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Safety in the Dive Tourism Industry of Australia

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International Dive Tourism

Scuba diving is one of the dominant activity-based tourism options found in tropical and temperate waters worldwide. The major recreational diver training agencies recorded 1,73,476 new diver certifications in 2003. Each certification supports dive travel, accommodation, equipment sales and a range of marine facilities. Despite this role the global industry is in something of a crisis where, after many years of sustained growth, certification rates for new divers show signs of decline (Dive Equipment Manufacturer's Association, 2004).

Since mistakes made in the marine environment can have very serious consequences, safety has always been of particular concern to dive tourism operators and government agencies charged with protecting visitors. The recent release of the movie 'Open Water' describing two American tourist scuba divers left at sea by a charter operator has increased public interest and attention to safety in dive tourism. This chapter details the challenges and responses for dive tourism drawing on Australian experiences.

Water Safety in Australia

The Australian National Water Safety Plan confirms that over 300 Australians drown annually, making it the nation's third highest cause of accidental death (Australian Water Safety Council, 1998). This has been despite the considerable efforts of water safety organisations, governments, statutory authorities, facility operators and individuals. To address this alarming figure, the Plan identifies four key result areas for future action. These are:

- Water safety research,
- Management of aquatic locations,

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¹ The opinions expressed in this paper are those of the author and do not necessarily represent the opinions or policies of the Department of Industrial Relations or the Government of Queensland.

- Water safety education, and
- Targeting of drowning demographics.

The safety of recreational scuba divers is identified as a focus for water safety education. Reference is made to Australian Standards **www.standards.org.au** and the provision of training by recreational diver training organisations. In-bound tourists, in general, are also identified as a key demographic accounting for 3.9% of the total number of drownings (5-year average). Between 1992 and 1998 there were 119 tourist deaths due to drowning in Australia. Of these, 50.4% occurred in Queensland with a further 25.2% in New South Wales (Australian Water Safety Council, 2000).

Tourists differ from the wider community in that their lack of awareness of the risks of Australian water conditions may be combined with a lower level of water skills. A number of studies have highlighted the implications of these two risk factors (Edmonds & Walker, 1999; Mackie, 1999; Walker, 1999). Walker (1999, pp. 584–585), for example, describes individual risk factors such as the inability to speak English and the unlikely prospect that "most tourists on a day trip to the reef will consider their pre-existing medical factors and physical fitness levels". She also illustrates environmental variables — "Australian ocean conditions are deceptively treacherous and may change from minute to minute".

This chapter seeks to explore these concerning trends with regard to the dive tourism industry. To do this, an outline of the structure of the tourist diving industry in Australia is provided, with a particular emphasis on the important position of Queensland both in terms of incidents and standards development. The relevant research is considered and certain inadequacies identified. The impact of the media is discussed and from there the development of self-regulatory and government regulation approaches to tourist diver safety are mapped out and reviewed.

The Structure of Dive Tourism in Australia

The current structure of the Australian recreational diving industry reflects its historic development and the regional growth of marine tourism across a number of geographically favoured sites. However it is not homogenous in structure or growth, making generalisations difficult.

In the various regions the importance of a wider and varied marine tourism industry is considerable. Nowhere is this more apparent than in Queensland with the marine attractions provided by the Great Barrier Reef. A detailed study of the structure and economics of the marine tourism industry in the Cairns region of the Great Barrier Reef (Coopers & Lybrand, 1996) made a number of findings, which illustrate this. Other marine tourism "hot spots" around the world may likewise have a similar role in regional economies. The key findings included:

- The marine tourism industry consists of operators of commercial passenger vessels and associated businesses that provide a nature-based experience to visitors.
- The marine tourism industry provides substantial economic benefits to the regional economy, which in turn supports corresponding infrastructure development, other tourism services and attractions.

- Tourism contributes a significant proportion (AUD\$0.8 billion or 25%) to the gross regional product of AUD\$3.2 billion (in 1992).
- Marine tourism activities on the Great Barrier Reef are a major drawcard to both the Cairns region and to Australia more generally.
- Approximately 75% of visitors to the Cairns region engaged in marine tourism. Visitor growth rates averaged approximately 9% in the 1990s.
- The industry is vulnerable to external influences due to its remote nature and highly sensitive ecosystem. It has a limited ability to influence the factors that may affect the industry.

More recent studies again indicate the considerable economic contribution both of the reef tourism industry and of the variety of contributions through taxes and other charges to government funds. Mules (2004) reports total expenditure by Great Barrier Reef tourism as AUD\$1.36 billion in 2004 prices. However, the growth trends are neither consistent nor necessarily positive. Returns for the environmental management charge collected from commercial reef visitors from 1994 to 2003 show declining visitation rates for the Cairns section of the Great Barrier Reef Marine Park, rising visitation in the Whitsundays region and static rates for Port Douglas (Hocking Research and Consulting, 2004).

According to Cater (2004) key threats and opportunities for the sustained growth of the marine recreation industry are identified as:

- Economic:
 - global economic outlook;
 - changes in key source markets;
 - aviation changes.
- Social:
 - global political uncertainty;
 - severe acute respiratory syndrome (SARS);
 - media coverage.
- Environmental:
 - o crown of thorns;
 - coral bleaching.

The negative impact of tourist diver incidents is discussed in a later section with a view to the media coverage generated and as such is a key factor able to impact on the industry's viability. Diver safety is an issue the industry cannot neglect.

The diving industry is a major sector of the broader recreational marine industry, which also includes non water-based activities such as fishing, cruising, whale watching and resort destinations.

Within the diving industry, there is no standard operator profile. Instead, it is varied according to the services that are offered. Across Australia there are distinct differences between the diving industry sectors, which service tourist divers as opposed to those servicing domestic markets. Table 14.1 illustrates typical contrasting features:

The tourist diving industry also has a number of distinct operational types, which cater for client variables such as cost and nature of experience. The services offered are not always compatible, for example combining beginner divers with more experienced divers, and so individual operators tend to focus on certain client types.

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This parallels common distinctions used in the wider adventure travel industry between hard and soft activities (Ewert & Jamieson, 2003). Some larger companies have developed separately marketed and operated vessels to deal with this. Some of the major tourist diving operational types are shown in Table 14.2. The tourist diving industry is both internally and externally competitive, with aggressive marketing both domestically and overseas. The industry is very price driven with many operators offering similar products and customers easily able to substitute one dive product for another. This is exacerbated by the relative strength of dive product wholesalers and retailers who have a high degree of control on the customer flow to preferred operators and very low switching costs between products (Coopers & Lybrand, 1996).

Domestic diving	
Local clientele	
Repeated visitation	
Sub-tropical and temperate waters	
Training at all levels	
Ongoing training	
Weekend or short trips	
Small- to medium-scale operators	
Summer and holiday seasons	

Table 14.1: Typical features of tourist and domestic diving.

Operational type	Typical features		
The dive school	Focussing on training divers from entry-level certification upwards. They may be mainland, offshore or vessel based. May be live-in or separately accommodated		
The live-aboard certificated	Offering adventurous diving for certificated		
dive vessel	divers over several days		
The day trip	A variety of dive and other activities may be offered from a vessel. Focussing on the occasional or time limited certificated diver, introductory diving and snorkelling		
Limited diving	Diving activities are not the focus of an operation but offered as a part of a wider marine package. For example beach hire, cruise ships, sail charters, island resorts. Catering for a similar group as the day trip vessels		

Table 14.2: Major tourist diving operational types.

A small number of operators have been able to develop and market differentiated products. Primarily these are by providing higher service and facility standards, or offering unique environmental and adventure experiences.

The implications for tourist diver safety of this variation in structure may be summarised as:

- The economic importance of marine tourism, particularly in certain regional contexts, ensures that there is a broad community and government interest in diving safety issues.
- Analysis of diving incident data does not always make reference to the variations shown within the industry between regions and sectors.
- Safety standards must be flexible enough to recognise and be adapted to both regional and sector variations within the diving tourist industry.
- There are intense competitive features of the regional, national and international diving tourist industries. These make any differentiation of product that affects price or a customer's experience a grave concern to operators.

How Safe is Tourist Diving in Australia?

If you can't measure it — you can't manage it.

There have been a number of discreet and some ongoing studies that provide a great deal of diving mortality and morbidity data within Australia and across its states. In part this has been ably supported by two major research and advisory organisations that support the diving industry. The South Pacific Underwater Medical Society (SPUMS) aims to promote and facilitate the study of all aspects of underwater and hyperbaric medicine. The Divers Alert Network (DAN) is an international group of autonomous non-profit scuba diving associations with branches throughout the world whose mission is to improve the safety of recreational scuba diving.

However, analysis of recreational diving incident data in Australia is unfortunately bedevilled by the lack of meaningful and differentiating denominator figures. The incident literature is dominated by descriptive case study and cross-sectional reports. These are extremely useful studies and assist in identifying the nature and mechanisms of injury, but do not allow any evaluation of ongoing diver safety *per se* or the impact of specific safety strategies.

Worldwide there is a considerable reported range in mortality rates amongst divers and allegations that diving industry sponsored studies have inflated the alleged population at risk so as to reduce the overall death rate (Edmonds, Lowry, Pennefather, & Walker, 2002).

Two of the better Australian studies (Monaghan, 1988, 1989) assessed the rate as 16.7 deaths per 1,00,000 for recreational divers but this fell to between 5.8 and 6.5 per 1,00,000 when the population expanded to include those who have had any diving experience. These fall within ranges found overseas; for example, 17.5 per 1,00,000 divers found in Japan (Ikeda & Ashida, 2000).

It is probable that studies reflecting different locations or sectors within the industry would show varying results and would hence be of great interest to those sectors. A study based on Stoney Cove Quarry (Hart, White, Conboy et al., 1999), an inland freshwater diver training site in Great Britain was able to accurately measure diver numbers as its denominator, in that all divers are required to register at the site. This study showed a relatively low fatality rate of 2.9 per 1,00,000 divers per year.

Queensland is particularly poorly served with studies of this kind. Still the most widely quoted study (Santoro, 1996) into the number of dives in Queensland dates from 1994 (Windsor, 1996). This study, which emanated from within the recreational dive industry, concludes that 1,290,500 dives were undertaken on the Great Barrier Reef in 1994. However, the rounded figures quoted (to the nearest 500 or 1000), indicate that the calculations are approximations. The mortality rate concluded by this study was an extremely low 1 per 4,30,000 (or 0.23 per 1,00,000) dives in Queensland. Unfortunately, this study has not been updated or externally corroborated. Even the national rate (for drownings of divers only) is only marginally lower, 0.08 per 1,00,000 of the overall population (Australian Water Safety Council, 1998).

Australia has been well served by the highly descriptive reports by Dr Douglas Walker commencing in 1972 and detailing approximately 400 diving and snorkelling deaths since that time (Walker, 1998, 2002). The trend shown here is disturbing, with an increasing average annual number of diving deaths over the study period. This contrasts with the US experience, for scuba divers only, showing a fall from a high of 147 in 1972 to 66 in 1988 and an average of approximately 80 deaths per year since that time (Divers Alert Network, 2000).

Although it is not clear if the Australian increase is due to increased participation or reporting there is only cold comfort to be drawn from an examination of these case studies, leading Edmonds and Walker to conclude "the real tragedy of this survey was that it shows that the lessons and teachings of yesterday are still not sufficiently appreciated today" (Edmonds & Walker, 1989). One wonders if they would make the same comment today?

Studies into recreational diver morbidity also paint a concerning picture. The preponderance of admissions of overseas visitors to Queensland hospitals for water-related injuries has been noted (Wilks, Coory, & Pendergast, 2004). This study showed that, for the three financial years 1998/1999–2000/2001, 59.6% of these admissions (162 patients) were using diving equipment. Of the diving incidents, the dominant cause of admissions was for decompression illness, accounting for 54.8% (149 patients). Sadly, comparisons with an earlier study (Wilks & Coory, 2000) conducted for the previous 3-year period (1995/1996–1997/1998) revealed that decompression illness continued to be the main condition treated, and that the proportion of patients treated had not changed over 6 years. This led the authors to recommend that scuba diving safety in Queensland requires further targeted attention. Specifically, that it is important to know which international visitor groups are experiencing problems and whether education and injury prevention initiatives are being delivered appropriately and in the correct languages.

In contrast, recent reports from the Townsville General Hospital Hyperbaric Unit (the main treatment facility for the Great Barrier Reef) show a drop in the numbers of divers being treated between 1997 and 2002 (Table 14.3). Possible explanations proposed by the treating physicians include the increased use of dive computers, calibrated for slow ascent rates and fitted with warning alarms as well as "tougher workplace health and safety laws"

	Total divers	Recreational divers	Recreational dive instructors
1997–1998	89	76	8
1998–1999	98	80	15
1999–2000	84	70	8
2000-2001	64	48	6
2001-2002	65	59	5

Table 14.3: Divers treated in the Townsville General Hospital Hyperbaric Unit 1997–2002.

Source: personal communications.

(ABC, 2004). However, declining visitor numbers in some sections of the marine park may equally be contributing to this decline (Hocking Research and Consulting, 2004).

Overseas, the US figures for decompression illness also show a recent decline. The DAN figures record increasing treatment rates from 1987 to 1994 but declining numbers since then (Divers Alert Network, 2000).

Tragically though; tourist divers who visit Australia to dive continue to die and be injured each year. The circumstances are rarely novel and the mechanisms usually identifiable. A better understanding of sector- and location-specific incidence rates would be useful not only to help identify preventative strategies but also to evaluate their success.

The Influence of the Media on Perceptions of Tourist Diving Safety

There is an ongoing morbid media interest in human suffering. Even with the positive market projections for marine tourism generally, and the hugely supportive international audience for the movie Finding Nemo, the popular media continues to monitor marine tourism activities very closely (see for example, Moore, 2004).

Certain factors appear to excite more than the usual media interest. There seems to be an increased level of interest in incidents where the combinations of the following factors are present:

- Youth
- Female
- Overseas
- Inexperience
- Time of life (holidays, gap year, honeymoon)
- Exotic locations
- Adventure activities

The tourist diving industry can provide each of these factors. For example, Wilks (2000) showed that British, American and German tourists are the most frequently represented overseas nationalities in diving and snorkelling fatalities in Queensland.

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The emotive impact this can have on the industry is illustrated in the following extract from a book written to assist tourist dive operators deal with the media after an incident:

An aggressive journalist can skew the true facts about diving to paint a picture of an opportunistic industry more concerned with profit than it is with safety. It's an increasingly more commonplace attitude; one in which accountability has now been replaced the notion of self responsibility. None of which helps a dive operator faced with a crisis situation where they might have to deal with the loss, injury or death of a customer, whatever the cause or reason. And who faces a barrage of questions from a media driven by the mantra "if it bleeds, it leads" (Strike, 2004).

However the longer term implications are less clear. There is some evidence to suggest that negative portrayal of environmental damage does not significantly impact on visitation numbers (Cater, 2004). Discussion of safety issues, such as recently occurred with the release of the film 'Open Water' also gives the tourist diving industry an opportunity to promote innovation and change in their safety systems. Perhaps there is no such thing as bad publicity!

Heightened media interest may also have the effect of sparking political and hence regulatory interest. Two coronial matters discussed below involved female Japanese divers and both had intense local media interest when the incidents occurred. The furore (Reid, 1998) surrounding the disappearance of the Lonergans in Queensland in 1998 went worldwide and has continued with the release of both books and a film based on the incident.

Self-Governance and Recreational Dive Training Agencies

Self-regulation is popular with tourist diving operators seeking freedom to engage in their business without legislative restraint. The diving industry in Australia has an extensive experience with self-regulation, particularly through the recreational diving training agencies. However in response to the ongoing mortality rates discussed above, self-regulation has repeatedly been subject to criticism, particularly from the various state coroners and sections of the media.

Since its inception in the 1940s and 1950s, the organisation of recreational diver training in Australia has followed a similar path to the rest of the world. After a period without regular formal training extending into the 1960s, diver training agencies developed either regionally or nationally in the 1960s and 1970s. The impact of these agencies has been extensive and today the major organisations are dominant fixtures in the recreational diving world.

Australia has seen the decline of local agencies, such as the Federation of Australian Underwater Instructors (FAUI), and the rise of the mainly US based agencies such as the Professional Association of Diving Instructors (PADI) and Scuba Schools International (SSI).

Affiliations between these and other agencies have led to a degree of standardisation of training, equipment and diving practice across the globe. Each agency practices a degree of risk management, quality assurance, legal advice and group insurance for members

(Nimb, 2004). The limitations facing these training agencies however are the same as those facing the dive operators themselves. In a competitive diver training marketplace where operators are able to transfer between agencies at will, the incentive to enforce onerous and costly safety requirements on members may be limited.

This may be contrasted with other adventure tourism sectors, such as the Australian Parachuting Federation where a single non-government agency dominates the activity. They are able to provide safety control of the industry's operators through both recognition of its status by the relevant regulatory authority, in this case the Civil Aviation Safety Authority, and by providing a gatekeeping mechanism, such as access to insurance.

The self-regulation of the diving industry in Australia has also been attempted through the development of employer groupings and associations. Nationally, these have tended to be short lived and characterised by internal division or marginalisation rather than by achievement. Associations such as Dive Australia have come and gone leaving no representational employer group currently on the national stage, while the Australian Underwater Federation focuses primarily on sport applications of diving and has little active association with the tourist diving sector.

Regional associations such as Dive Queensland or the Association of Marine Park Tourism Operators have tended to be focussed on particular issues and acted both as an industry apologists and advocates. With the development of a government regulatory approach to tourist diving safety, these organisations have moved towards an advocacy and consultative role rather than developing a self-regulatory approach. In the late 1980s, continuing high-profile incidents prompted the beginning of this more regulatory approach to diving safety.

Regulation of Diving Safety

Standards Australia

Standards Australia is a non-government independent body, which is recognised by the Commonwealth government as Australia's peak national standards agency. These standards may be called up by different state legislators or used as references to "best practice" in civil and other matters.

Standards Australia has long had an interest in occupational diving. This devolved, with consent from within sections of the recreational diving industry, into the development of Australian Standard 4005 (1992) Training and certification of recreational divers. Part 1: minimum entry level SCUBA diving. A revised version was released in 2000. This important document formed a benchmark for this level of diver training and helped set a number of standards, for example, the medical evaluation of divers which has become a national norm despite the fact that a medical consultation is not required by most of the diver training agencies.

After this tentative beginning, Standards Australia has more recently been prompted into taking a considerably more proactive role with regard the recreational diving industry. This has seen both the development of further training standards and with the release of Australian and New Zealand Standard 2299 (2003) Occupational Diving Operations. Part 3: Recreational industry diving and snorkelling operations. The impact of this standard on tourist diver safety is still to be evaluated but will no doubt be referenced by regulatory agencies in all states in the future.

Queensland's Workplace Health and Safety

Queensland, unsurprisingly in view of its dominance of marine tourism in Australia, first began to experiment with a regulatory approach towards enforcing certain safety standards on the tourist diving industry in 1989. As with other jurisdictions worldwide, the task of regulation was given to the occupational health and safety agency, in this case being Workplace Health and Safety Queensland, a part of the Department of Industrial Relations. The health and safety of others, the diving customer, is to be protected in as far as it may be affected by the conduct of the diving operator.

A succession of fatal recreational diving incidents in the late 1980s that attracted considerable media and coronial interest prompted Workplace Health and Safety to release part 36 of the Workplace Health and Safety Regulation 1989 "Dive shops, self-employed scuba instructors and dive charter vessels". This regulation marked the beginning of a succession of evolving standards for the recreational dive and snorkelling industry, summarised in Table 14.4.

This original regulatory part prescribed standards for dive equipment, air purity, equipment available on dive vessels and operational requirements to be ensured by the dive master. In some cases the regulations can now only be described as arbitrary, where the outcome appears to have more to do with measuring compliance than improving health and safety. For example, regulation 264(3) (j) limits any diver to undertaking no more than four dives in any 1 day. As a control measure to limit the risk of a diver developing decompression illness this control is demonstrably illogical in that there is no reference to individual dive profiles.

The reaction from the Queensland tourism diving industry to these regulations was negative, loud and long (Spencer, 1990). The prescriptive nature of regulation and lack of

Table 14.4: Queensland recreational diving and snorkelling standards.

Workplace Health and Safety Regulation 1989-Part 36 Dive Shops, Self-employed SCUBA Instructors and Dive Charter Vessels — Repealed

Code of Practice for Recreational Diving at a Workplace 1992 - Repealed

Code of Practice for Recreational Diving and Recreational Snorkelling at a Workplace 1995 — Repealed

Workplace Health and Safety Regulation 1997-Part 12 Underwater Diving Work — Current

The Compressed Air Recreational Diving and Recreational Snorkelling Industry Code of Practice 2000 — Current-under review

The Industry Code of Practice for Recreational Technical Diving 2002 - Current

flexibility when applied to the different sectors found within the industry made its effectiveness as a risk management tool questionable. With limited resources applied to this new area; compliance, monitoring and enforcement efforts were also low.

However, the underlying need for a standard supported by Workplace Health and Safety was recognised by the peak recreational diving employer's organization, the Queensland Dive Tourism Association of Australia, later to become Dive Queensland (Heywood, 1996). In partnership these two organizations developed the 1992 Code of Practice. This new standard provided a much more extensive document in a more flexible code of practice format. Specific sections applied differing standards to differing risk groups so that sections were developed catering for the differing needs of resort divers, divers in training and certified divers.

Workplace Health and Safety had by this stage recruited specialist diving inspectors and begun compliance monitoring and enforcement activities. The following years from 1992 until 1998 saw the Code of Practice revised reactively following a number of significant incidents.

The disappearance of Thomas and Eileen Lonergan while diving from the vessel Outer Edge near St Crisper's Reef in January 1998 prompted the largest and first holistic review of the legislation since the original 1992 Code of Practice.

Coroner Noel Nunan made extensive findings but a limited set of recommendations following the inquest into the disappearance. The recommendations were aimed at preventing a recurrence of the event, with specific comments made on lookouts, counting procedures and signalling devices to be incorporated into the then ongoing review of the Queensland Code of Practice (Nunan, 1998).

This incident prompted the then Minister for Employment Training and Industrial Relations to set up a Diving Industry Taskforce to examine and report back on the overall approach to managing health and safety within the recreational diving and snorkelling industry in Queensland. This taskforce started a process of consultation with a variety of stakeholder groups against a background of intense media interest (Metcalf, 1998), broader tourism industry concerns, a coronial investigation and the unlawful killing (manslaughter) charge brought against the master of the Outer Edge.

This matter was also prosecuted under the Workplace Health and Safety Act 1995 and a guilty plea was entered by the employer. This resulted in the then largest fine for a recreational diving matter of AUD\$27 500.

The ensuing report of the taskforce (Division of Workplace Health and Safety, 1999) recommended that the existing Code of Practice be reviewed in both content and legislative basis. A further recommendation led to the appointment of another specialist diving inspector. Following an extensive program of face-to-face and written industry consultation, the results were amendments to Part 12 Underwater Diving Work of the Workplace Health and Safety Regulation 1997, and the release of the Compressed Air Recreational Diving and Recreational Snorkelling Industry Code of Practice 2000.

By combining regulatory and industry code of practice provisions, flexibility is maintained while improving the robustness of monitoring and enforcement activities. The first state-wide audit program was conducted in 2001. A total of 59 tourist diving and snorkelling operators were audited and 169 Improvement Notices issued. This outcome was achieved with a high degree of operator support (Thompson, 2002). Enforcement activities have also led to a number of prosecutions based on breaches of these standards. For example, in 2003 a Cairns dive operator was fined AUD\$10,000 following a further incident where a crew member was left behind in the water for 25 min.

As with the 1992 Code, subsequent incidents have prompted further amendments to the standards. A fatal incident involving a recreational dive worker using a semi-enclosed enriched air nitrox rebreather off Cooktown was outside the scope of the existing standards, so a new standard was developed commencing in February 2002. The Industry Code of Practice for Recreational Technical Diving 2002 incorporates diving using both open circuit and rebreather SCUBA systems for gases other than air as well as decompression stop diving on all gases.

Workplace Health and Safety Queensland has also taken a proactive advisory and educational role to enhance industry use and understanding of the relevant standards. Most recently, translations into 10 languages of medical advice for prospective resort divers and snorkellers, as well as briefings for certificated divers and snorkellers, were produced in a waterproof format and provided to assist all Queensland dive operators.

The evolution of these regulatory standards in Queensland has had a considerable impact in other jurisdictions. The relevant Australian Standard, AS/NZS 2299.3 (2003) makes extensive use of the Queensland standards as the basis for its own text.

Western Australia

Following the death of Kaori Adachi on 1 December 1998 at Exmouth in Western Australia on a night dive, the coroner made comments specifically regarding rescue tenders, qualifications of divers and out of water supervision (Hope, 2001). The coroner concluded with the following comments to encourage the development of a regulatory code of practice for recreational dive operators:

I note that a draft Code of Practice has been prepared for approval pursuant to section 57 of the Occupational Health and safety Act 1984 relating to recreational diving using compressed air and recreational snorkelling. That draft code of practice does deal with the issue of supervision of divers in open water and the requirement of a lookout. The Code of Practice also provides that the dive supervisor should manage the dive operation and remain at the surface of the dive site while the diving is taking place. It is important that safety issues of this type should be covered by such a code of practice (Hope, 2001, pp. 31–32).

Following these recommendations, the Department of Sport and Recreation published the 'Recreational Diving and Snorkelling Codes for Western Australia'. Interesting and unlike most other jurisdictions, this standard was not made under the relevant occupational health and safety legislation but contains the following reference:

All workplaces are covered by the Occupational Health and Safety Act (1984) and this document attempts to benchmark minimal acceptable standards for assisting achieving compliance as well as best practice for industry.... The

regulatory function under the Occupational Health and Safety Act (WA) will be undertaken by Worksafe WA with reference to this code whilst the Department of Sport and Recreation provides an advisory role (Department of Sport and Recreation, Government of Western Australia, 2003, p. 1).

New South Wales

In New South Wales, the coroner, Mr Elwyn Elms, made extensive recommendations regarding regulation of the recreational dive industry following the inquest into the deaths of Midori Takano and Nicola Sheen. The recommendations are highly critical of self-regulation within the industry and of PADI in particular. The coroner makes reference to another six fatalities in NSW between 1994 and 2001. He states:

Why make recommendations? The short answer is to minimise risk and to avoid needless waste of life which this court has had to concern itself over the years. Particularly concerning is the needless waste of life involving young inexperienced divers, who fall into a statistical bracket which shows they are more likely to succumb to injury or death in view of their inexperience and low skill levels (Elms, 2002, p. 4).

And:

To my mind, it is no answer to say that this is an adventure sport that the participant is qualified and takes the risk, that if they don't know what to do, they shouldn't be there in the first place, and that in such a sport deaths are going to occur from time to time. The young people I am concerned with in these inquests comprise the industry's most vulnerable participants (Elms, 2002, p. 4).

In conclusion, the coroner makes reference to both the Queensland Code of Practice and the, then, draft Australian Standard. He advocates the adoption of a suitable standard, which can be enforced by an appropriate regulatory body (Elms, 2002).

Overseas Comparisons

In many countries there appears to have been a reluctance both from operators and the authorities to become entangled with diver safety at a regulatory level. However as in Australia, this has in certain cases been overcome by continuing incidents, media concern and stern coronial recommendations, which have all combined to prompt the regulatory or standards authorities into action.

In several cases the outcome and response seem to have mirrored the Queensland experiences. Overtly regulatory regimes have differentiated local diving tourism products to their detriment and zealous enforcement creates a combative rather than a supportive relationship between government and industry.

Malta, for example, has specific regulations including requiring divers to obtain permits to dive from licensed dive centres. These are only issued when the diver has produced acceptable evidence of their certification and current diving medical certificates. Spain likewise requires divers to produce current medical certificates. However, these and other restrictions differentiate the local product from regional competitors and are consequently resisted by some operators (Anonymous, 2004).

Great Britain has also prescriptively legislated for its recreational dive industry, producing a range of information products and engaging in high-profile enforcement activities including audits and prosecutions of operators.

Other European nations have pursued the development of consensual standards, similar in scope to those of Standards Australia, to include competency, medical assessment and tourism services including dive operators and dive training schools (Wendling & Muller, 2004).

The USA has largely been an exception to this trend perhaps reflecting a generally stronger self-regulatory approach. Again though, when significant or repeated incidents have occurred, regulatory authorities have sought a role.

In 2000 two US divers were left behind by a dive charter vessel from Key Largo, Florida. Fortunately they swam to a light and remained there until they were rescued, *before* their disappearance was reported by the dive operator. The company involved in this matter was fined US\$1000 under local maritime safety legislation and required to adopt a safe accounting system (Warren, 2004).

Most recently, a diver was left behind at a dive site off California by the dive operator but was eventually spotted from an offshore platform. Following this the US Coastguard directed PADI to take steps to improve counting procedures. PADI then sent out a Diver Accounting Procedures Reminder to all members worldwide. This included reference to a tagging board developed by Divers Alert Network (PADI, 2004).

The Future

The nature of tourist diving as an adventure activity in a marine environment unfortunately precludes the likelihood of any strategy absolutely removing the incidence of death and injury among divers. However, in an increasingly litigious society one can anticipate that morbidity and mortality are now likely to be followed by demands for compensation for an unfortunate outcome. These outcomes will continue to attract intense media interest.

Notwithstanding this there remains much room for improvement in strategies to reduce both the incidence and rate of tourist diver morbidity and death. There is likely to be a continuation of a cycle of incident, media interest and investigation, possibly leading to reactive developments in both self-regulatory and government regulatory regimes.

All those stakeholders with an interest in diving safety are therefore faced with the challenge of working within this reality to develop outcomes that can genuinely improve diver safety without having the effect of imposing conditions that are overtly unworkable for the tourist diving industry.

Systems of self-regulation in a competitive environment will continue to only have a limited value in ensuring improvements in diver safety. Dive tourism operators would be better served to develop a single national body with close links to government regulators that is able to formulate and implement well-researched safe systems and perform an effective education, assessment and quality control function for its members. The development of Australian Standards provides a basis for this but to date there has been insufficient leader-ship regarding implementation from within the stakeholder group.

Without this leadership there continues to be an erosion of confidence in the self-regulatory approach and government regulators have moved slowly in to fill this gap. Tensions have developed where the resulting systems appear to create unreasonable reactive standards that differentiate the local dive industry rather than any measurable improvements in safety.

Queensland's relatively long experience in this process has resulted in a more flexible and dynamic regulatory approach, which combines a measure of industry acceptance with a regulatory program balancing consultation, education, assessment and enforcement. Other jurisdictions confronted with similar problems have used this as a model for their own approaches. Ongoing analysis of trends in diving incidents is required to provide a better picture not only of emerging issues but also to assess the impacts of safety strategies.

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