a delicate piece of equipment and dangerous malfunctions can arise from inappropriate handling. Furthermore, both the warranty and insurance may be void if uncertified people have opened or serviced regulators.

Compressor - The MPA may have its own compressor for filling bottles, or may have to use the services of a local dive operator. Compressors range in size, weight and capacity, from those that are portable and fill a bottle in 20 minutes, to those that are fixed to the ground and fill five bottles in ten minutes. Power can be supplied by a petrol, diesel or electric engine. Proper installation and maintenance of the compressor is vital for safe SCUBA diving, particularly installation of an up-wind air intake to avoid contamination of the air by the exhaust fumes of the engine, and changing the carbon filters as per users' manual.

Underwater camera and video - Digital cameras and underwater housings are rapidly becoming cheaper, and with a computer, images can be produced within minutes of leaving the water. These are not essential diving items, but are very useful for obtaining images that can be used for promoting the MPA (e.g. for fund raising); use in education materials; and monitoring and research.

MAINTENANCE

SCUBA and snorkelling equipment requires good maintenance, for the following reasons:

- The lives of those using it may depend on it working effectively;
- The equipment is often expensive; and,
- Repairs may require specialists and replacement of spare parts may be difficult.

Maintenance begins with the treatment of the equipment as soon as it leaves the water before being stored for future use. The first step for all equipment is a freshwater wash with a good soaking to remove salt, sand and oils. This must be followed by dry storage, preferably in an air-conditioned storeroom, which can be used to store boat equipment as well e.g. outboard engines. However, most MPAs do not have this luxury so the storeroom should be kept clean and well-aerated. Following washing, O-rings may need careful greasing with silicone, or filters may need replacement. It is advisable to disinfect equipment regularly to prevent growth of mildew and bacteria, particularly regulator and snorkel mouthpieces, and booties. The special products for this purpose are not widely available in the region, but a mild chlorine solution can be used. However, check with an expert on appropriate dilutions as solutions that are too concentrated will damage the equipment severely.

In addition to regular maintenance by the users and MPA personnel, SCUBA diving gear, especially regulators, diving cylinders, and compressors, requires periodic maintenance

by a specialised facility. When purchasing SCUBA equipment, it is therefore important to consider the maintenance/repair facilities that are available to the MPA. Although using official dealers for maintenance and repairs may appear expensive in the short term, it is more cost-effective in the long run, and it will help to ensure that lives are not put at risk through faulty equipment.

DIVING ACCIDENTS AND INSURANCE

All diving operations should have a procedure to treat diving accidents. Normally this would include evacuation to a qualified medical centre or re-compression facility. In many diving accidents, the victim should be given oxygen as soon as possible after the accident, ideally on site. Small oxygen bottles can be purchased from commercial diving centres and should be a standard part of emergency kit in MPAs where diving is carried out. Many insurance policies consider SCUBA diving as a 'dangerous' sport that is excluded from standard cover, so that special arrangements may need to be made. Alternatively, organisations such as Diver Alert Network (DAN) have specialist insurance for divers.

KEY POINTS FOR THE MPA

- ❑ Develop close co-operation with local dive operators who can provide technical support, maintenance facilities as well as help with training.
- ❑ Do not buy equipment without checking with experts for appropriate models and suppliers; local dive operators may be able to assist with this or even help to provide the equipment.
- ❑ Ensure proper maintenance of diving equipment, good basic training, additional training and regular refreshers for diving staff.
- ❑ Make sure the MPA has a strict policy on diving practices, particularly safety aspects.
- ❑ Ensure that any necessary insurance has been taken out.
- ❑ Make sure that all MPA personnel are aware of first aid and emergency procedures that would be needed in case of a diving accident.

Sources of further information

The NOAA diving manual is available in hard copy and CD-ROM from: www.ndc.noaa.gov/rp_manual.html or www.ntis.gov/products/bestsellers/noaadive.asp

CMAS, BSAC, SSI and PADI other manuals are available from dive shops and SCUBA training facilities, or online: www.padi.com; www.cmas2000.org; www.bsac.com or www.bsac.org; www.divessi.com or www.ssiusa.com

Information on digital underwater camera equipment available at www.digideep.com/ and www.wetpixel.com/

Manufacturers of SCUBA equipment include: www.poseidon.se/; www.aqualung.com/; www.technisub.com/; www.diverite.com/; www.sherwoodscuba.com/; www.suunto.com/

Diving insurance details can be found on: www.daneurope.org/