

NOVEMBER / DECEMBER 2014

# OZDIVER

IT IS THE JOURNEY AND NOT THE DESTINATION

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ATHOLL

REBREATHERS

TOP 10  
CREATURES

GREAT  
BARRIER  
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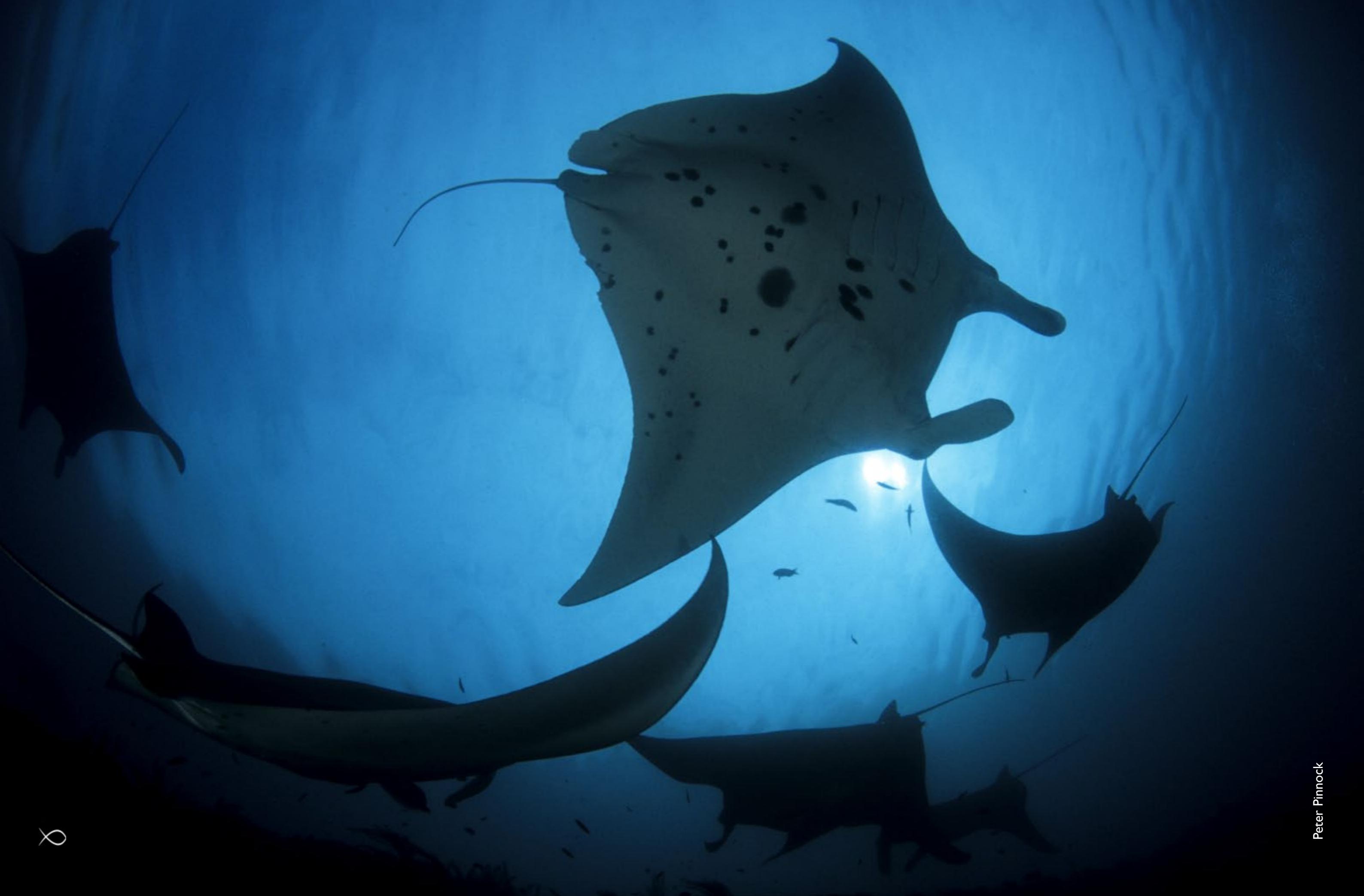
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# RAJA AMPAT



FREE Online Diving Magazine - [www.ozdiver.com.au](http://www.ozdiver.com.au)



8



# Editors Deco stop

It is time for a new beginning, and why not a new magazine? Most of you are probably wondering where, what and how, so let me first start with my story and explain how I came to start this magazine.

I arrived from South Africa about a year ago and had the best job in the world (or I thought so). I have always believed that you can't find a better job than getting paid for doing something you really love. I started diving about 20 years ago - and no, I am not old, I just started really young! I was working as a dive instructor and technical course director when I was offered an even better job, which I did not think was even possible.

People wanted me to dive and write stories about my experiences. Not only did I get to dive for free, but I also got paid for doing it... After a couple of years of doing that, they asked me to become the Editor and Publisher of the diving magazine. Wow. This meant that I get more money for doing what I loved. Why not?

After 10 years of flying and diving around the world it

was time to hang up my fins a little and take things a bit slower, so we decided to move to Australia where I could sit back and enjoy the country while raising my two kids. As the locals says, "living the dream."

The days went by, however, and I started to become more and more frustrated. I needed to get in the water, and then it all started again... I had a good look at the diving industry in Australia and found it to be a very interesting and challenging landscape. Australia has everything, but what it really needed was a world-class dive magazine to cater for the large diving community in Australia. So why not start my own dive magazine here, I wondered?

I asked myself this question many times. Did I really want to do it all over again? A part of me said yes, while another part answered with a resounding no. However, it is a passion and diving has always been a big part of my life that I can't ignore. It is in my blood.

OZDiver was born.

OZDiver Magazine will be a free bi-monthly online magazine that will cater for the scuba diving community all over the world with a focus on the Australian diving community. As scuba divers are adventure seekers by nature, we will cover all the relevant topics in each magazine, such as exciting diving news, scuba happenings, medical topics, technical diving, wreck diving, local as well as international dive travel plus reviews for scuba divers on the latest scuba diving equipment, books, gadgets and much more.

OZDiver.com.au will be THE gateway for the Australian diving community - the website and magazine will take you all over the world with a click of a button.

Keeping up with the times, this is an interactive magazine and it is full of hundreds of links to websites, information and videos for you to go and explore to make the magazine more than just words on a page.

I hope that you will enjoy the first of many.

*The Editor & Publisher*

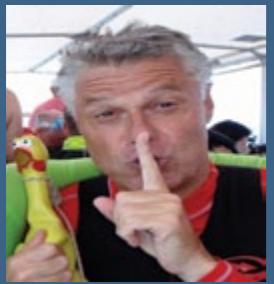
**Johan Boshoff**

*-it is all about the journey and not the destination*

**Genesis 1**

*1 In the beginning God created the heaven and the earth. 2 And the earth was without form, and void; and darkness was upon the face of the deep. And the Spirit of God moved upon the face of the waters.*

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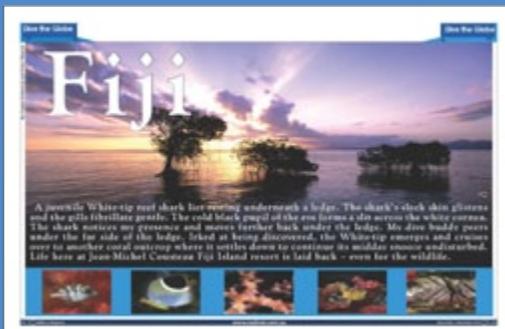
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FEATURE

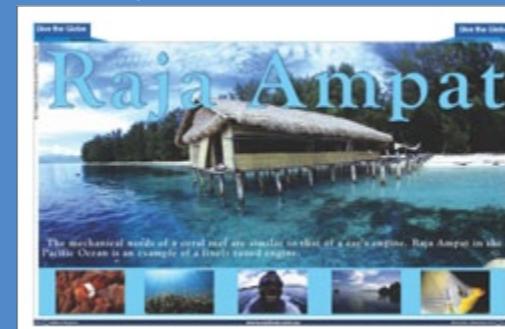


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Peter Pinnock

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FEATURE

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### THE WORST JOB EXPERIENCE

Rob is a commercial saturation diver for Global Divers in Louisiana. He performs underwater repairs on offshore drilling rigs. Below is an e-mail he sent to his sister, who sent it to a radio station in Ft. Wayne, Indiana, which was sponsoring a worst job experience contest. Needless to say, she won.

Hi Sue

Just another note from your bottom-dwelling brother. Last week I had a bad day at the office. I know you have been feeling down lately at work, so I thought I would share my dilemma with you to make you realise it is not so bad after all. Before I can tell you what happened to me, I must first bore you with a few technicalities of my job. As you know, my office lies at the bottom of the sea. I wear a suit to the office, a wet suit.

This time of year the water is quite cool, so what we do to keep warm is this: we have a diesel-powered industrial "water heater", a \$20,000 piece of equipment that sucks water out of the sea. It heats the water to a delightful temperature and then pumps it down to the diver through a hose, which is taped to the air hose. Now, this sounds like a darn good plan, and I have used it several times with no complaints. What I do when I get to the bottom and start working is take the hose and stuff it down the back of my wetsuit. This floods my whole suit with warm water. It is like working in a Jacuzzi.

Everything was going well until all of a sudden, my butt started to itch. So, of course, I scratched it. This only made things worse. Within a few seconds my butt started to burn. I pulled the hose out from my back, but the damage was done. In agony I realised what had happened. The machine had sucked up a jellyfish and pumped it into my suit. Now, since I do not have any hair on my back, the jellyfish couldn't stick to it. However, my butt was not as fortunate.

When I scratched what I thought was an itch, I was actually grinding the jellyfish into the crack of my butt. I informed the dive

supervisor of my dilemma over the communicator. His instructions were unclear due to the fact that he, along with five other divers, was laughing hysterically. Needless to say I aborted the dive. I was instructed to make three agonising in-water decompression stops, totalling 35 minutes, before I could reach the surface to begin my chamber dry decompression. When I arrived at the surface, I was wearing nothing but my brass helmet. As I climbed out of the water, the medic – with tears of laughter running down his face – handed me a tube of cream and told me to rub it on my butt as soon as I got in the chamber. The cream put the fire out, but I could not poop for two days because my butt was swollen shut.

So, next time you are having a bad day at work, think about how much worse it would be if you had a jellyfish shoved up your butt. Then repeat to yourself, "I love my job, I love my job." ▀

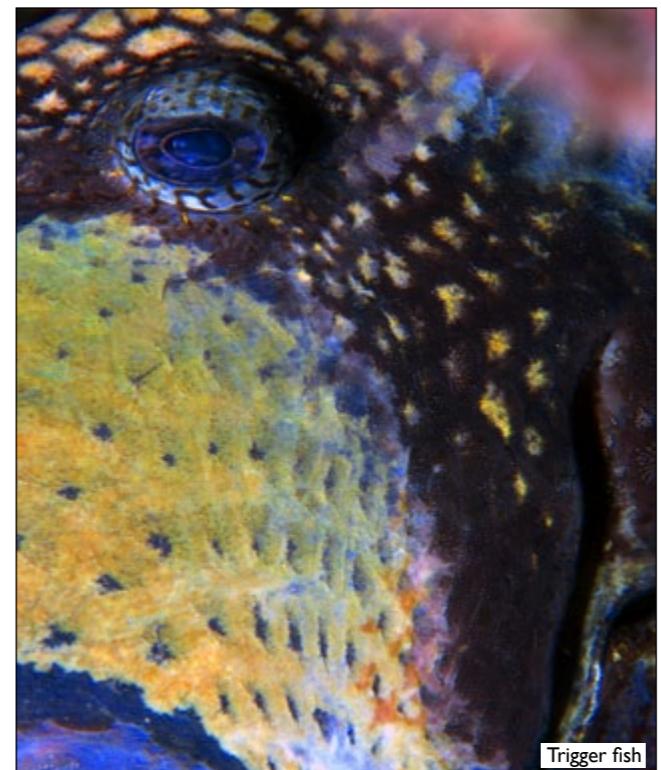


Hard coral

### MIND THAT DIVING ETIQUETTE

I have a concern that I believe every instructor has come across when taking students for training dives. I am referring to common dive practices by fellow divers, dive leaders and instructors. It starts with the surface swim. If you see an instructor busy with a group, please don't swim into his or her group – go around them! If you see a group utilising a buoy, wait your turn, or ask if you can please descend before the group starts. If you must use the buoy line to descend, don't hog the line at the bottom – move away from the line and continue your dive. Instructors should also move away from the line so that other divers can use it for a controlled descent – don't continue right there with your exercise. I am not saying you should clear out, but make some space so a diver can descend without landing on someone's head. If a group occupies a grid, wait your turn. I find it disgusting that qualified instructors and divers use the grid where students are doing their exercise as a "touch-down" and safety-stop after their dive, with no concern for other divers. Just recently I had to deal with this on more than one occasion, only to be bad-eyed when I asked them to please move away from our group of students. ▀

Concerned instructor



Trigger fish

### ETHICS QUESTIONED

Do we as technical divers really care if the training organisations we deal with have strong business ethics? We do have expectations that they should be easy to contact and helpful, providing accurate quotes and competitive pricing. They should treat their competition fairly, debating facts and not opinions, and they should avoid personal issues. The question is: are our training organisations and their instructors living up to our expectations? Ethical behaviour is behaviour that does no harm. Does it matter what goes on behind the scenes or is your personal experience more important?

As consumers we get the 'nice' face of a company. We assume that staff and vendors get paid and contractual agreements are complied with. But what is really going on? If you knew that an organisation was not honouring its financial or contractual obligations, would you care?

We should be expecting our organisations and leaders to deliver on their promises. But, what happens when they do not? Ordinarily we would vote with our feet, resulting in lost market share, forcing change. But where is this choice when it comes to technical training?

As a community, have we become a collection of egocentric, megalomaniac monopolies, each striving to dominate the industry and acquire accolades? Do we want a technical community where there are no consequences for unethical behaviour, and minimal professionalism? Do we want to continue to live in a monopoly where a select few determine price and availability? What choice do we have when we have no choice at all? ▀

By Anonymous

### HOW MUCH IS TOO MUCH?

As a responsible diver, I am mindful of how many drinks I enjoy during an evening, watching the sun go down and sitting on the beach with some cold beers. However, when I get back to the dive camp I am amazed at how much alcohol some young guys from upcountry actually drink when they are on a diving holiday at the coast. The interesting thing is to watch them the next morning. Most dive operators offer a couple of early dives. Most of these young men go straight for a mug of hot coffee and walk around in a bit of a daze, probably due to dehydration and a bad headache. Then they try and get their kit together. In my view, that's not the best way of getting ready for a dive. As a DM, is it my job to actually explain the effects of alcohol on the body and the effects of diving with it in your blood? This ties in with trying to encourage people to be responsible divers. Not much has actually been said about the amount of alcohol consumed on diving holidays. Isn't it about time that this subject was brought out into the open?

Sue ▀

WIN

Send your letter to us and win a  
Marine Life Species Guide

Here is a chance to be heard! If you have anything that you would like to share with the OZDiver Magazine and other divers, send an email to Log Book at [johan@ozdiver.com.au](mailto:johan@ozdiver.com.au). Remember that letters have more impact when they are short and sweet. We have the right to edit and shorten letters. In every issue, the winning letter will receive a Marine Life Species Guide. ▀



# OZ News

## THE OZTEK 2015 DIVING CONFERENCE

Saturday 14th March 2015: 09.00 - 18.00  
Sunday 15th March 2015: 09.00 - 17.00

### SPEAKER PROGRAM

All the latest developments in equipment technology and training coupled with gripping tales of underwater adventure and exploration. With more than 60 presentations, seminars and workshops focussed on the very best of diving 'info-tainment', the OZTeK2015 Conference offers an inspirational voyage of discovery into all of diving's future possibilities.

### THE SPEAKERS

Be Inspired! Meet, talk with and learn from more than 40 of modern diving's most accomplished personalities at one of the world's largest gathering of diving celebrities.

### CONFERENCE TICKETS

The complete passport to the world of diving excitement, Gold (two-day) and Silver (single-day) Conference Passes give full access to all the presentations, as well as exhibition entry. Session Passes give entry to the exhibition and two presentations. Entry tickets to the Exhibition on sale at the door. Details will be posted soon. Pre-purchase a Gold Pass and be automatically entered into the Opening Ceremony draw to win an overseas dive trip.

### PHOTO COMPETITION & EXHIBITION

The OZTek2015 photo competition focusses on wrecks, caves and open categories - with the opportunity to win thousands of dollars in prizes - The Call for Entries is open - check the Photo Comp page to enter.

Winning images will be displayed in our Photographic Exhibition open during the weekend along with some of the impressive images from past competitions.

To see some of the awesome images from previous comps - take a peek at our website image galleries  
Bookings for this increasingly popular highlight event are essential.



### THE VENUE

One of Australia's premier event facilities, the Australian Technology Park.

An inspirational diving event devoted to Information, Education, Exploration and Adventure, OZTeK2015 will again prove that:

Mark OZTek March 14/15th, 2015 in your diary today! 

## Australia International Dive Expo (AIDE) 2015

12 - 13 SEPTEMBER 2015 - SYDNEY

The first ever Australia International Dive Expo debuted at the Royal Hall of Industries in Moore Park, Sydney on 22-23 February 2014. It was successfully concluded with dive enthusiasts attending from eight different countries including Australia.

The show was a great stepping-stone for the consumer market interested in recreational diving. At the Expo, exhibitors introduced new dive gear, dive destinations, tours and camera products to the visitors.

AIDE is back for 2nd year with exciting exhibition and activities for keen divers and to be divers. Scheduled for 12 - 13 September 2015 at Royal Hall of Industries, Moore Park, Sydney, the show will continue to promote the sport of scuba diving, snorkeling, free diving, dive equipment & gears and dive travel as well as ongoing conservation efforts and practices.

Approximately 5,000 visitors anticipated and a total of over 100 booths to be taken at the expo with floor space of 5,000 sqm. Sessions for presentation will be allocated on first come first serve basis.

AIDE 2015 will see even more experts from the diving community taking the stage to share their knowledge, vast experiences, travel advice and valuable diving tips. Product demonstrations will also be held at the event for those interested in learning about the latest marine gadgets and diving technology.

A trade session will be included as parts of AIDE 2015 to better engage with industry suppliers and partners. The expo will be one stop center to promote and showcase your product and services.

Also, not to be missed is the Underwater Project, the world's first perpetual underwater shootout. Visitors are encouraged to join this project and be part of the exciting shootout competition at [www.underwaterproject.org](http://www.underwaterproject.org).

AIDE2015 is open for registration with the early bird package ending on 28 February 2015.

Information on Speakers, Activities and all details for the show will be updated from time to time. Kindly visit AIDE's website at [www.australiadiveexpo.com](http://www.australiadiveexpo.com) and join our Facebook page to get the latest news 



### Dive Schools / Operator / Organisers / Instructors

Do you have any interesting, newsworthy info to share with the industry? If so, we would like to invite you to send us your OZ News section for possible inclusion in the magazine (please note that inclusion is FREE of charge).

Here's what we need:

- Newsworthy stories (promotional material will not be accepted)
- Word limit: 100 words
- Text prepared in a Word document
- Accompanying high-resolution image(s) are welcome (please supply caption and image credit)

Please send to [info@ozdiver.com.au](mailto:info@ozdiver.com.au) 

# AUSTRALIA INTERNATIONAL DIVE EXPO (AIDE) 2015

**AUSTRALIA  
INTERNATIONAL  
DIVE EXPO**

**AIDE 2015**  
DIVE & DISCOVER

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MOORE PARK SYDNEY  
12-13 SEPTEMBER 2015

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**DIVE &  
DISCOVER**



Photo: "Blinded By The Light" By Matthew Shepherd  
Picture Courtesy: Underwater Festival™

# The Great Barrier Reef

It's great, it's a barrier and it's the biggest reef in the world.



The Great Barrier Reef is the world's largest coral reef system composed of roughly 3 000 individual reefs and 900 islands stretching for 2 600 kilometres over an area of approximately 344 400 square kilometres. The reef is located in the Coral Sea off the coast of Queensland in northeast Australia.



To get to this amazing reef you have to depart from the city of Cairns which is the closest harbour to the Great Barrier Reef. Cairns is one of the most diverse places in the world and a great place from which to explore 'Down Under'. If you ever visit Cairns, you can dive the Great Barrier Reef, explore lush tropical rainforests and visit the beautiful rugged outback regions - all of which are located within a short distance of the airport.

There are an incredible number of activities in Cairns, ranging from full adrenaline to full relaxation, all in some of the most scenic locations in Australia. There are also a variety of places to stay, from four-star resorts to youth hostels. The gentle tropical climate makes for the perfect holiday and helps to make nearly any activity enjoyable. This area of Australia thus has something on offer for everyone.



Anemone fish

Cairns is also home to the world's biggest single structure made by living organisms. This reef structure is composed of, and built by, billions of tiny organisms known as coral polyps. It is so big that it can be seen from the moon with the naked eye, and in area, it is bigger than Ireland and Great Britain put together. However, it's not just one reef, but it is rather made up of thousands of different reefs. Some of these on their own are humungous in size and measure many kilometres in length. Each reef is separated by a vast, vivid blue sea. The brilliant blue color of its water comes from the fact that there are minimal particles floating around in it. These seas are relatively lifeless, but the reef itself is an oasis of life in an otherwise marine desert. The Great Barrier Reef has the highest diversity of life of any reef system in the world. With its



Grouper

1 500 different species of fish, 350 different kinds of coral, 6 000 species of crustaceans, 5 000 species of mollusks and numerous reptiles and marine mammals, the reefs are a kaleidoscope of animal life and colours.

The Great Barrier Reef falls under the supervision of the Great Barrier Reef Marine Park Authority and is protected as a marine park, an agency of the Australian Government, and is split into four main reef regions. These are the Cairns/Port Douglas Reefs, Northern Ribbon Reefs, Coral Sea Reefs and Far Northern Reefs.

### Cairns/Port Douglas Reefs

These reefs lie offshore of Cairns and Port Douglas and are within range of the one-day dive trips that leave these towns.

There are an enormous number of reefs here and an equal variety of reef trip operators, with the combination resulting in a great variety of diving and snorkelling opportunities. There are trips just for snorkellers, trips just for divers, and still other trips that visit islands or large pontoon decks moored on the reefs - a perfect place for families with young children. There are also many liveaboard boats operating in the area which offer 1-4 day trips and a chance to experience the thrill of a night dive. The trip out to the reef from this area takes between

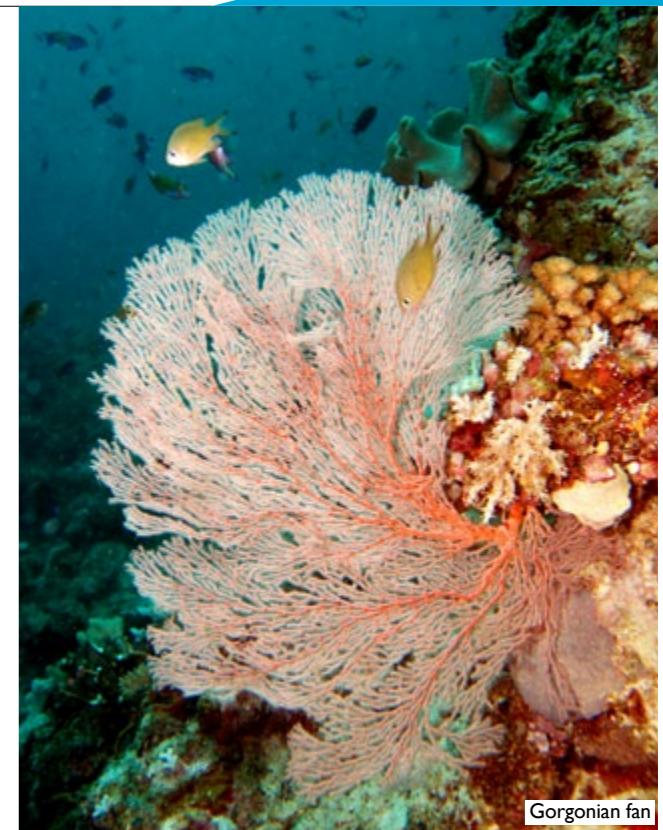
one and three hours, depending on the speed of the boat and which reef you are visiting. The diving and snorkelling in this region is equally varied. The reefs here are known for having lots of hard corals, a variety of colourful reef fish and the wonderful surprise appearances of sea turtles, Humpback whales, dolphins and other remarkable creatures.

### Northern Ribbon Reefs

The Northern Ribbon Reefs lie 40-60 miles north of Cairns and Port Douglas.

This long chain of narrow reefs extends all the way up to Lizard Island, and offers some outstanding diving and snorkelling. The most well-known dive site here is Cod Hole, famous for its resident population of large (up to 350 pounds) Potato cod, which are joined by groups of large Maori wrasse and other fish that have become accustomed to the presence of divers.

These reefs offer a range of great diving sites as the Skippers have a lot of options, enabling them to choose the best diving available based on the tides, winds and weather. Due to their greater isolation from large rivers, agriculture and coastal developments, the visibility on these reefs can be better than those off of Cairns and Port Douglas. The northern reefs are out of the range of one-day reef trips - most trips out this way range from 2-5 days.



Gorgonian fan



Silvertip shark



Green turtle

## Coral Sea Reefs

The Coral Sea lies outside of the Great Barrier Reef to the north and east of Cairns. There are a few small coral atolls and surrounding reefs set in the Coral Sea some 60-100 miles offshore. These reefs – Holmes, Osprey, Horn and Bouganville Reefs – are visited by just a few dive boats and offer some amazing diving opportunities – well worth the long overnight trip that is required to reach them. Being so far away from shore, the visibility at these reefs is consistently amazing. Typically, visibility is between 25m and 35m but during June, July and August it can be as high as 60m.



Whitetip reef shark

These reefs are known for their populations of large pelagic fish – if you like big fish, this area will be one of your favourites. Sharks are common in the area, especially Reef sharks and Silvertips, with Hammerheads and other shark species making appearances according to their annual migration patterns. Other pelagics are also abundant, including Dogtooth and Big-eye tuna, Mackerel, Potato cod and various species of trevally. At Holmes and Osprey Reef, dive operators have been holding shark-feed dives for a number of years, so you will see these pelagics at a very close range.

## Far Northern Reefs

The Far Northern Reefs are aptly named – they make up the northernmost portion of the Great Barrier Reef, over 200 miles from Cairns and Port Douglas. This is a huge region with over 600 reefs and spectacular diving, but due to the remote location, it sees very little diving.

The diving here is largely exploratory, with just a few 7-10 day trips when dive conditions are at their absolute best. This time of year is when much of the reproduction occurs on the reef, so along with a huge diversity of life, the diving is also rich and varied.

Given the huge size of the Great Barrier Reef and the thousands of dive spots available, there are a large number of dive operators that could be used. Anything from day trips to 10-day trips are available, but if you want to see the best of the reef, a couple of days on a liveaboard is the way to go.



Potato cod

## Diving from a liveaboard

Liveabards have extended dive trips to remote regions of the Northern Great Barrier Reef and the Coral Sea. From liveabards you will dive some of the most amazing sites this huge reef has to offer.

They drop anchor at many different diving locations on the dive trips. A highlight is adventure diving at Osprey Reef in the Coral Sea where you will see an exciting shark feed with amazing drop-offs and 30m plus visibility. Add to that sightings of giant Potato cod and Maori wrasse at the Cod Hole and you have a truly exceptional diving experience.

I was lucky to fulfill a lifelong dream on board a top class liveaboard with food and service that was out of this world. On the first day I was picked up from my hotel and checked in onboard by one of the experienced and friendly crew members. That evening we travelled 150km overnight to the Cod Hole. During this time we organised our dive gear and were given a briefing on the trip.

The next morning when I awoke and walked out of my cabin, I was surrounded by the Great Barrier Reef. We started our day with two dives on the Cod Hole where the dive master fed giant Potato cod. Seeing the 2m cods fighting over the food was something that I had never before witnessed. In addition to the huge cods, we were also treated to sightings of the Maori wrasse, which gets its name from the unique patterns evident on its face. If you get a chance, head over to Shark Alley where you might find a couple of sleeping Whitetip reef sharks.

After lunch we dived a small pinnacle of coral that rose up from 30m to just below the surface. Although it was only 7m across, the small dive site was full of aquatic life such as Anemone fish, Anthias fish, Lionfish, Gorgonian fan coral, Peacock grouper, Nudibranchs



and Soft sponges.

To end off the day we did a night dive, where, for the first time in my life, I saw Giant kingfish hunting in schools. The kingfish, which measured up to a metre, followed your light wherever you shone it. As soon as you shone your light on any other fish they attacked – what an amazing site!

That night the weather was good and we went to an outer reef known as Osprey Reef – a small piece of reef with wall dives up to 1 000m and visibility as far as you can see. Here we did four dives where we could see almost everything. One of the dives on Osprey is the shark feed – the highlight of the trip comes after everyone is seated on the wall and shark feed is dropped down a line. Whitetip reef sharks, Grey whaler sharks and Silvertip sharks tend to fight over the food for anything from five minutes to 20 minutes – you can't afford to forget your underwater camera for this extraordinary experience. Hammerhead sharks, giant Potato cod, Moray eels and huge Soft corals can also be seen here.

From there we started our cruise back to the mainland. On the way back we stopped at four different sites where we did dives on walls, pinnacles, ledges and swim-throughs. Some of the reefs had large pinnacles surrounded by a variety of pelagics, while others had metres and metres of swim-throughs and gullies to keep divers entertained. We ended the day off with a very nice night dive.

The next morning we had two dives before we got back to Cairns. This was probably the most diving that I had ever done in such a short space of time, and on top of that, some of the best dives in my career. Importantly, this was also one of the safest places that I have ever dived, with the crew caring for each and every diver.

Before you take your last breath you have to take one underwater on the Great Barrier Reef. □



Anemone fish

## Did you know?

- The Great Barrier Reef Marine Park is the size of 70 million football fields.
- It is the world's largest expanse of coral reef and is still growing after more than 10 000 years.
- It is the only living organism that can be seen from outer space.
- 1,6 million people visit the Great Barrier Reef Marine Park each year.
- It is home to 1 500 of the world's 13 000 species of marine fish.
- Within the Marine Park there are about 2 900 reefs which include 760 fringing reefs and 300 coral cays, including 213 unvegetated cays, 43 vegetated cays and 44 lowland wooded islands.
- Approximately 3 000 Humpback whales will migrate this season between Antarctica and the Great Barrier Reef.
- Six of the seven species of marine turtles in the world are found in Australian waters.
- The female Green sea turtle lays its eggs in the same place as it was born.
- 30 species of whales, dolphins and porpoises live in or visit the waters of the Great Barrier Reef.
- Some of the largest populations of dugongs in the world live on the Great Barrier Reef.
- Over 200 species of birds, including 40 species of seabirds, live on the Great Barrier Reef.
- 14 species of sea snakes are found in Australian waters.
- Many wrasse, parrotfish and basslets living on the reef started life as females and later changed to males.

Information given by the Cairns Tourism Board, Dive Great Barrier Reef and Dive the Reef.



# Reef building

Hard corals are the primary organisms responsible for the formation of coral reefs. These microscopic animals, known as polyps, are carnivorous and belong to the group (phylum) of invertebrate animals called Cnidaria (previously Coelenterata).

Peter Pinnock

Some cnidaria are free-swimming while others are fixed or attached to the reef or substratum. A coral polyp is a sac-like structure with two cell layers - an outer surface or 'skin', known as the ectoderm, and an inner lining to the gut, called the endoderm. The centre of the body consists of a cavity and comprises the gut, which has only a mouth, or orifice, and no anus. The orifice is lined with tentacles which have stinging cells at the top which are used to capture and paralyze prey and to ward off predators. The principal diet of coral polyps is zooplankton.

Reef-building cnidarians, or hard corals, deposit limestone cases (skeletons) around and beneath their balloon-shaped bodies to support them and to provide protection for the polyps. The skeletons are known as corallites, the walls of which are reinforced by a series of radial partitions known as septa - these provide corals with their geometric patterning. Corallites gather to form colonies which characterise the coral's shape and form.

However, only hermatypic corals of the order Scleractinia build reefs through their relationship with tiny single-celled algae of the order Dinophyceae. The many different forms and colours within this species are collectively referred to as zooxanthellae. Since coral polyps are transparent, it is the colour of the zooxanthellae within them that gives hard corals the various subtleties of colour they display when healthy. Through photosynthesis the zooxanthellae are able to use sunlight to convert carbon dioxide and water into various sugars and oxygen. This added oxygen is absorbed by the coral polyp thereby increasing its respiration while generating the energy required to drive its life processes. In return, the zooxanthellae gain a home and protection from the coral polyp's limestone case and stinging tentacles.

However, for this relationship to flourish, the water must be sunlit, shallow and as free of suspension as possible, otherwise photosynthesis will be retarded - it will not occur below certain depths because of the loss of direct sunlight. In addition, if the water temperature drops below 20 C (68 F) or rises above 29 C (84 F), the successful deposition of corallite by the coral polyps rapidly decreases. The forces of erosion soon overwhelm those of growth, and under these conditions it is not long before the coral reef begins to degenerate and die.

Nature sculpts hard corals into a seemingly endless array of shapes and forms and colours. Within a tropical reef there are corals which are huge and ponderous while others are lace-like, fragile and delicate; some are tiered and overbearing, others are flat and insignificant. Many corals of the same species adopt different shapes in different locations and thus the environment the coral species finds itself in has a great influence on the shape it adopts. In shallow areas where corals are exposed to wave action they are short and squat and often rounded so that they can contend with the forces



Pipefish

of water movement. In calmer waters these same species assume more delicate and avant-garde forms, generally as a means of maximising the amount of light required to generate life-giving photosynthesis. Another factor that helps to determine the shape is competition with other corals for space.

## Non reef-building Cnidaria

Non reef-building corals that occur on coral reefs comprise ahermatypic hard corals, soft corals of the order Alcyonacea Octocorals, gorgonian corals of the orders Gorgonacea Octocorals and Pennatulacea, and black corals of the order Antipatharia.

Ahermatypic hard corals are omnipresent as they do not depend on zooxanthellae. Many belong to the family Dendrophylliidae, including the ubiquitous daisy or turret coral *Dendrophyllia* sp. When this coral feeds, its tentacles are extended and its uninteresting turret-like structure is transformed into a bank of bright orange daisy-like flowers. Another ahermatypic hard coral is the dark green, rugged, bush-like *Tubastrea* sp. which can grow up to 2m in diameter and in which many dainty tropical fish make their home. □



Hawkfish



# Currents

## - the rivers in the sea

The ocean's water is constantly in motion, but there is a pattern and direction to this seeming chaos – currents. Surface currents are currents present in the upper 10% of the water and derive mainly from wind patterns. When wind blows over large areas with reasonable consistency of direction and strength, significant volumes of water move horizontally across the oceans. In the northern hemisphere, the trade winds (near latitude 15 degrees N), blow from the northwest to southwest; the westerly's in the mid-latitudes blow primarily from the southwest. At very high latitudes, the polar easterlies blow from east to west. A mirror image set of these wind belts exists in the southern hemisphere.

The energy from these wind systems drives the major surface ocean currents. Some of these currents transport more than 100 times the volume of water carried by all of the earth's rivers combined. As with a wind-driven wave, surface current speed diminishes rapidly with depth, becoming negligible at depths around 190m.

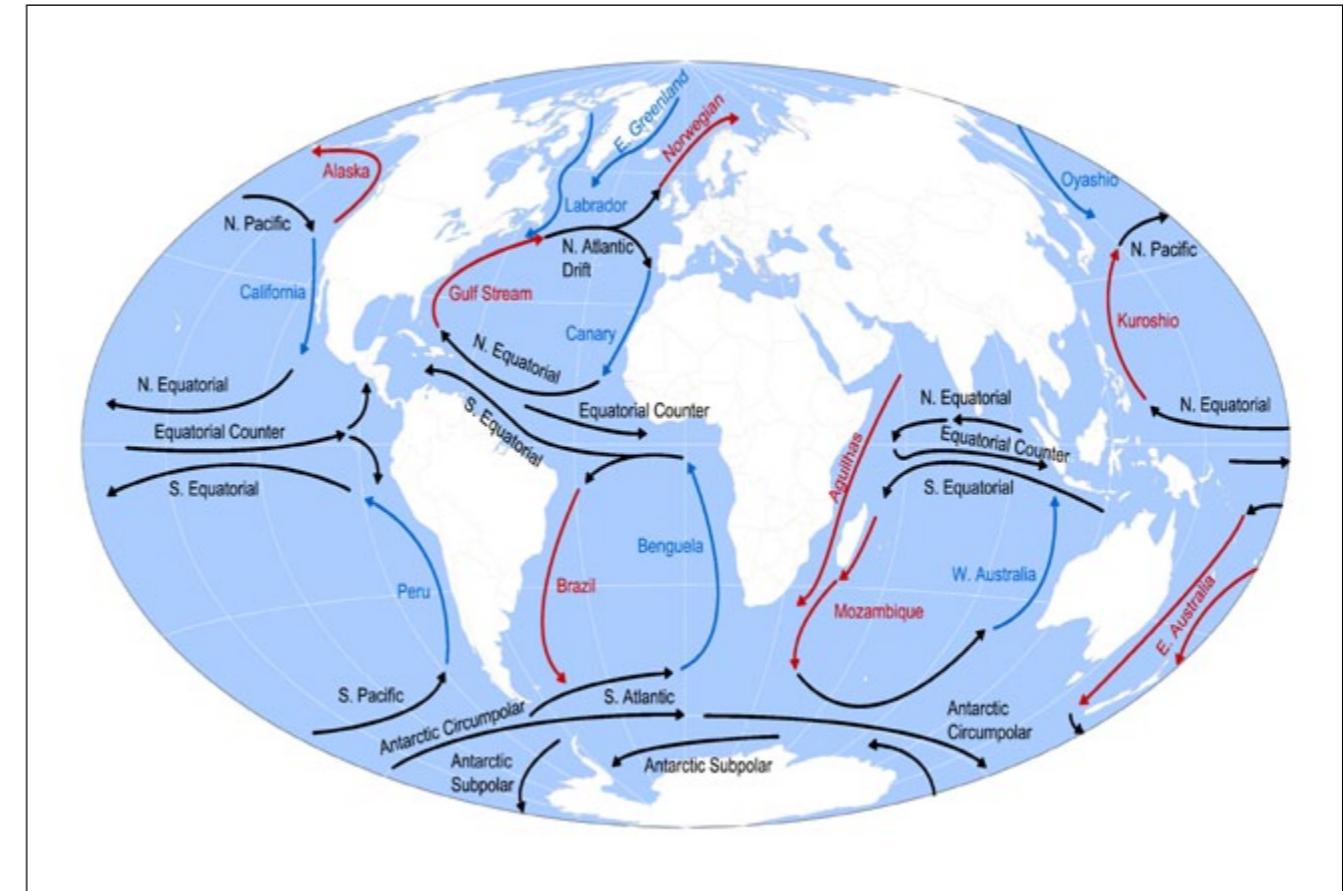
The earth's rotation also affects the major ocean currents. This is termed the 'Coriolis effect', and explains why objects in the northern hemisphere deflect to the right of the direction of the force acting on them (in this case, the wind is the force and the object is the water's surface).

The opposite is true in the southern hemisphere. There, objects deflect to the left of the direction of force. The result is that water tends to pile up in the

middle of the ocean basins as the major currents travel along their edges according to the Coriolis Effect. These circular water movement patterns are called 'gyres' and they play major roles in the global heat and marine life distribution. There are six major gyres – the North Atlantic and the North Pacific in the northern hemisphere and the South Atlantic, the South Pacific, the Indian Ocean and the Antarctic Circumpolar Current in the southern hemisphere.

Currents also persist below the upper layer of the ocean and are driven primarily by thermohaline circulation. This process is responsible for most vertical water movement and eventually circulates the entire ocean. This circulation starts because equatorial regions receive more heat than polar regions. Simplistically, water is cooled and made denser and less salty at the poles. This water then sinks and drifts towards the equator. As the water moves towards the equator, it is warmed and made less dense, therefore rising to the surface. Once on the surface it is pushed again towards the poles where it is cooled and the process begins anew.

Currents occur in oceans, but also to some extent in large lakes, seas and even smaller water bodies. However, the smaller the water body, the stronger the wind needed to develop a current of a given strength because there is less surface area across which to transfer energy. However, many large lakes have sufficient area to generate significant currents (and waves). □



# Plastic in our seas



**Plastic in the ocean could be breaking down faster than we initially thought!**  
 It's estimated that as much as 10% of all the plastic produced every year ends up in our oceans. The United Nations estimates that for every square kilometre of ocean there are 46 000 pieces of plastic, killing over a million sea birds and tens of thousands of mammals and turtles every year.



Tom Crowley

Traditional thinking has been that this plastic then continues to cause havoc for hundreds of years, gathering in areas like the Great Pacific Garbage Patch, also known as the Pacific Trash Vortex.

The Pacific Trash Vortex, discovered in 1997 by a Californian sailor, surfer and volunteer environmentalist, Charles Moore, is a large garbage patch of plastic stretching several thousands of kilometres created by Pacific Ocean currents. The currents have caused the plastic to gather in an area of no currents, called a gyre. Although scientists are unable to agree on the actual size of this plastic marine island – some estimate that it could be the size of Texas while others say it could be larger – the damage to sea life by this plastic death trap can only be imagined.

Initially it was thought that this large plastic rubbish heap was caused by shipping fleets that crisscross our oceans on a daily basis. Although the estimated 639 000 plastic containers thrown overboard everyday do contribute to this gathering death trap, this only represents 20% of the overall plastic pollution that flows into our seas, with the other 80% originating from land sources.

As if one of these plastic islands of trash was not enough, our planet has five other oceanic gyres where currents can trap garbage, causing similar plastic islands. We are already aware of a similar island occurring in the Atlantic Ocean, aptly named the Atlantic Garbage Patch, but who knows how many of the other gyres host similar marine life death traps.

The actual damage these Garbage Vortices cause to marine life will continue to be studied for many years, but now new evidence shows that plastic causes another danger to everything that calls the sea their home.

## Plastic could be decomposing faster than we thought

A recent study headed up by Katsuhiko Saido, a chemist with the College of Pharmacy at Nihon University in Japan, has shown that some of these plastics could actually be decomposing in the sea, releasing potentially toxic chemicals into the habitat of all our marine life.

Scientists previously believed that plastics only broke down at very high temperatures and over hundreds of years. Saido's team, however, collected water samples from oceans across the globe and found that these samples contained derivatives of polystyrene, a common plastic used in disposable cutlery, styrofoam and DVD cases amongst other things.

To prove that there was a link between these toxic compounds and plastic, Saido's team were able to simulate plastic decomposition at 30°C, leaving bisphenol A (BPA) and PS oligomers in the water,

the same compounds discovered in the ocean samples. These compounds are not naturally found in ocean water.

Finding BPA specifically in the water is a major concern as previous studies have shown that exposure to this compound can have an effect on an animal's hormone system. If an animal eats plastic, the plastic will not break down in the animal's system, but when the substance has been released into the animal's natural environment the substance may be absorbed by the animal. What effect this could have on animal's reproduction systems or ability to fight disease is anyone's guess.

## Where does this leave our marine animals?

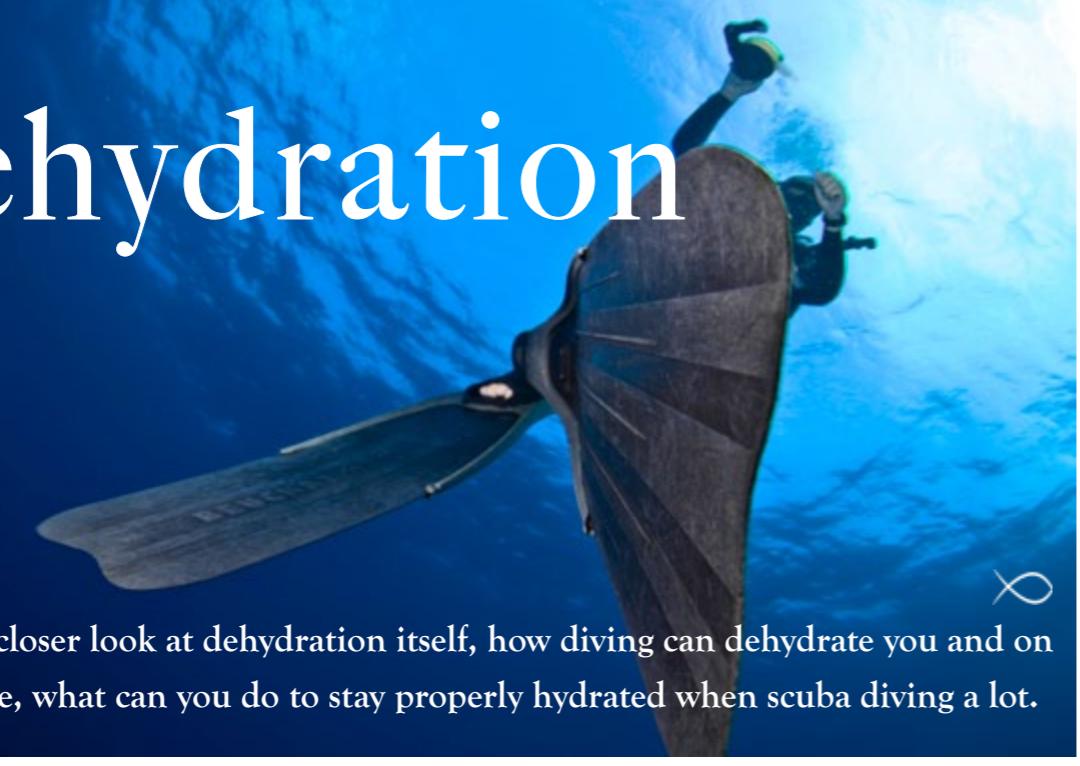
We previously thought that only actual plastic floating in the ocean could harm marine animals. Marine life is not always able to distinguish plastic from normal food and will often swallow your plastic bottle, take-away burger box or supermarket plastic packet (one of the trillion plastic packets produced every year).

This new research means that there are additional unseen dangers being created by the plastic we discard daily. Some scientists have questioned Saido's research, saying that 70% of plastic released into the oceans will probably sink before it decomposes and that not enough is known about whether the doses of BPA in the ocean will have any noticeable effects on the marine life we enjoy watching while diving at 25m.

The larger concern is that not enough research is being done on the overall effects our continued disposal of plastics is having on our marine life. We know they are being affected to some extent, we know there are already many species on the brink of extinction, yet we continue, as the supposedly intelligent species, to use and dispose of millions of tons of plastic into our precious oceans. Plastic is not killing our marine life, we are. █



# Dehydration



Let's have a closer look at dehydration itself, how diving can dehydrate you and on a practical note, what can you do to stay properly hydrated when scuba diving a lot.

The first time I ever sat up and took notice of dehydration was in the early 90's when two police divers undertook an underwater swim of several hours on scuba from Robben Island to Blouberg Beach. Unfortunately the record attempt had to be aborted because one of the divers experienced dehydration of the epiglottis. In hindsight I'm sure that's not the only manifestation of dehydration they must have experienced; however, the unbearable 'dry throat' must have been the most noticeable and unfortunately, the most debilitating symptom.

Although dehydration is a fairly common consideration for many divers and instructors that have a busy diving schedule, not too many divers out there fully understand the intricacies of dehydration. Some divers still think that a cold frosty at the end of the day's diving will do the trick - for some even in between dives. Sorry guys, but your favourite beer is not hydration.

## Different levels of dehydration:

**Mild** - the dehydrated individual will hardly notice the symptoms as the body is compensating quite well and might only be a little thirsty and fatigued.

**Moderate** - the body is finding it hard to maintain fluid balances for all metabolic requirements, will be even more fatigued and the diver could be quite

thirsty.

**Severe** - At this stage the body is way short of the cooling and lubricating properties that water offers the body and several systems could shut down, level of consciousness would drop, sunken eyes, reduced skin recoil (turgor), shortness of breath etc.

## Different ways divers can dehydrate:

**Alcohol** - the reason why beer (essentially alcohol) is not suitable for hydration is because alcohol is a diuretic - which means that alcohol (and caffeine too) stimulates urine production in the kidneys. This takes water from your body's cells and bloodstream to produce urine and if not replaced, can lead to mild or moderate dehydration.

**Perspiration** - excessive perspiration during heavy exertion in hot humid conditions, exacerbated by wearing thermal protection. Wearing a drysuit or thick wetsuit when diving in cold water during hot weather can also bring about excessive perspiration when you linger in the 'hot' suit before and/or after the dive.

**Vomiting** - caused either by the irritation of the gastric mucosa (stomach) or triggering to vomit by stimulus to the Central Emetic Trigger Zone (CETZ) of the brain.

**Diarrhea** - intestinal tract drawing water from your body to flush out the colon as a response to the

irritated (infected) mucous membranes.

**Scuba air** - high pressure compressors remove excess moisture from the air which your body in turn humidifies again for optimal respiration requirements. Over the duration of a dive a significant amount of body fluids can be 'cashed-in' to humidify the scuba air.

Another area of concern for a diver is with suspected Decompression Illness (DCI). During DCI the bubbles can damage the inner linings of blood vessels, causing fluid (plasma) to seep through the blood vessel walls after which a secondary inflammatory response ensues. That is why it is very important to, apart from administering 100% O<sub>2</sub>; hydrate the diver very well with a non-alcoholic, non-carbonated and non-caffeinated drink. Ideal hydration fluids are dependant on what's available, whether you are sustaining hydration or recovering from any one of the fluid loss mechanisms mentioned earlier. Obviously the best, cheapest and easiest ways to hydrate is with good ol' water. For sustained exertion where the aim is to not only replace water lost but also electrolytes, a balanced salt-solution like one of the many sports drinks available would be sufficient. Please note that most of these sports drinks are isotonic, thus for urgent

and prompt re-hydration they should be diluted with water (hypotonic) to leave the stomach quicker and reach the target areas rapidly through osmosis (osmotic 'pull').

The question is often asked when an ideal time to hydrate is. If possible hydration should take place frequently and from early on. Remember; if you're thirsty you've left it too late. If you are already dehydrated and the process continues, the body's ability to recover soon is compromised by the impaired cellular function due to inadequate lubrication. For endurance scuba diving events the process is a bit more complex and requires more practice and planning; preferably considering a back hydration pack with a bite-block that prevents the drink from being diluted or contaminated by the water being dived in.

Finally, preventing dehydration during recreational diving activities in a warm climate can be as simple as sipping regular gulps of water or your favourite sports drink throughout the day; and then a bit extra after each dive. So, drink-up and help your body and immune system cope better with the onslaught of the strange little bubbles and the dry scuba air.



# Global News

## World's First Documented Conjoined Gray Whales



A pair of conjoined gray whales has been found off the shore of Mexico, in what could be the first documented case of Siamese twin grey whales. Scientists in Mexico's Laguna Ojo de Liebre, or Scammon's Lagoon, discovered the dead calves, believed to have been miscarried as a result of their disability. Conjoined twins have occurred in other species, notably fin, sei and minke whales, however, research has not found any published cases of conjoined gray whale twins. Scientists in Mexico's Laguna Ojo de Liebre, discovered the dead gray whale calves, believed to have been miscarried as a result of their disability.

The carcass is only about two meters long, versus the normal three to five meters for new-born gray whales. Alisa Schulman-Janiger, an American Cetacean Society researcher, pointed out that the twins were severely underdeveloped and wondered whether the birth or stillbirth might also have killed the mother.

The twins' carcass has been collected for study. Images were posted by the Guerrero Negro Verde Facebook page, with the translated statement: 'Unfortunately, the specimen died. [Its] survival was very difficult.'

Gray whales are arriving in the lagoons along the Baja California peninsula, after a nearly 6,000-mile journey from Arctic home waters. They give birth during the southbound journey, or in the lagoons, and nurse their calves for several weeks before embarking on their northbound journey back to the Bering and Chukchi seas.

According to NOAA, the Pacific gray whale population numbers about 21,000. Most calves are born during the last week of December and the first two weeks of January.

Daily Mail

## Largest Whale Shark Slaughterhouse Uncovered in Southeastern China

The world's largest slaughtering facility for whale sharks – an internationally-protected endangered species – has been discovered near Wenzhou, in China's southeastern Zhejiang Province. The factory, which operates openly, is reportedly slaughtering over 600 whale sharks annually to produce shark oil for health supplements.

Revelations about shark-processing at the factory, located in Pu Qi township, near Wenzhou, follow a four-year investigation by the Hong Kong-based marine conservation NGO, WildLifeRisk. In a joint-statement released today, Alex Hofford and Paul Hilton of WildLifeRisk said: "We went to Pu Qi three times in the last three years, and on each occasion the scale of the slaughter was truly staggering. How these harmless creatures, these gentle giants of the deep, can be slaughtered on such an industrial scale is beyond belief. It's even more incredible that this carnage is all for the sake of non-essential lifestyle props such as lipsticks, face creams, health supplements and shark fin soup. We are calling on China's regulatory authorities to enforce the international agreements on this illegal activity now, before these animals are brought closer to extinction."

According to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), to which China is a signatory, the international sale of products from an endangered species is illegal and the trade is unsustainable. However, the WildLifeRisk investigation found that countless basking sharks and great white sharks – two of three species currently afforded the highest protection under CITES – are also being industrially processed at the Pu Qi factory.

The products derived from these protected species are being exported to the United States, Canada and Italy, in contravention of the internationally-binding CITES agreement. Undercover footage and audio recordings obtained by WildLifeRisk reveal that the whale sharks ending up at the factory are being caught off the coast of China in the South China Sea as they traverse the region on their migratory journeys. These extensive journeys across the world's oceans, take in such famous whale shark-spottng sites as the Ningaloo Reef off Australia's northwest coast, and waters off Indonesia, the Philippines and Mexico.

WildLifeRisk believes a compelling argument exists for the better protection of whale sharks in their natural habitats, maintaining that these endangered creatures are worth far more, in economic terms, alive rather than dead. According to the Pew Environment Group: "In regions where whale sharks are known to aggregate, ecotourism has proven to be an extremely lucrative alternative to fishing. It has been estimated that whale shark tourism, mainly through recreational diving, is worth about US\$47.5 million worldwide."

The WildLifeRisk statement pointed out that if whale sharks are to avoid being hunted to extinction, consumers must be persuaded to reject whale shark products, or any other kind of shark-related products. It said that the trade in endangered shark and manta ray products is both environmentally unsustainable and morally unethical.

"If we hope to save species such as the whale shark from extinction, we must hold individuals accountable for their violation of international protection laws and demand transparency so that consumers can make informed decisions about the products they buy."



## Palau declares EEZ a marine sanctuary

Tommy E. Remengesau, President of the Republic of Palau, a Pacific Island nation, declared the waters of Palau's Exclusive Economic Zone (230,000 Sq. Miles / 620,000 Sq. Kms.), as a marine sanctuary, during his keynote address at the United Nations Sustainable Oceans Forum in New York.

President Remengesau explains this initiative with very distinct word: "Palau's economic potential lies in tourism, not tuna. Tourism, in fact, already provides more than half of our GDP, and it depends upon our pristine marine environment." The declaration further stresses Palau's leading the way in conservation efforts. The country was the first nation in 2009 to declare its EEZ a shark sanctuary and article 6 of Palau's constitution requires its government to "take positive action" to conserve "a beautiful, healthful and resourceful natural environment."

Dermot Keane, founder of conservation organization Palau Shark Sanctuary and ardent protector of sharks, comments: "This is another great step in the right direction to protect Palau's pristine environment and its healthy marine ecosystem. 80 percent of global fish stocks are now fully or overexploited. Strengthening sustainable ecotourism makes perfectly sense for Palau and can hopefully be a role model to be studied by other nations in the Pacific region to follow the direction our nation is taking."

# Japan Accepts Court Ban on Antarctic Whaling

The UN's International Court of Justice (ICJ) has ruled that the Japanese government must halt its whaling programme in the Antarctic. It agreed with Australia, which brought the case in May 2010, that the programme was not for scientific research as claimed by Tokyo.

Japan said it would abide by the decision but added it "regrets and is deeply disappointed by the decision". Australia argued that the programme was commercial whaling in disguise. The court's decision is considered legally binding.

Japan had argued that the suit brought by Australia was an attempt to impose its cultural norms on Japan.

Science 'myth'.

Reading out the judgement, Presiding Judge Peter Tomka said the court had decided, by 12 votes to four, that Japan should withdraw all permits and licenses for whaling in the Antarctic and refrain from issuing any new ones. It said Japan had caught some 3,600 Minke whales since its current programme began in 2005, but the scientific output was limited.

Japan signed up to a moratorium on whaling in 1986, but continued whaling in the north and south Pacific under provisions that allowed for scientific research. Norway and Iceland rejected the provision and continued commercial whaling.

The meat from the slaughtered whales is sold commercially in Japan. Japan has clashed repeatedly with Australia and some other western countries, which strongly oppose whaling on conservation grounds. Japan has argued that minke whales and a number of other species are plentiful and that its whaling activities are sustainable. A spokesman for Greenpeace UK, Willie MacKenzie, welcomed the ICJ's decision.

"The myth that this hunt was in any way scientific can now be dismissed once and for all," he said.



# Great white shark journey



By Paul Rincon

A great white shark, called Lydia, is about to make history as the first of its species to be seen crossing from one side of the Atlantic to the other. The satellite-tagged 4.4m-long female is currently swimming above the mid-Atlantic ridge - which marks a rough boundary line between east and west. Lydia was first tagged off Florida as part of the Ocearch scientific project. She has travelled more than 30,500km (19,000 miles) since the tracking device was attached.

Dr Gregory Skomal, senior fisheries biologist with Massachusetts Marine Fisheries, told BBC News: "No white sharks have crossed from west to east or east to west." Lydia is now roughly 1,600km (1,000 miles) from the coasts of County Cork in Ireland and Cornwall in Britain, and nearly 4,800km (3,000 miles) from Jacksonville, Florida, where she was tagged by scientists in March 2013. Dr Skomal explained: "Although Lydia is closer to Europe than North America, she technically does not cross the Atlantic until she crosses the mid-Atlantic ridge, which she has yet to do.

"She would be the first documented white shark to cross into the eastern Atlantic." The mere act of tagging a great white shark (*Carcharodon carcharias*) is a feat in itself. The scientists have been using a custom-built 34,000kg (75,000lb) capacity hydraulic platform, operated from their research vessel the M/V Ocearch, to safely lift mature sharks so that researchers can tag and study them. Lydia is over the underwater mountain system known as the Mid-Atlantic ridge and is now roughly 1,600km (1,000 miles) away from the British Isles. The Ocearch project was initiated to gather data on the movements, biology and health of sharks for conservation purposes as well as for public safety and education.

Though Lydia's journey is impressive, the sharks are known for their marathon migrations of thousands of kilometres. A great white nicknamed Nicole travelled from South Africa to Australia and back - a circuit of more than 20,000km (12,400 miles) - over a period of nine months between November 2003 and August 2004.

As for where Lydia might go next, Dr Skomal explained: "We have no idea how far she will go, but Europe, the Med, and the coast of Africa are all feasible."

## Send us your news.

Do you have any interesting, newsworthy info to share with the diving world? If so, we would like to invite you to send us your Global News section for possible inclusion in the magazine (Inclusion is FREE of charge).

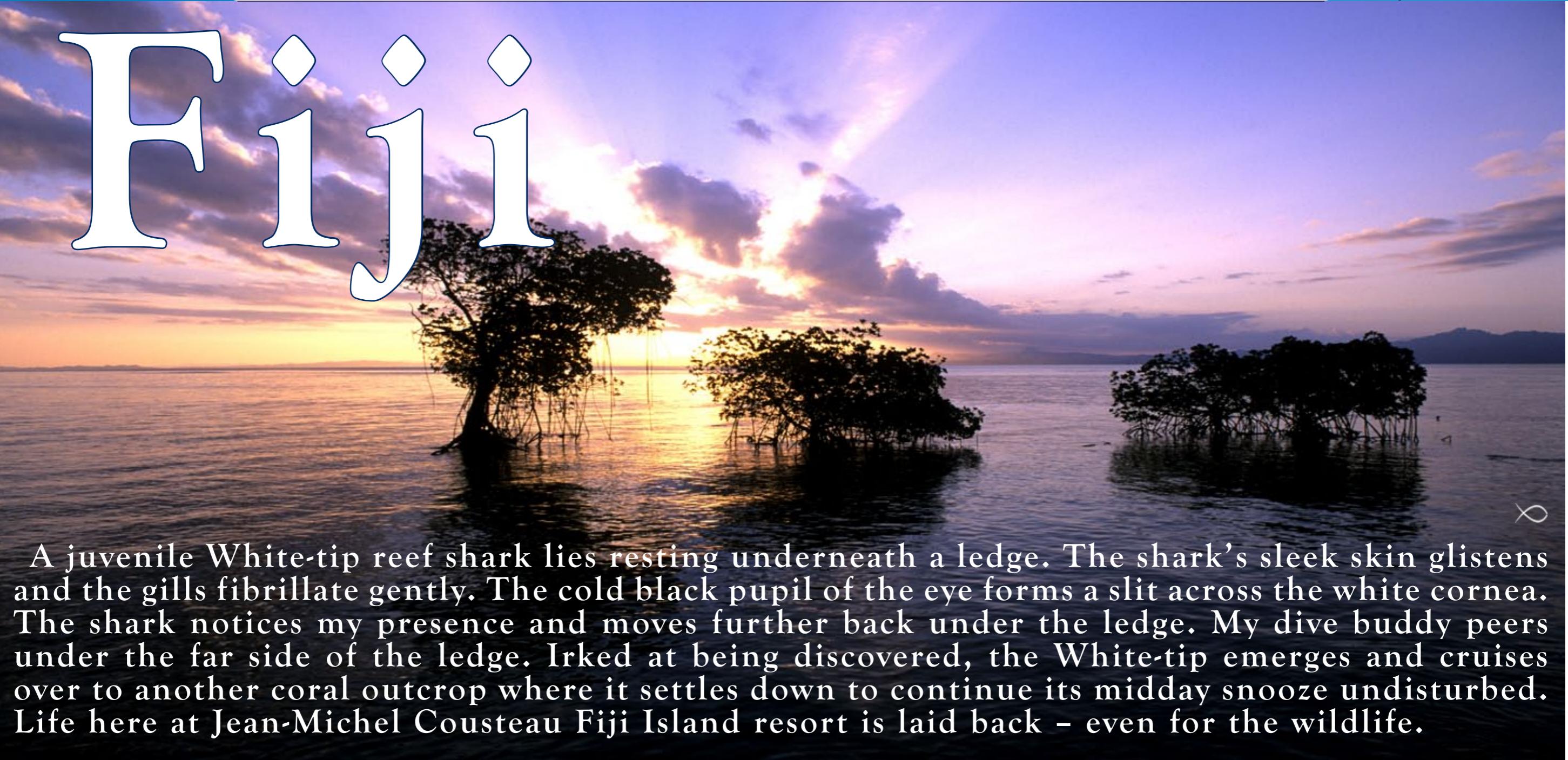
Here's what we need:

- Newsworthy stories (promotional material will not be accepted)
- Word limit: 150 words
- Text prepared in a Word document
- Accompanying high-resolution image(s) are welcome (please supply caption and image credit)

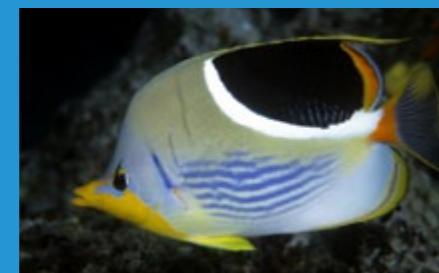
Please send to [info@ozdiver.com.au](mailto:info@ozdiver.com.au)



# Fiji



A juvenile White-tip reef shark lies resting underneath a ledge. The shark's sleek skin glistens and the gills fibrillate gently. The cold black pupil of the eye forms a slit across the white cornea. The shark notices my presence and moves further back under the ledge. My dive buddy peers under the far side of the ledge. Irked at being discovered, the White-tip emerges and cruises over to another coral outcrop where it settles down to continue its midday snooze undisturbed. Life here at Jean-Michel Cousteau Fiji Island resort is laid back - even for the wildlife.



Situated 18° south of the equator in the Pacific Ocean, Fiji comprises over 322 islands of inhabitable size. Jean-Michel Cousteau Fiji Island resort is located on Vanua Levu, the second largest island in the archipelago. Jean-Michel Cousteau, famed oceanographer, fell in love with Fiji and its delightfully friendly people many years ago. Later he converted 17 acres of coconut plantation at the edge of Savusavu Bay into a luxurious retreat. Through this eco and culturally friendly resort, Jean-Michel passes on his love of the ocean, land and culture of the Fijian people.

Leaving the White-tip reef shark I swim across a carpet of hard corals punctuated by coral castles encrusted with flamboyant soft corals. A Blue-ribbon ray glides effortlessly over the reef. Further on a Giant moray peeks out from a rocky crevice, its mouth gaping aimlessly as it watches us pass by. We are heading towards Dreadlocks, a site in the middle of Savusavu Bay where two undersea mounts rise from a depth of 20m to 5m below the surface. The name Dreadlocks is derived from the intertwined masses of soft corals that cascade down the reef



Filefish

walls. A small shoal of blue and yellow fusiliers leads the way towards the first of the seamounts. I am in awe of the colourful spectacle before me. Delicate soft coral sprigs lavishly festoon the reef and huge bouquets of soft corals are juxtaposed against the hard coral structures. Florists would be envious of the arrangements. Clouds of dancing pink, orange and purple anthias bustle amongst the soft corals.

Midway up the pinnacle a large cave recess is filled with a swirling congregation of glassies. The glassies move in perfect unison, undulating like a scarf blowing in the wind. Nearby lurks a watchful Devil firefish eyeing his next meal, its poisonous spines in resplendent battle display. It is a formidable sight for the diminutive glassies who swarm into the safe retreat of the soft coral thicket. Feigning disinterest, the Devil firefish nonchalantly turns away from the reef but keeps one eye on his prey's movements, ready to resume the hunt.

The shallower parts of Dreadlocks are a pink fantasy. Soft corals are found in hues of pink ranging from baby pink through to salmons,

crimsons and cerise. Even the anthias are predominantly pink and purple. The second pinnacle is just as spectacular as the first. A myriad of colourful fish stream through the gin-clear blue waters. Explosions of colour emanate from the tangles of colourful crinoids and assorted reef life. However fitting the name Dreadlocks may be, the reef certainly deserves a name more reflective of the passionate colour pink.

## A spectacular resort

Jean-Michel Cousteau Fiji Island Resort has two main objectives. The first is to create an environment where one can relax, unwind and be rejuvenated, pampered and indulged in a heavenly tropical setting. The manicured, lush tropical gardens interweave amongst the towering coconut palms creating privacy and tranquility for each of the 23 luxurious thatched bures. Each bure features either a magnificent sea or garden view from a private wooden sundeck. Lazing in the double hammock on the sundeck I absorb the ambience of the setting. Overhead in the rustling palm leaves, wild parrots squabble over roosting sites. A sea breeze passes gently through the open wooden French shutters of the bure. As dusk approaches, a Fijian dressed in traditional grass skirt performs the time-honoured ritual of lighting paraffin lamps on the waters edge using a flame torch. Oblivious to the world, I allow the gentle rocking of the hammock to lull me into a tropical doze.

The second objective of the resort is to arouse awareness and stimulate an interest in the environment and culture of Fiji. Resort activities are planned around a daily theme, such as 'Day of the Rain Forest' and 'Day of the Feast'. Jean-Michel Cousteau believes we need to understand the oceans in order to protect them - if water is the source of life the oceans must be sustained. On the 'Day of the Coral Reef' the resident marine biologist, Mike Greenfelder, has his hands full as he enlightens landlubbers on the wonders, fragility and powers of the ocean. Experiences include snorkelling trips, making fish prints, glass bottom boat adventures and discovering scuba. In addition to leading marine activities, Mike successfully tenders a clam-growing project. Once threatened by over harvesting, clams are grown to a reasonable size before being returned to the ocean. On the day of ocean awareness, the resorts dive shop, L'Aventure Divers, advertised a special opportunity for divers to visit Namena Island.



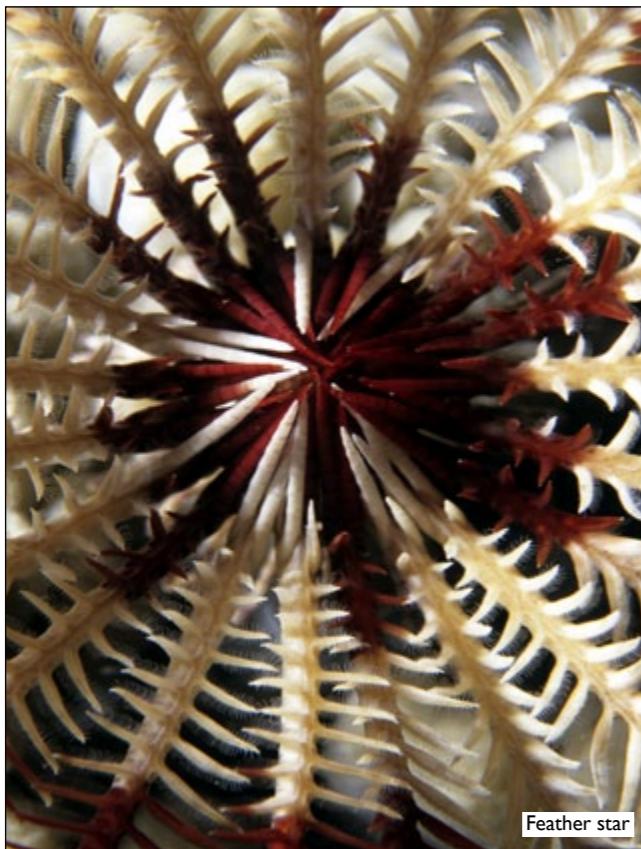
Anemone



Gorgonian fan coral



Leaf fish



Feather star

Namena Island reef is rated as one of the top ten dive sites in the world. A mere 20 miles south of Savusavu, the island is only visited by liveaboard dive boats and, of course, L'Aventure divers. The local chief who owns Namena has applied to have the island registered as a marine reserve. He has not granted fishing rights in the vicinity and access to the island is restricted – the phenomenal marine life bears testament to this. Boobies, terns, frigates and tropicbirds colonise the coastal forests and the deserted beaches create a valuable nesting site for both Hawksbill and Green turtles. Underwater the magnificent coral reefs are untouched. Waters from the nearby Koro Sea bring big fish activity to Grand Central. The spurs of the reef flourish with soft coral growth and teem with fish life while the current attracts Barracuda and Kingfish like a magnet.

Close to Namena Island you will find Chimneys, an incredible site consisting of two towers slightly off the main reef. These two chimneys are covered in fans and soft corals epitomising the nickname 'Soft coral capital of the world' that Fiji has earned. Fans quiver and whip corals sway gently in the current. Colourful crinoids cling to the brim of the fans taking advantage of their precarious position to feed in the nutrient rich waters. As one side of the chimney is always facing directly into the current, there are always soft corals in full bloom. As the tidal current turns the goldies move around the soft coral forests continuously feeding on passing plankton.

At Jean-Michel Cousteau Fiji Island Resort the old adage of "children should be seen and not heard" is exercised. A Bula Camp for children up to the age of nine is full of exciting happenings. It's a holiday within a holiday for parents. Each child is issued with a 'Bula Camp Passport', and when this passport is filled with incentive stamps the child wins a prize. The stamps are awarded for participation in activities or completion of tasks. Planting mangroves, flower painting or learning Fijian arts and crafts all earn stamps, as do snorkelling, rain forest walks and kayaking. Children join their parents after the evening meal exhausted and happy.

#### Fine dining

Jean-Michel Cousteau Fiji Island Resort has won many awards, one for the Best Food in Fiji. Executive chef, Vijendra Kumar, creates diverse cuisine evolved through the influence of geography,

Indians and indigenous Fijians. The resort grows 40% of its vegetables organically on site, so scrumptious salads with rocket, basil and homemade pesto are fashioned daily. Luxurious artichokes, anchovies, peppers and capers are served as starters. The desserts are irresistible with choices such as melon balls steeped in liqueur and brownies drizzled with chocolate.

In keeping with Jean-Michel's philosophy to promote Fijian culture, a traditional lovu feast is held weekly. A pit oven or lovu is prepared on the shore of the island. Allegedly, this was the cooking method of cannibals. Nowadays meat wrapped in banana leaves is braised slowly in the lovu with tender, succulent results. Traditional delicacies such as nama or sea-grapes appear as hors d'oeuvres. These salty tasting little beads resemble the caviar of the sea. Kokoda, raw fish marinated in a very spicy coconut cream, is for the adventurous and not the fainthearted – sushi lovers may be tempted by the description, but beware of the Indian influence. Another traditional food is the dalo vegetable, which is comparable to spinach in taste and texture. Many more interesting and unusual dishes are prepared for the lovu feast.



After dinner the multi talented staff fill the tanoa bowl with kava and strike up as 'The Beach Boys Band' – entertainment for the night. Guests are invited to join them around the tanoa bowl to learn the art of kava drinking. Kava, otherwise known as yaqona, is the national drink of Fiji. Made from the roots of a pepper plant that has been dried and ground, kava is then infused through a cloth. Kava has no alcoholic properties and my faithful guidebook describes it as 'a drink of relaxing properties'. Drinking kava was once a religious observance and thus remains a ceremonious affair



Kingfish

**By Jeanne Liebtrau and Peter Pinnock**  
-the soles of feet must not point towards the chief or the kava bowl as this is considered disrespectful. The bilo (coconut shell) is offered around the circle starting to the left of the bowl. As each person accepts the bilo he/she claps once and says "Bula" (life). The silt-like liquid is drunk without hesitation. The bilo is handed back followed by three slow claps and "Vinaka" (thank you). This ritual could go on for hours but at some stage the revelers feel ultra relaxed and the huge king size bed in the bure calls gently. Imbibed with kava the sounds of the ocean penetrate the soul rousing the desire to return to the underwater realm.

L'Aventure Divers typically offer two morning dives returning for lunch and an optional afternoon or night dive. Diving at night is the best time to explore the reef in detail as the soft corals are a safe haven for a multitude of marine life. Yellow damsels in a quest for refuge are well camouflaged against the delicate yellow soft corals and under the cover of darkness, Decorator crabs emerge from hiding. Brightly coloured Brittle stars entwine their arms around soft corals as they feed on small organisms while Parrotfish are found in every crevice of the reef seeking dormitory space. The active creatures are the sharks. White-tip reef sharks pursue their

prey at night and beyond the torch beam they patrol the reef. Often the only indication of their presence is the cracking noise heard as they feast on their victims. The once laidback White-tips reef sharks are the nighttime hunters on the shallow reefs in fabulous Fiji.

From action packed to calm picturesque dives, Fiji has it all. Jean-Michel Cousteau Fiji Island Resort niftily balances ocean adventures with luxurious living. Experience the friendliness of Fijians, partake in their unique culture, indulge in fine cuisine and enjoy the artichokes. □

## Information:

**Location:** East of Australia in the South Pacific Ocean

**How to get there:** Air Fiji and Sunflower Airlines fly to Savusavu from Nadi International on Viti Levu

**Language:** English, Fijian and Hindustani

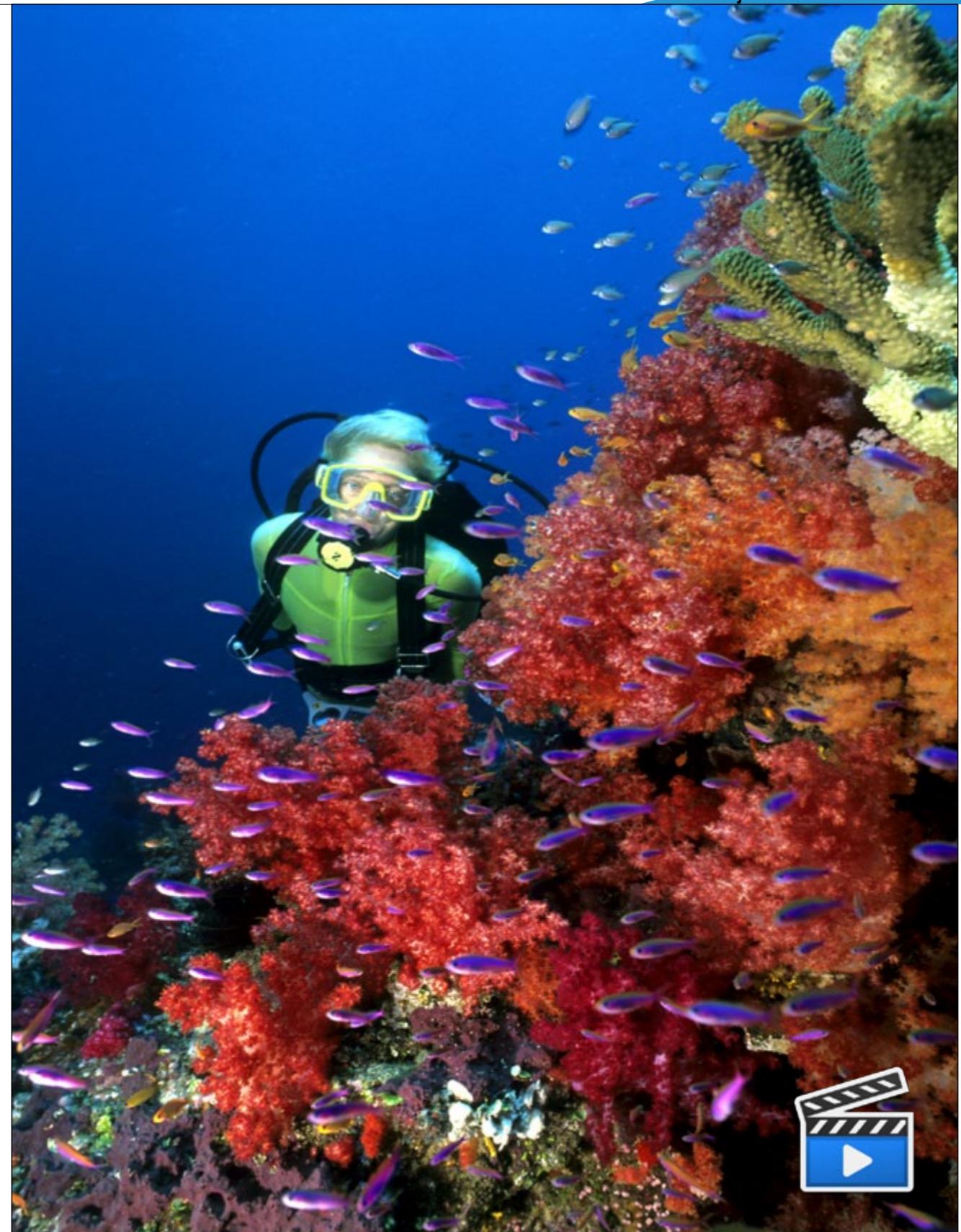
**Visas:** Not required for a stay less than four months

**Currency:** Fijian dollar

**Wet season:** Hot and humid from November to April

**Dry season:** Colder and drier May to October

**Contact:** [www.fijiresort.com](http://www.fijiresort.com)



# Raja Ampat



The mechanical needs of a coral reef are similar to that of a car's engine. Raja Ampat in the Pacific Ocean is an example of a finely tuned engine.  $\infty$



Rich in diversity beyond imagination, scientists are constantly breaking fish-recording records on Raja Ampat. During a Rapid Ecological Assessment by Nature Conservation's Indonesia programme, the renowned ichthyologist Gerald Allen broke the record for the most fish ever recorded on a single dive – 283. His mate, coral expert Charles Vernon, recorded more than 450 species of hard corals.

Raja Ampat has all the required elements for a dynamic engine. Located on the equator, it has plenty of sunshine essential for rapid coral growth. The water temperature is a constant 28°C and human impact is minimal. Currents from the nearby Philippines, Maluku Islands and Australian seas converge here, bringing nutrient-rich waters to fortify the reefs. It is also protected from tropical cyclones by the mainland island of Papua (formerly Irian Jaya) lying to the east.

The Indonesian name Raja Ampat means "Four Kings" and is a reference to the four main island groups, namely Salawati, Batanta, Waigeo and Misool. Even though there are over 15 000 islands



Hawksbill turtle



in the area, there is only one dive resort and very few live-aboard boats. SMY Ondina, a wooden Buginese-style schooner, has explored these waters for a number of years. The Ondina sails through Raja Ampat from October to January, departing from Sarong. Co-owner Ricardo Buxo is fluent in at least three languages, while his charismatic dinghy driver, Michael, makes up for his lack of English with plenty of loud laughter and huge smiles.

"Salamat pagi," Michael greets us as we board. "Welcome. We go to Misool. Good, good." Then he laughs loudly and gives us a bear hug.

The remote islands of Misool are a range of inhospitable limestone structures created millions of years ago by the tectonic forces of Mother Nature. With precipitous cliffs, craggy spires and razor-sharp rocks, even the hardiest of trees battle to find root anchorage. Many small islands are carved into mushrooms by the constant gnawing of the currents. The only fresh water is donated by the heavens. Fishermen venturing south in their outriggers are frustrated by endless days at sea with land in sight, but nowhere to beach. The fish, however, love it, since they have only their natural enemies to contend with.

"Aros," yells Michael excitedly as he looks at the sea bubbling ahead. It indicates a strong current and we must hurry to get the best of it. "Satu, dua, tiga," he shouts, counting us down for the descent. We roll off the boat into the richness below. The reef is vividly plastered with brightly coloured soft corals.



Sea horse

Whoever nicknamed Fiji the soft coral capital hasn't visited Misool. The dense soft coral jungle begins in the first meter. Orange soft corals, frequently only encountered at depths, bloom in the shallows. A wall reminiscent of a sunflower field is festooned with yellow soft corals. Huge bouquets of purple, crimson, pinks and reds cascade down the side of bommies. Then there are the fish – and there is certainly no shortage here. Phenomenally large



Surgeonfish

schools of fusiliers, surgeons and jacks shoal near the drop offs. It's as if we are watching a Discovery Channel documentary.

As we progress, the current drops and the soft corals, so resplendent when pumped full of water, relax. Their dinnertime is over. Billowing waves of feeding anthias stop and instead mingle closer to the reef. The predatory attacks by the jacks and trevallies diminish. All is seemingly quiet, but a distinctive crunching sound is heard above the crustaceans' clicking chorus. A hawksbill turtle is chewing on a sponge. Turtles are on the endangered species list, because in Indonesia they are relished for their meat. This hawksbill is safe from humans in Misool, but to where will its travels lead? Brought back to reality by this thought, I realise that the show is over and that it's time to surface. Michael grins as he loads the dive gear. "Munching barracuda," he chortles. I have no idea what he is talking about, but he is happy and so am I.

**Barracudas**

The islands near Batanta are not as inhospitable as those around Misool. Small primitive villages line the narrow beaches against a backdrop of forest and palm trees. Local legend Papa Yafat, his family and Jason the cockatoo occupy the island Wai. Papa Yafat has an enviable hard coral garden on his doorstep. Boulders of brain corals, pockets of mushroom corals and shelves of plate coral intersperse with green coral trees and long whip corals. The hard corals are not just the standard military brown, but red, blue and orange. World War II wreck enthusiasts usually visit Wai to dive a P47B plane lying in 27m of water. It is one of seven planes that went down near Wai; another lies at 45m, while a third one is no longer recognisable in the prolific shallow hard coral gardens.

A tidal current called The Passage rips between the islands of Gam and Waigeo, bringing nutrients to the reefs. With

its brownish water and cliff faces on either side, the current resembles a river. Parrotfish, goatfish and shrimp gobies swim among sea fans, clams and stony corals. Rays of sunshine filter through the dense foliage and cast a dappled light on the waters below. In the calm waters of the coves and bays, archerfish swim parallel to the surface, darting amongst fallen logs and sea fans as they search for insects in the jungle overhead.

The Ondina usually ends diving near Kri. Papua Diving, based at Kri Eco Resort, also operates in the area. These islands have the most diverse mechanics to service the reefs. Fish, crustaceans, nudibranchs and cephalopods all work the reef day and night. Sardine Reef is not named after sardines, but for the feeling of being packed in a can one gets when diving. Mike's Point is famous for huge schools of sweetlips, while Mioskon has a bit of everything - hard corals, soft corals, pygmy seahorses and giant trevally.

At the right tide, the point of Cape Kri pumps with activity. Huge schools of surgeonfish block out the sunlight as they move down the length of the reef. Otto, Papua Diving's guide, draws our attention away from the circling barracuda and shoaling batfish and points to the delicate strands of a hydroid. Something resembling reef dandruff purposefully drifts from one hydroid to another. It is a pygmy seahorse no bigger than 5mm, sporting a yellowish body and a reddish head. (Max Ammer, the owner of Kri, is hoping that this seahorse, not yet described by science, will be named after Otto who first discovered it.) Next, a pack of kingfish attacks some fusiliers overhead. One is singled out and with lightning speed the kingfish sweep in for the attack. Soon a few scales drift down. Otto calls again. This time he points out a pink pygmy seahorse (*hippocampus bargibanti*), which is perfectly camouflaged in a fan. Thanks, Otto, but the big fish action has my full attention. The giant barracuda have settled in a hollow on top of the reef and a blue-striped cleaner wrasse is busy grooming the scales of the largest one.

**Pygmy sea horse****Corals**

Three other barracuda wait their turn. This is weird stuff: the big hunters being cleaned by fish that would normally suffice as hors d'oeuvres.

Manta Point, where tidal currents torrent over a shallow reef, is the perfect spot for mantas to stop and hover. Here they can dine on plankton while having their wings and gills preened by diligent cleaner wrasse. There are mantas large and small, some with dark bellies and white markings, others black-on-white, some with short tails and others with crooked tails. They all congregate to partake of the free cleaning service and we spot more than 25 mantas at once.

Raja Ampat is a booming healthy engine with a bounty of fish, corals and critters. The scientists completed their preliminary study in 2002 and recommended that it be declared a World Heritage Site. May it happen soon – it is imperative that we look after this “engine of the Pacific”. ▀

By **Jeanne Liebtrau and Peter Pinnock**

### INFO BLOCK

**Location:** Eastern half of New Guinea Island, north of Australia.

**Language:** Bahasa Indonesian; English widely spoken.

**Visas:** Required. Some nationalities may purchase a 30-day visa at the airport, so check with your embassy.

**Getting there:** Fly to Manado via Singapore, where you will need to overnight, then fly on to Sarong.

**Currency:** Indonesian rupiah, and new US dollar notes can be exchanged. Travellers' cheques and Visa cards are generally not accepted.

**Best time to go:** Raja Ampat is on the equator and can be dived all year.

**Water temperature:** 28°C to 29°C throughout the year.

**Topside attractions:** Raja Ampat offers very little for the non-diver, but birding and fishing are available.

**Health Warning:** Malaria risk.

**Who to contact:** For live-aboard trips, visit: [www.smyondina.com](http://www.smyondina.com), or find land accommodation at [www.iriandiving.com](http://www.iriandiving.com).

For more underwater images and stories, visit [PeterPinnock.com](http://PeterPinnock.com).

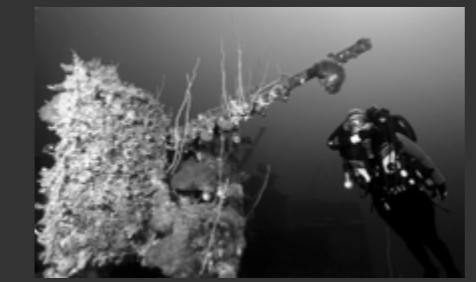
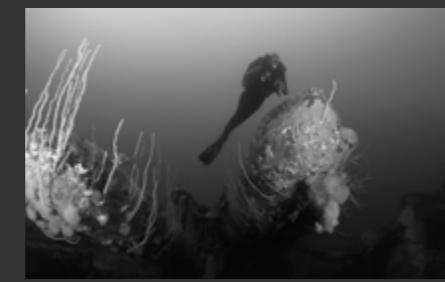




# Torpedoes, bombs and really, really big guns

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## Bikini Atoll



The distinctive shape of a flight deck materializes as I descend to 30m. I imagine a fighter plane returning - mission complete. The pilot negotiates the approach, the deck crew ready for the landing, the fire fighting crews on standby and gunners scanning the skies for stray enemy aircraft. I fin over the vast deck from which hundreds of planes had taken off and landed on. A fine layer of silt stirs to reveal the rivets that once held the teak planks together.

In the sponsons on either side of the deck, rows of live ammunition is stacked ready to be loaded into the tactically positioned 5" 38 calibre guns and MK2 Quad 40mm guns. The rubber focusing eye-cup on one of the 38 calibre guns is still in good nick. A colony of whip corals growing on these weapons softens the harshness of the scene and schools of coral groupers lazily swim over the piles of ammunition. In front of the bridge, the No 1 twin 5" 38 calibre guns stand, resolutely pointing to the skies. How many planes did these big guns shoot down during combat?



On the bridge, the flight deck control room and aerological platforms are invitingly open. Further up, inside the communications room, the identification labels marking the speaking tubes to the decks below are clearly legible - Aviation Ready Room, Main Communication Station and Captain's Emergency Cabin. A table in the navigation room is a treasure trove of historical artefacts. This is the scene on a check-out dive of the USS Saratoga CV3 at Bikini Atoll - the largest diveable aircraft carrier in the world. To put her size into perspective, she is 3m longer than the Titanic.

The Saratoga was one of 73 target vessels for the atomic tests performed on Bikini Atoll. In 1946, fully laden battleships, battle cruisers, destroyers, transport ships, landing craft and submarines were strategically placed inside the atoll for Operation Crossroads. Today, these wrecks are the property of the Bikini people. Since 1996, Bikini Atoll divers have been taking adventurous souls underwater for

truly incredible exploration dives. The history of Bikini, its people, the tests and the diving is an amazing story to hear.

After WW2, the USA was the new superpower and wanted to do tests on the atomic weapons that had just destroyed Hiroshima and Nagasaki. Bikini Atoll was identified as the ideal location. It was sheltered with predictable weather, was under Allied control and only 167 people would need to be relocated. The Bikinians were approached one Sunday after their church service and were told they needed to give up their island paradise for "the good of mankind".

Perhaps they were intimidated by the monstrous battleships that were parked in their lagoon, or perhaps the Sunday spirit had something to do with it, but soon the Bikinians and their fishing craft were shipped off to Rongerap Atoll, 201km away. Bikini Atoll was transformed into a camp for the 42 000-odd people involved in the tests,



including observers and the press. The first test was an aerial drop called the "Able Blast". The press labelled it a spectacular flop. While it missed the target ship, it managed to sink five others: the HMIS Sakawa, the USS Anderson, USS Lamson, USS Gilliam and USS Carlisle. A day after the test, US personnel boarded the remaining ships to retrieve monitoring equipment. Radiation levels were extremely high but minimal protective clothing was worn. The world was



still blissfully unaware of the invisible danger of nuclear fallout.

The second test took place three weeks later. "Baker Blast" was an underwater nuclear explosion. It was a spectacular sight as tons of displaced ocean and pulverized coral was sucked upwards into a huge mushroom cloud. This blast sank seven vessels immediately, including the submarines USS Apogon, Pilotfish and Skipjack. The USS Saratoga was badly damaged and sank a few hours later, as did the HMHS Nagato. Other ships that were badly damaged but hadn't sunk were later scuttled. Although the third test on Bikini was cancelled, the US continued to test further nuclear weapons in the atoll until 1958.

By Jeanne Liebetrau and Peter Pinnock  
While all this was going on, the Bikinians were starving on their new island home. The lagoon produced little fish and only small coconuts were to be found. Once again they were moved, first to a tent city on Kwajolein and then to Kili Island, where many of them still live today. In 1968, officials declared Bikini to be radiologically safe for the people to return. Few did return in 1971, but within a few years medical examinations found unacceptably high levels of cesium-137 being ingested through eating coconut and banyan fruits. The Bikinians were relocated once again. Through the efforts of Jack Niedenthal, legal action was taken against the US government in 1982. The Bikinians won the case and were awarded a resettlement trust fund. Bikini Island though, remains elusive for Bikinians as all food must be imported. This makes traditional living on

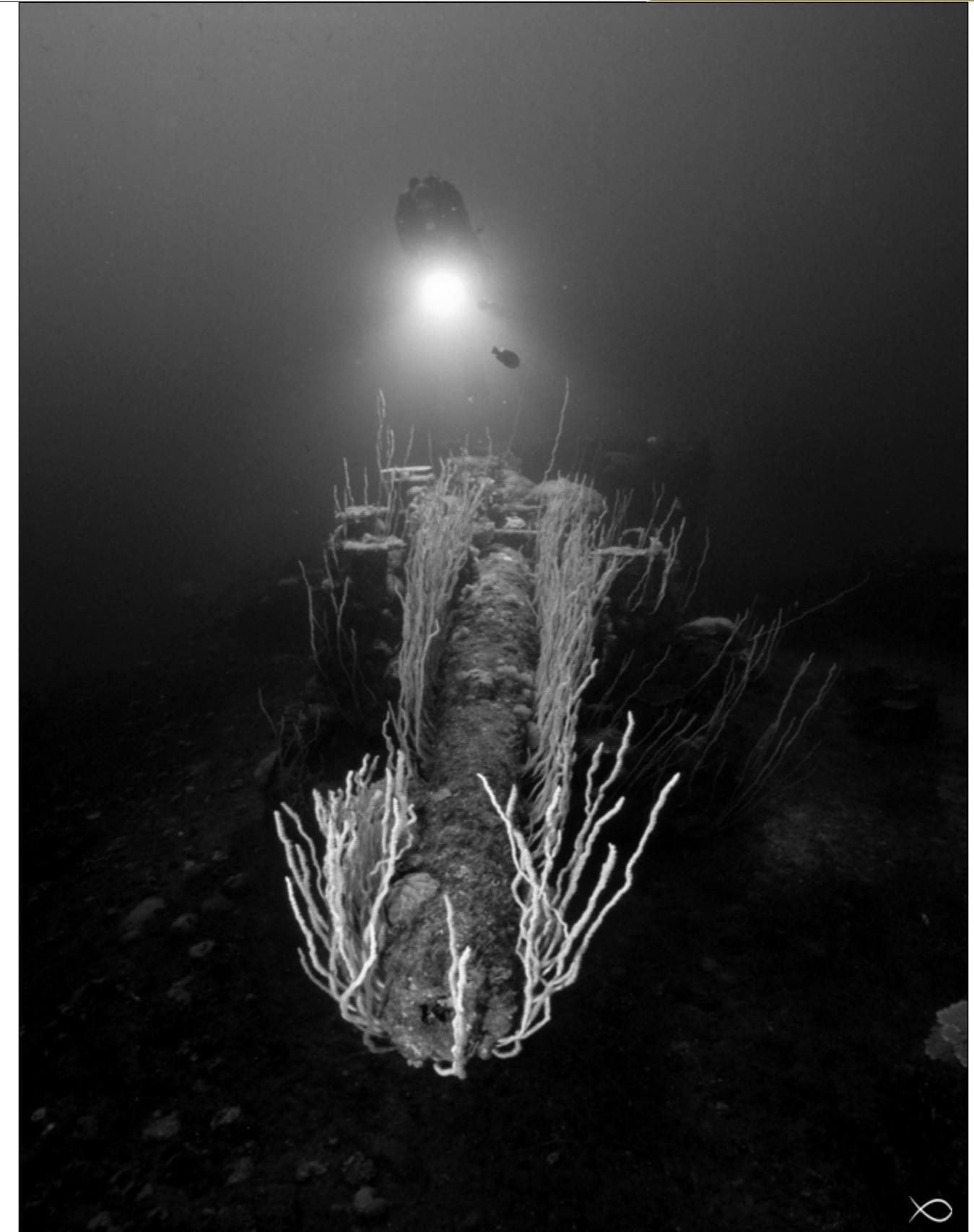


the island unviable.

Bikini Atoll divers live in simple yet comfortable accommodation. Food is brought in by supply ship or plane, the water is safe to drink and ice-cream is on tap in the dining hall. The only other people living on the island are the Park officials who maintain the island for the visiting scientists who monitor the radiation levels in the coconut plantation. The nearest island is 201km away and there is only one flight each week to the atoll. Dive safety is therefore of paramount importance and detailed briefings include the wrecks history, the dive plan and an emergency plan. The danger of diving Bikini is not the radiation, but rather the depths.

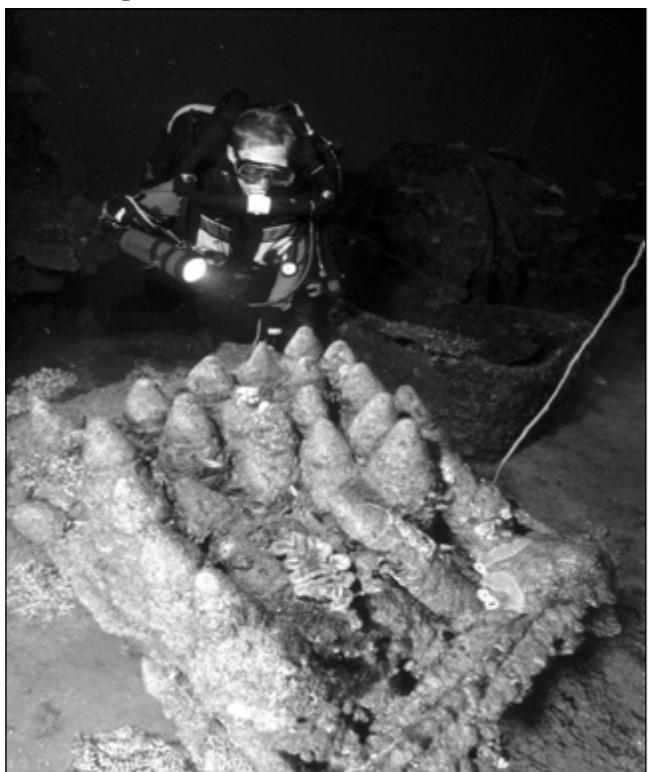
Listening to the Saratoga's history, it was clear that she demands a lot of respect. "Sara" was the first vessel to be launched as an aircraft carrier. At 251m long, she was the largest vessel in the sea and could cruise at a speed of 22 knots – the fastest at the time. Her cargo of 82 aircraft took part in many air strikes in the Pacific and were recorded as having sunk at least one aircraft carrier, two cruisers and several destroyers. Damage was caused to one battleship, several destroyers and numerous merchant ships, as well as hundreds of aircraft. She became a legend when, in the battle of Iwo Jima, she was badly damaged by five kamikaze pilots and bombs but still didn't sink. Firemen doused her burning deck which was rebuilt in only five hours.

The second dive on Sara saw us head down her elevator shaft into the hangar deck.



Rows of incendiary bombs and Mark 64 aerial bombs greeted us as we entered. She may have been down here for 50 years, but the live ammunition still makes me nervous. Parked in a corner is a Curtis SB2C Helldiver, largely intact apart from the engine cowling that has fallen off. The dials, gauges and other instrumentation meters are frozen in position. The hangar deck ceiling has collapsed, crushing many of the planes, but amazingly there are still some fluorescent lights that survived both the blast and the sinking. Exiting the hangar deck, we were greeted by complete chaos. Crockery and cutlery is scattered all over the place. With little time to scratch around, we proceeded to the command tower where the compulsory decompression stops allowed us time to explore each of the decks.

The bow dive on the Saratoga is a phenomenal experience. She sits upright on the lagoon floor at a depth of 52m, with the bow curving gracefully towards the flight deck at 32m. Her heavy anchor chains lie tossed on the sands below and a giant hole is reminiscent of the stockless anchor's size. A healthy growth of long whip corals blurs her sharp outline when viewed from afar



and I felt dwarfed by her sheer size. Lying on the sand beyond the bow are two planes that were blown off the flight deck in the blasts. One is a Helldiver and the other is a TB Avenger Torpedo bomber. The bomb bay of the Avenger is open and reveals her lethal cargo. Both planes resemble dead insects with their wheels protruding helplessly upright in the water.

Over that week, we managed to dive on seven different wrecks. Nothing has been removed from these wrecks - each one remains armed with tons of unexploded ammunition and massive guns. At the stern of the USS Lamson, a 104m long Mahan class destroyer, racks of depth charges are positioned for quick release into the ocean. There are 5" 38 calibre guns, 50 calibre Bofor machine guns and 20mm anti-aircraft guns. Interestingly, the red glass on the engine telegraph survived the blast.

The USS Anderson was a destroyer and she was the only vessel whose ammunition went off during the tests. Despite this, the glass in her portholes survived, as did at least 12 torpedoes being stored on her deck. Being so close to the Baker Blast, the battleship USS Arkansas was unceremoniously dumped upside down. The superstructure didn't have time to fall off, resulting in her now resting on it with the turrets of the No 1 12" 50 calibre guns projecting out from underneath her deck. Wooden crates filled with unexploded, emerald-green proximity-fused ammunition lie alongside her.

The USS Carlisle was a transport ship that was loaded with 5" 38 calibre anti-aircraft guns and Bofor machine guns, along with a consignment of ammunition. In the 1940s, transport ship manufacturing was a hurried process and many were made with inferior steel. Today, her metal parts creak eerily in the currents. The USS Apogon is perhaps the most intact diveable submarine. In fact, the Apogon was pumped out and re-floated after the blast, but it wasn't worthwhile to maintain the pumps so she was left to sink again. On her bow, the open torpedo door reveals a 24MK torpedo ready to be fired. In front of the conning tower stands a 5" 25

calibre gun aimed towards the bow.

The most infamous of the ships is the HIMJS Nagato. This was Admiral Yamamoto's command centre for the attack on Pearl Harbour. The Nagato rests upside down on top of the biggest guns imaginable. With some tricky bearing and elevation calculations, these guns could fire an unbelievable distance of 33kms. The projectiles for the four twin-mounted 16" guns weighed in at 900kg each. Swimming underneath the deck is unnerving - there are several tons of once hostile steel overhead. The pagoda (bridge) was built exceptionally high to accommodate the gun director's view. This fell off as she turned sideways and is lying alongside the upturned hull. Swimming past, I wondered which deck Yamamoto was on when he received the signal that the attack on Pearl Harbour was a success. I moved away from those horrific thoughts and headed for the four giant propellers. Nature is now in command of the props that once powered this heavyweight battleship to 26.7knots. Lightly encrusted with red and orange growth, it's a reminder that everything has an end. For me, this was the end of an incredible journey into the past and the beginning of hopes for a return in the future. ▀

### How to get there

From Marshall Islands fly to Bikini.

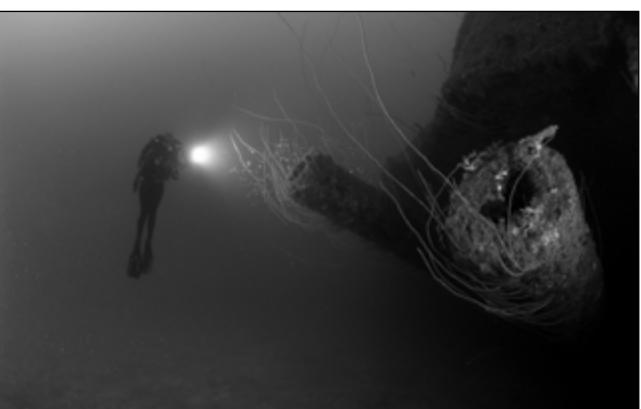
Continental Airlines fly to Majuro either from Guam or Honolulu.

### Minimum requirements

Divers should be comfortable with their equipment  
Dive Insurance and Advanced Open Water Qualification is essential  
Average depth is 50m

For more information and contact details, visit [www.bikiniatoll.com](http://www.bikiniatoll.com)

For more underwater stories, visit [www.peterpinnock.com](http://peterpinnock.com) and to view a gallery of Bikini Atoll photos, visit [www.peterpinnock.com](http://www.peterpinnock.com)



# Photographic Competition



Scorpionfish

Stuart Skene took this photograph of a ragged scorpionfish with a Canon G11. 



Whale shark

Johan Awbrey took this photograph with a Samsung Techwin Digimax V70. 



Whitetip reef shark

Kieran Brown took this photograph with a Fuji Finepix F30. 



Mantis shrimp

Jack Visser took this photograph with a Sony DSC-W5. 



Cleaner shrimp

Philip Peach took this photograph with a Canon G9. 



Pufferfish

This photograph was taken by Matt Caisley with a Panasonic DMC-TZ2. 



Nudibranch

Michael Dick took this photograph of a Chromodoris willani at 3-Sisters, Malongane with a Sony Cybershot. 



Scorpionfish

Thea Potgieter took this photograph with a Canon Powershot A650. 



This photograph was taken by Tim Brown with a Fuji Finepix F30. 

## How to enter your photograph

Whether you're an amateur or professional photographer, this is a photo competition for all levels of photographers. We're looking for pictures that capture the true experience of scuba diving and the wonders of the underwater world.

### Submit your photo!

- Photographs may be taken above or below the water, as long as diving remains the theme.
- The Name of the photograph must be the photographer's name.
- Photographs must not be bigger than 5 MB per photo.
- Submit your snaps in high-resolution (at least 150 dpi) in jpeg format.

Visit [www.ozdiver.com.au](http://www.ozdiver.com.au), click on the "photographic competition" link and follow the steps.



# Photo School

## Expose it right underwater



Underwater photography is rapidly becoming more popular and is no longer an elite diving speciality. Most scuba divers taking up the challenge of underwater photography are your true recreational divers who just want to have fun and be able to relive those special diving moments. The problem is that they often come back after a dive and are disappointed with the results. They then seek the assistance of a much more experienced or professional underwater photographer – only to walk away even more confused than before.

In this new series, I am going to take you through the basics of underwater photography. It is not difficult and anybody is capable of taking good photographs – the first thing you need to decide is how serious you are about underwater photography. In other words, how much do you want to spend on underwater photography equipment? Unfortunately one must realise that the quality and capabilities of your equipment will affect your photographs, but at the same time, you can still take amazing photographs with entry-level equipment. The secret is to know your equipment and what its limitations are and, most importantly, to never give up. Underwater photography requires effort and lots of practice.

So let's start with the exposure. One of the most common problems I encounter is that very few people take the time to read the camera's manual. The advantage of reading your camera's manual is that you will have a good idea where all the settings are found in the camera's menus. This is important when you want to start manually changing the

settings on your camera. You can know all the theory behind underwater photography but if you don't know how your camera works you are at a serious disadvantage! So why such a big issue about knowing how your camera works? It is all about exposure! This is the one fundamental basic in any form of photography and you are going to need to understand your camera to get it right. Without good exposure, the photograph is going to be ruined. So let's look at what exposure is and how can we turn those disappointing photographs into winners.

### What is exposure?

Exposure is basically taking control of the available light and 'painting' it onto a light sensitive device. The way light is controlled is managed by four factors.

- Available light
- Lens aperture
- Shutter speed
- 'Film' sensitivity

To work with any of these factors we need to first have some sort of reference to work from. This information is obtained from the camera's internal light meter that measures the light reflected off the subject and through the lens. I want to talk a little about the one factor that we have little influence over – available light. Yes, I know we can use artificial light, but we first need to understand a little bit about the characteristics of light underwater. What

happens to the natural light?

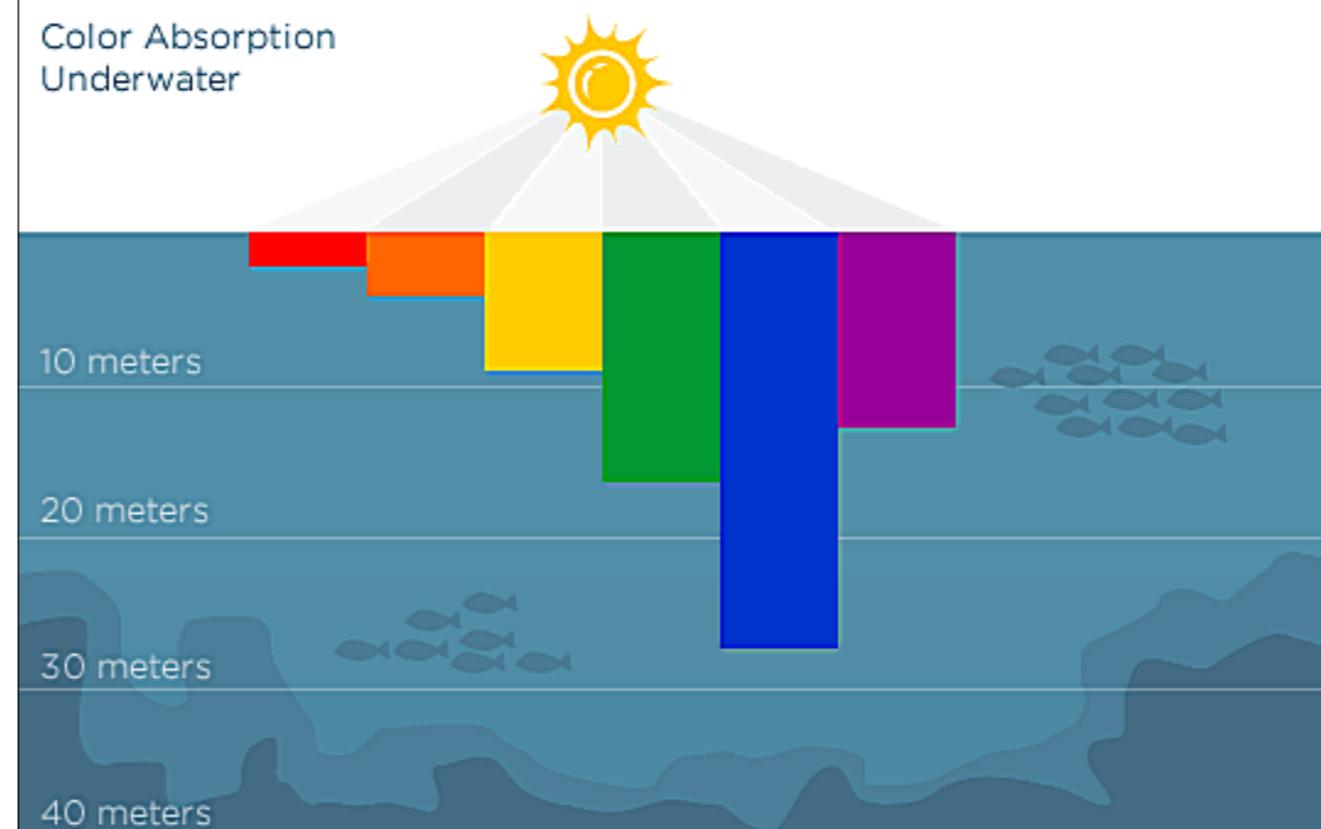
You must understand that water is 800 times denser than air, therefore light travels slower through water than through air. Light also scatters, losing colour and intensity. There are three factors that effect light underwater:

- **Reflection** – This is when light is reflected off the surface. This is caused by the angle of the sun onto the water and the sea conditions. Ideal conditions would be midday in calm waters.
- **Refraction** – This is the bending of light as it passes from air to water. This is why subjects appear to be a third bigger.
- **Absorption** – Light is made up of a spectrum of colour and when it enters the water the different colours are absorbed as we go deeper. The camera cannot compensate for the colour loss and that is why we use artificial light underwater. Otherwise most of the photographs will just be different shades of blue.

Light absorption is your biggest enemy underwater and with artificial light we can regain the colours lost due to absorption. Now using strobes has its own challenges – a strobe is an electronic device that emits light that is almost the same as perfect daylight. It 'paints' your photograph with the colour that was lost as a result of absorption. The best way to get rich colours is to get as close as you can to your subject and use artificial light. The one main problem with strobes is 'backscatter'. Backscatter is all the small white dots you often see on your photograph. This is caused by small particles that are suspended in the water that act like small mirrors reflecting light back to the camera. This really does not do your photograph any good. There are two basic things you can do to prevent backscatter:

- Improve your diving technique.
- Adjust the position of your strobes.

In the next issue I will be talking about lens aperture and how this plays a role in getting the correct exposure. ▀



# Photo Editing



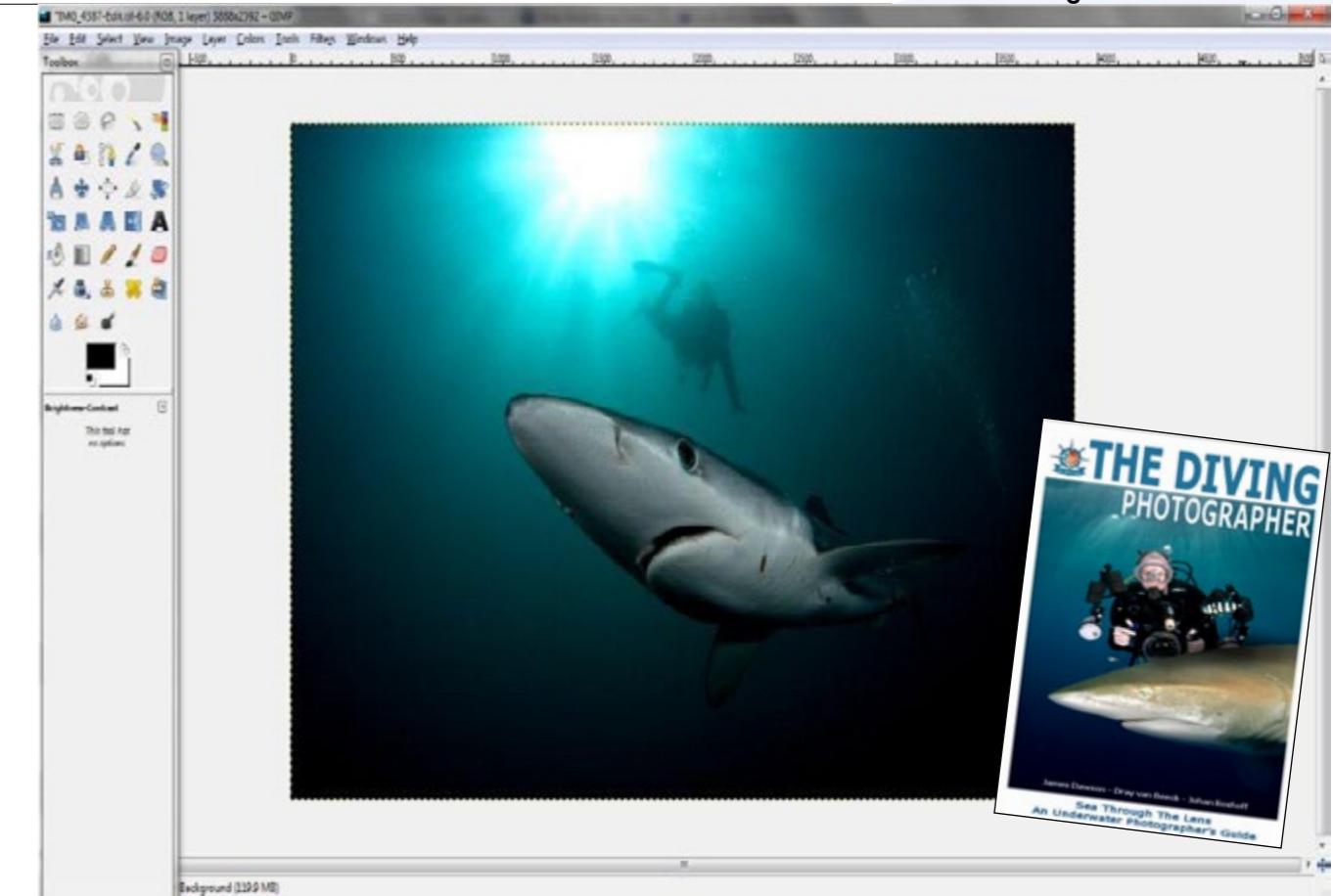
You get back to your room to anxiously download the photographs from your excellent dive. The photos look great on the camera but when they pop up on the screen they are again blue colourless and not what was expected!

Everyone who has been diving for a while will know exactly this feeling, but fortunately these days are gone and there is little excuse for poor results if you follow our series of tutorials in our 'Photo Blues' lab. We will be covering everything from camera housing care to advanced editing (for beginners). Our guide will give the answers you were waiting for to break through that blue haze to come out with stunning, colourful crisp



photographs from your dives. In our guides we will be showing you two sides of the coin with one page teaching you skills underwater and the other page looking at computer editing and enhancing your photographs. If you practice both skills, it will not be long before you return with postcard quality photographs. We are fully aware that most of us cannot afford, nor want to spend money on professional photo editing software, so we will be running our tutorials on freely downloadable software for all to access.

There are many different photo editing tools available on the market and most people know Adobe Photoshop as the photo editing king. We could write many articles from simple to advanced techniques in Photoshop, but to be realistic, many people do not have a large budget for such expensive software. If you look around you will find many affordable software programs out on the market which are powerful enough for your needs. When searching the internet



I came across a fantastic software program called Gimp which also happens to be free! Gimp is an extremely versatile photo editing software program with many features similar to Adobe Photoshop. This software has been developed and refined over 12 years and many photographers are starting to turn to Gimp as a free alternative to Photoshop. We will publish a series of tutorials to help you understand the tools to eliminate your photographic blues, so get a move on and download Gimp now!

## Pros of Gimp

### \* RAW functionality

This is possible by downloading a plug-in to use with Gimp. Once downloaded you can open and edit RAW files from your camera. Taking your photographs in RAW format (see your camera's user manual), will give you a huge advantage when editing the white balance and colours.

### \* Photoshop plug-ins

You can download a tool to use all Photoshop plug-ins in Gimp.

### Digital retouching

By using the Clone and healing tool combined you will be able to eliminate any noise or particles in the water.

### Colour editing

With Gimp you can easily add colour and manipulate colours in your photographs to eliminate the dominance of blues and greens in your pictures. Tools such as hue and saturation, levels and colour balance will come in handy.

### Blur and sharpen

This is an excellent tool to pick out the parts of your photographs where you want to sharpen or blur to give more clarity or depth to your photographs. □

Download Gimp - [www.gimp.org](http://www.gimp.org)



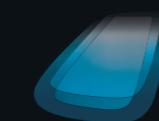
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# THE SEA'S 10 WORST CRITTERS

"What about sharks?" A question commonly asked by new divers early on during their scuba diving training. The response to that question being each individual instructor's unique calming response; in fact far too many to list. Thanks to one of the most perception influencing events of all time, the film JAWS has made us super-aware of not only sharks but, dreaded deep water lurgies in general. Steering clear of neurotic hysteria we'll look at most forms of risky denizens from the deep; some large and ferocious and others small but deadly nonetheless. Regarding the hazardous organisms or creatures from the sea, these creatures have pros and cons for us. As far as the 'cons' go, some you confront and others you consume. Marine food poisoning will be discussed in a later article. For now we'll focus on all those that we confront.

For more practical relevance and a greater perspective, this article will also focus on the 10 MOST LIKELY Hazardous Critters that you will encounter as a diver and swimmer in the sea. For those rooting for the sharks for a top position, sorry to disappoint but they are lower down on the ranking. This article will, however, for the sensationalists start off with the 10 WORST Critters. The Worst critters earned their place and ranking in the top 10

based on their actual threat to our physical well-being. From the outset I have to stress that most case studies reveal that ignorance and fidgety dispositions were largely to blame; not forgetting trying to 'impress the chicks'. Regarding the effect the 10 Worst Critters have on our bodies, compiling a comparative scale to prioritize the average statistical outcome, is based on data derived from non-standardized retrospective analysis. The effect or rather, the outcome of the infliction of the various critters is based on the resultant morbidity or mortality. To illustrate the potential outcome based on mechanism and anecdotal data, the degree of severity is illustrated as follows:

**Priority 1 (P1):** Almost dead, dying or will die if no specialized interventions are started asap

**Priority 2 (P2):** Not critical but could become critical with time if no proper care is given soon

**Priority 3 (P3):** Walking wounded (to prevent complacency with this category, please note that secondary infection from marine life sources can have a potentially fatal outcome)

## The 10 Worst\* Critters are:

No	Common name	Funny name	Risk Profile	Mechanism
1	Box jellyfish	<i>Chironex flickeri</i>	P 1/2	Sting
2	Cone shell	<i>Conus geographicus/C. textile</i>	P 1/2	Envenomation
3	Stone fish	<i>Synanceja horrida /S. verrucosa</i>	P 1/2/3	Envenomation
4	Lion fish	<i>Pterois volitans</i>	P 2/3	Envenomation
5	Scorpion fish	<i>Scorpaena poreus</i>	P 2/3	Envenomation
6	Sea snake	<i>Pelamus platurus</i>	P 1/2	Envenomation
7	Blue-ringed octopus	<i>Hapalochlaena lunulata</i>	P 1/2	Envenomation
8	Great white shark	<i>Carcharodon carcharias</i>	P 1/2	Bite
9	Zambezi Shark	<i>Charcharhinus leucas</i>	P 1/2/3	Bite
10	Puffer fish (Fugu)	<i>Tetradon stellatus</i>	P 1/2	Poisoning

\* Although several other nasty creatures can be added on, the creatures on the abovementioned list were chosen because the mean average of the prognosis or risk profile is Priority 2 and, there is potential for worse, not better.

Before you sell your dive gear, the top critters are risks that you have to actively seek out. Consider the following, to really be at risk with some of the most dangerous marine creatures you basically have to do the following:

- Search for and actively handle a cone shell with your bare hands (pretty suicidal)
- Climb over the protective screens in Northern Australia to frolic with the box jellyfish dressed only in your speedo
- With intent try to catch a blue ringed octopus to take to the office to show your colleagues its funky colour pattern, especially when its annoyed
- Walk barefoot over a tropical seabed to the awaiting dive boat, with no worries of any possible stingers

• Leave the security of your shark cage to ride a large great white shark, thinking the beast won't notice you holding onto its dorsal fin

• Not being too fussy where you dine for your lip-numbing Fugu addiction

Get the message.....?

For most divers these risks are passive and through proper planning, vigilance, common sense and a healthy fear of pain, you can enjoy a long and safe diving future. Fortunately for scuba divers, sharks are a very low risk.



Scorpionfish

## The Most Dangerous Sharks

The following list is a statistical illustration provided by the International Shark Attack File from the Florida Museum of Natural History of which sharks attack humans, starting from the least at no 1 to the most attacks by a specimen on humans at no 10. With sharks the risk index is based on the size of the bite, size of the shark, teeth configuration, jaw anatomy, jaw strength and general tenacity. The degree of severity of a shark bite (Grade 1, 2 or 3) will be discussed in greater detail when discussing shark bites with the first follow up article on 'Bites'. The statistical figures shown below have no relationship with the risk index illustrated again as Priority 1, 2 or 3:

1. Lemon Shark (*Negaprion brevirostris*) - P2/3
2. Blue Shark (*Prionace glauca*) - P2/3
3. Hammerhead (*Sphyrna mokarran*) - P2/3
4. Ragged Tooth (*Eugomphodus Taurus*) - P2/3
5. Grey Reef (*Carcharhinus amblyrhynchos*) - P2/3 (most attacks on scuba divers)
6. Shortfin Mako (*Isurus oxyrinchus*) - P2/3
7. Oceanic Whitetip (*Carcharhinus longimanus*) - P2/3
8. Tiger (*Galeocerdo cuvier*) - P1/2
9. Great White (*Charcharodon carcharias*) - P1/2



Great white shark



Puffer fish

10. Bull / Zambezi shark (*Charcharhinus leucas*) - P2/3

Further interesting statistics from the data-base of the International Shark Attack File from the Florida Museum of Natural History reveals that in over 3500 attacks recorded since 1580, only a fraction of all shark attacks were on scuba divers. Of all those attacks, 85% were close to shore of which about two-thirds were in less than 5 feet of water. For the average person that enjoys the sea often, the risk of a shark attack is calculated to be less than being struck by lightning, winning the lotto or a coconut falling on your head. More people are killed annually by faulty toasters than by sharks. Despite these relatively comforting odds, divers should heed to the following:

- Scuba divers - be careful and don't turn your back on any risky species of shark
- Spearo's - watch your back all the time, especially with fish on your line

## 10 Most Likely Critters (for divers)

For risk exposure a scale of 1 to 5 will be used; 1 being scarce and 5 is most common. The following inflictions are statistically the most common that divers experience all over the world.

1. Urchins (Most families of Echinoderms) - 5
2. Blue-bottle (*Physalia physalis*) - 5
3. Lionfish (*Scorpaenidae*) - 3
4. Stinging Hydroids (*Aglaophenia cupressina* / *A. whiteleggei*) - 4

5. Fish bite - accidental (*Sphyraena barracuda* / *Murinidae*) - 2

6. Stingray sting (*Dasyatidae*) - 1
7. Cone shell (*Conidae*) - 4
8. Coral abrasion (*Vibrio bacteria*) - 5
9. Shark bite (*Carcharhinus amblyrhynchos*) - 1
10. Marine toxin Poisoning (*Saxitoxin*, *Tetrodotoxin*, *Ciguatoxin* & *Scromboid*) - 2

In four follow up articles we will be looking closer at the location, mechanism of injury, basic first aid principles and dispelling folklore regarding the management of the following categories of hazardous marine life injuries:

1. Bites (sharks, barracudas, morays, seals)
2. Stings (jellyfish, hydroids, fire-coral)
3. Envenomations (stonefish, lionfish, urchins, cone-shell, stingray)
4. Poisoning (red tide, scromboid, ciguatera, tetrodo)

Remember the old adage that "the most dangerous creature you're most likely to encounter underwater is yourself". All the creatures of the sea that hold some mechanism of injury or ill-health to us were created to use those mechanisms for hunting or defence. Unfortunately when we encroach on their environment we find out the hard way what we shouldn't touch, eat, play with or turn our backs on.



Stingray



Scorpionfish



Portuguese man o' war



Jellyfish



Cone snail



# Creatures of the night

It's rush hour underwater. Daylight is fading and night is creeping in. Traffic is building up as nocturnal fish are slow to wake and venture away from the sanctity of the reef. Diurnal fish are desperately looking for safe parking space for the night but the parking lots are still occupied. Adding to the chaos and causing multiple accidents are the voracious feeders that attack the homeless fish. Each attack scatters the queuing fish, causing many to crash into the reef barriers as they attempt to flee from the chaos. The wounded limp into crevices to recuperate, only to find that the hospital staff are off duty for the night. The hustle and bustle of a coral reef can be likened to a giant underwater city with many different buildings, apartment blocks, tunnels, alleys, freeways and parks – all in a cosmopolitan atmosphere.

At night the buildings remain the same but the activities and occupants are different. The blackness is apparent – there are no streetlights or neon lit shop fronts to illuminate the reef. Occasionally moonlight is reflected off sandy patches and on cloudless

nights during full moon there is incandescent lighting. Adapting to the dimness, some nocturnal fish have developed extremely good eyesight. For example, the aptly named Big eyes have extremely large eyes with massive pupils to allow in more light. Their eyes also have more rods than cones which, although don't help colour vision, enable the fish to differentiate shapes in the darkness. Furthermore, these high-tech eyes simulate a mirror effect that reflects light back onto the visual cells thus doubling the visual perception. Flashlight fish go one step further – they have their own headlights and the ability to switch them on and off. Behind each eye lives a patch of luminescence bacteria. A retractable membrane covers these bacteria, effectively turning the lights off, but if the Flashlight fish want to attract plankton, find their way in the dark or communicate with mates, the membrane is kept open. With their acute night vision these nocturnal fish travel great distances hunting for food. The darker the night, the greater the distance they feel safe to travel.



Shrimp

### The start of rush hour

Usually the first to hit the road at night are the Feather stars. Feather stars relinquish their parking lots early as they vie for prime real estate – skyscrapers or penthouses with a view into the open current. The more precarious the position the better the chance they have of catching passing plankton with their sticky arms. Basket stars, close relatives, are not such early risers – the moon is high before they stir. Resembling tangled balls of string, the Basket stars unwind to create a net of sticky lace, the filigree strands constantly recoiling as caught plankton is fed down the arms towards the mouth at the base. The more delicate Brittle stars twine their arms around sturdy structures that are situated in current rich areas.

When the parking lots are full, fish need an alternative form of protection. Acting as bouncers, the heavyweight Potato bass evict any existing tenants to dominate large caves and overhangs. But for the average size Parrots and Pufferfish there may not always be sufficient shelters – or they may be occupied. They must resort to their own defense mechanisms. The Parrotfish ingeniously secretes a mucus sleeping bag around its body. This flimsy cocoon masks its body odour, thus providing some protection against the bloodhounds of the night. Pufferfish don't bother to hide as they continually exude poisonous mucus and therefore don't appear on anyone's menu. Yet even smaller creatures such as Periclimenes shrimps rely on their hosts to provide protection. Choosing the ideal host is a personal decision. Living amongst crinoids' spiky arms is one popular hangout. Crinoids though are fairly stationary creatures and some shrimps prefer the more



Lizardfish



Slipper lobster



Brittle stars

adventurous lifestyle on hosts that also act as a public transport system. Popular modes of transport are sea cucumbers and starfish. The sea cucumbers are slow movers but offer good protection as they too exude poisonous substances. The starfish may cover more ground but they offer less protection.

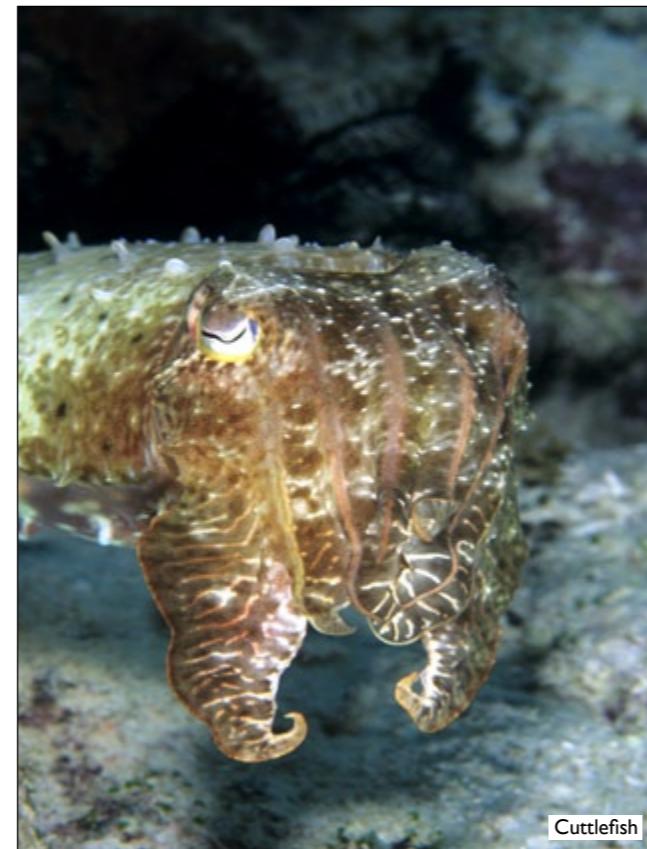
### A noisy setting

Many fish may be snoozing peacefully but the reef is far from quiet at night. Making the most noise is the crustacean family. As crayfish, lobsters and crabs scuttle over the reef searching for food, their rigid shells and hard legs clatter across the hard corals. Ungainly Slipper lobsters shuffle around scraping their carapaces noisily across the rocks. Adding to the underwater chaos, the Slipper lobsters use their modified shovels to dig prey out of the reef. Hermit crabs struggle to carry their heavy shells as they scour the reef for food and, in order to communicate, crustaceans snap their pincers shut. It is possible that the noise stuns prey but mostly it's used to warn others that they are trespassing on private property. As a result the reef sounds like a mini construction site.



Squat lobster

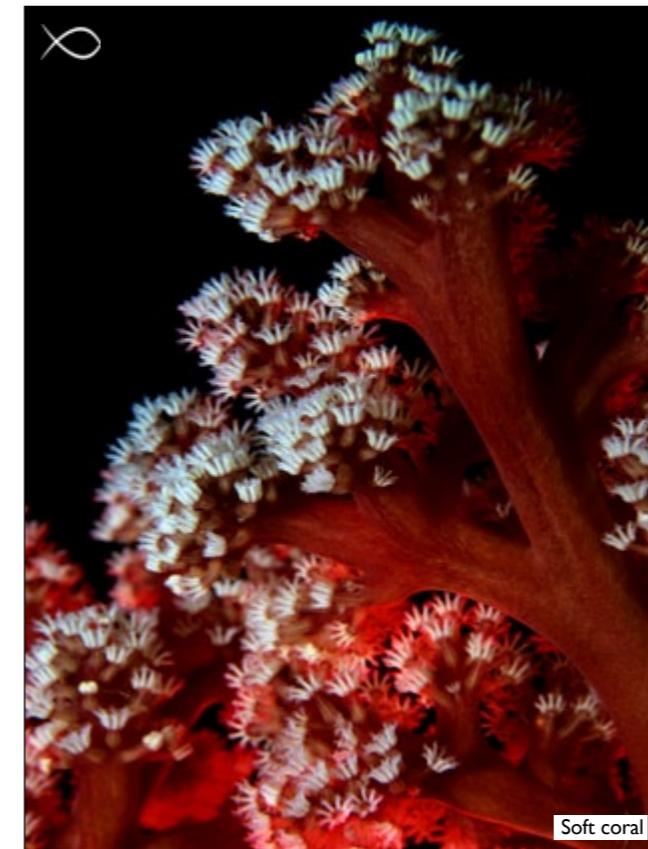
The dress code at night is pretty simple. The vibrant colours of diurnal fish are not noticeable in the darkness and have no value in attracting the opposite sex. Red, however, is a dominant colour of many nocturnal creatures – fish, lobsters, shrimps, urchins, starfish and even krill. The technical reason is that as light enters water it is diffracted. Red is lost a few metres below the surface - reds therefore appear brownish – an excellent camouflage colour. Hence the reason Coral rockcod and Big eye squirrelfish often hang out in the back of caves during the day. But at night they become ferocious predators combing the reef. Even diurnal fish sporting day-glo colours are required to change their attire to pyjama colours for the night. The brilliant yellows of the Butterflyfish soon fade to drab mottled creams and the striking Blue damsels fade to grey. The crimson red Spanish dancer nudibranchs are famous for their flamenco dancing which is spectacularly performed in the disco lights formed by phosphorescence in the water. Plankton disturbed by movement releases protein that mixes with an enzyme causing a chemical



Cuttlefish

reaction producing glitter sparkles known as phosphorescence or bioluminescence.

Coral reefs even have night time street sweepers. Moving slowly across the substrate, starfish feed on detritus while spiny urchins roll along like pincushions scouring algae off the reef. Sea cucumbers work the sands recycling it as fresh sand. Also working at night are the restaurateurs – plankton is the nutritious soup of the ocean served 24-hours a day as it drifts with the ocean currents. However, with fewer predators around at night and therefore less chance of being nipped by corallivores, both soft and hard corals enjoy the plankton feast at night. During the day hard corals resemble boulders and stones carved into miniature mazes, yet at night, with polyps extended, they are instantly converted into beautiful flower gardens in full bloom. The bedraggled and limp soft corals gorge themselves with water, inflating their size many times over as they too partake of the nutritious soup. Enjoying the flower show and adding to its beauty are Glass



Soft coral

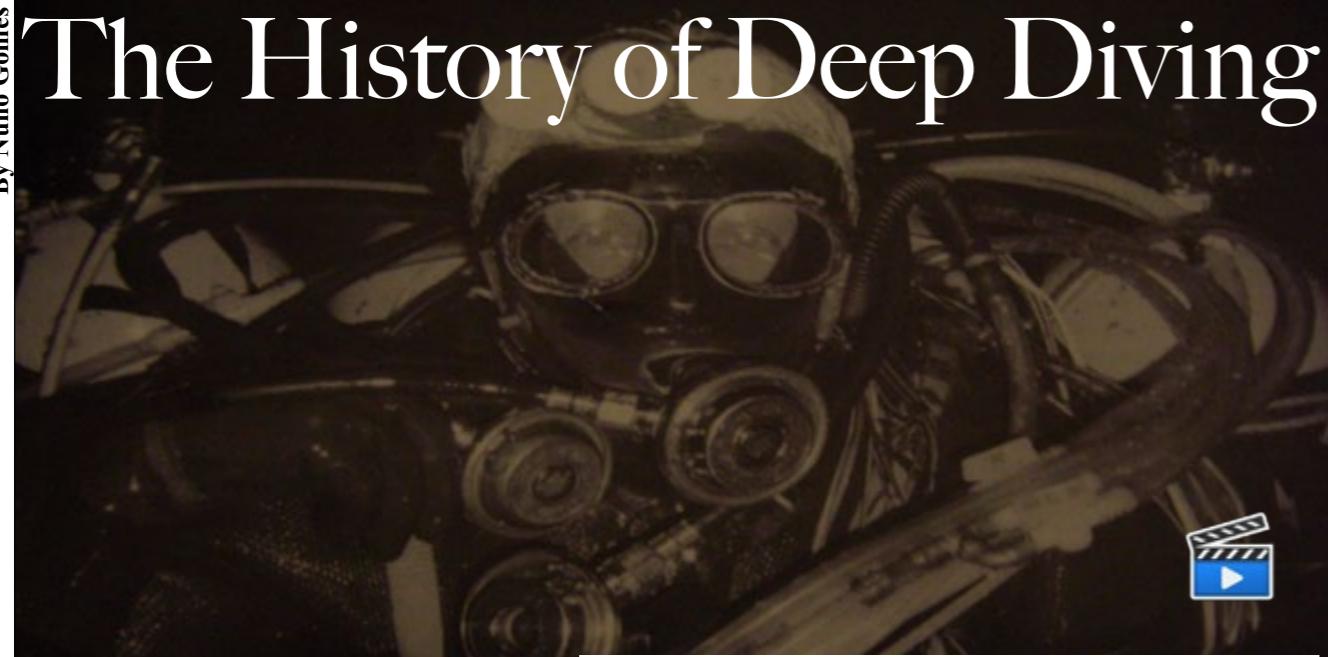
shrimps and Decorator crabs. Decorator crabs, apprehensive about being eaten, attach polyps and spinules of soft corals to their bodies in order to blend in with the delicate soft corals.

Although they will dine during the day if the opportunity arises, eels frequently dine at night. Their favourite meal is shrimps and prawns followed closely by octopus. Like shrimps, the octopus also eat out at night. Under cover of darkness they flush out critters hiding in the sands – the hunters become the hunted. In midwater, Cuttlefish also feed on crustaceans and fish, manipulating their internal light organs to create magnificent chromatic displays, often mesmerising their prey with the lightshow. The traffic congestion has settled. The reef city is ablaze with flickering lights, abuzz with noise, and while the night owls are dining, other sea creatures have settled in for a good night.

For more underwater images and stories, visit [PeterPinnock.com](http://PeterPinnock.com)



Hard coral



Jochen Hasenmayer after his world record dive in the Vaucluse cave to 205m in 1983

The year was 1988. No one was diving with mixed gas, not even using nitrox. In fact, any deep technical diving was frowned upon.

The last mixed gas diving using trimix had been done in 1969 by Roly Nyman, Ian Robertson, John van der Walt and Danny van der Walt, at the Sinoia caves in Zimbabwe. That dive was a world record at the time – the divers had reached a depth of 102m. I had just completed my BSc degree and I was eager to go deeper than I could on air.

There was a deep cave near Danielskuil, in the Northern Cape. It was called Boesmansgat and it had lots of unexplored depth. A team of divers from the University of the Witwatersrand, consisting of myself, Dian Hanekom, Ian Riphagen, Malcolm Keeping and Liz Gomes decided to revisit Boesmansgat with trimix. On April 4, 1988, Dian Hanekom and I reached a depth of 123m – SABC captured the dive and it was shown on TV. At the time, this was the third deepest dive in the world, the world record at the time being a dive to 205m in 1983 by Jochen Hasenmayer of Germany, in the Vaucluse caves in France.

On April 5, 1988, one day after my dive at Boesmansgat, Sheck Exley from the USA plunged to 237m in the Mexican cave system

of Nascimento del Rio Mante – he had beaten Hasenmayer's record and set the new depth world record. The next year, on January 9, 1989 Boetie Scheun and Eben Benade increased the Africa record to 132m, at the Guinas sinkhole in Namibia.

Not happy with his dive to 237m, Sheck Exley revisited Nascimento del Rio Mante on March 28, 1989 and reached a new world record depth of 267m, beating his own world record. The dive was uneventful, involving a total decompression time of 14 hours.

The world of deep technical and deep cave



Nuno exits The Temple of Doom in Palau

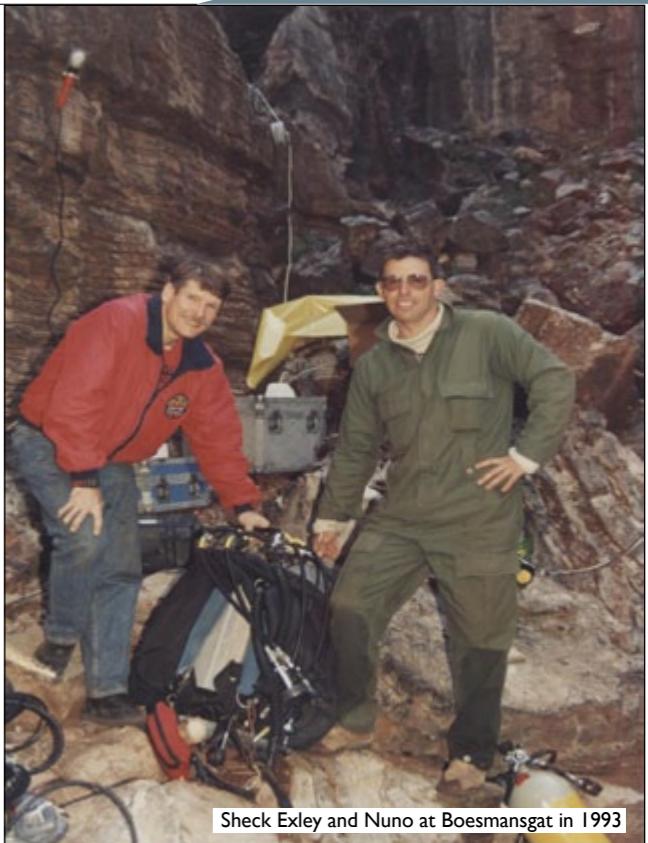
diving was to be quiet until August 1993; this was when Sheck Exley made his historical visit to South Africa and Boesmansgat, at the invitation of Charles Maxwell. For me, this was a great opportunity to learn from the best – earlier in the year I had made a dive to 153m and I was keen to improve on that depth.

The aim of the expedition to Boesmansgat in 1993 was to explore and map the cave and produce a computerised side scan sonar picture of the cave. In this trip, Boetie Scheun lost his buddy, Eben Leyden. We were committed to the expedition and it went ahead. Sheck Exley did a dive to the bottom at 263m, thus becoming the first diver to reach the bottom. I managed to get to 177m, and thus I became only the second diver in the world to dive to a depth of over 150m more than once.

In April 1994 tragedy struck. Sheck Exley died at 271m in the Zacaton cave in Mexico. It is thought that High Pressure Nervous Syndrome (HPNS) was the main contributing factor of his death. Sheck and Jim Bowden were attempting to break the 300m barrier; Jim survived his dive to 281m and became the new world record holder. Independent witnesses had verified the dive and his name was placed in the Guinness Book of World Records.

That same year I did two deep dives at Boesmansgat, one to 230m and later in the year another one to 253m. In the last dive I encountered decompression problems and was successfully treated at the Institute for Medical Aviation by Dr. Frans Cronje.

Late in 1995, young Deon Dryer disappeared at Boesmansgat. A Remotely Operated Vehicle (ROV) was hired by his parents to try and locate the body, but to no avail. I was contacted by Theo van Eeden, an inspector in the police, and requested to try and recover the body. A few months later on August 23, 1996, I was on my way to the deepest part of the bottom; I reached a depth of 282.6m (the altitude corrected depth for the dive was 339m due to Boesmansgat being located at an altitude of 1 550m above sea level), a new Guinness World Record. There had been no



Sheck Exley and Nuno at Boesmansgat in 1993



Deco Red Sea Record 2005

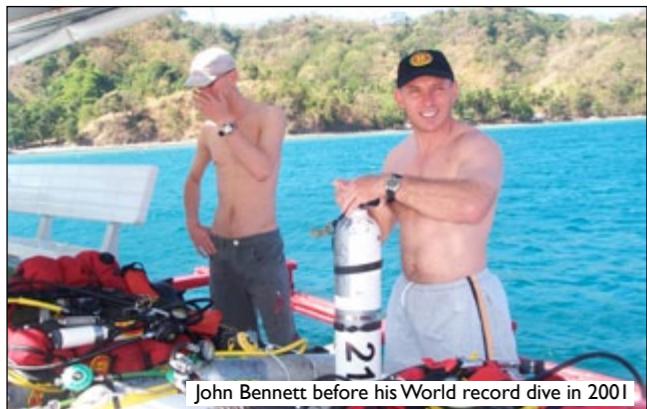
sign of Deon Dryer's body at the vast bottom of the cave. The dive had been covered by Peter and Stefania Lamberti and it was shown on the Discovery Channel. The dive had involved a 12 hour decompression schedule in 19°C water. Nevertheless, it had gone off without any major problems.

Now it was the turn of the women, and in 1996 Dr. Ann Kristovich, a friend of Jim Bowden, reached a depth of 167m in the Zacaton cave of Mexico – the dive went off without any major problems. It was a few years before another woman, Claudia Serpieri of Italy, would beat that record, and this time in the Mediterranean Sea she reached a depth of 211m.

In 1997, deep cave diving returned to Fontaine de Vaucluse, in France. Pascal Bernabe dived to an estimated depth of 240m (the estimate was based on the amount of High Pressure Nervous Syndrome that he had felt because he had no proof for the depth of his dive). The dive was overshadowed by the death of his deep support diver when he ran out of gas at depth.

Mark Andrews of the United Kingdom carried out the deepest air dive in July 1999. At the maximum depth of 156,4m Mark lost consciousness, his deep support diver John Bennett (on mixed gas), inflated his BC to initiate his ascent. While ascending Mark regained consciousness.

In April 2001, Coelacanths were seen and filmed at Sodwana Bay, in their natural habitat. The find by Pieter Venter, at close to 120m, was one of the biggest scientific finds



John Bennett before his World record dive in 2001

in South Africa. It accentuated that technical diving could assist science and that it could be done safely.

Later that year, on November 6, 2001, John Bennett from the UK did the first dive below 300m – he had done the impossible and reached a depth of 308m. His dive, in the Philippines, had placed his name in the Guinness Book of World Records and National Geographic had covered it. Bennett's total dive time had been 9,5 hours, which proved to be short of what was required and he had decompression problems during and after the dive. With time he recovered but tragically he died the following year in an unrelated diving accident.



Lesze and Nuno at Boemansgat following 194m dive in 2003

In South Africa, towards the end of 2001, Verna van Schaik was ready to take on the women – first she did the deepest cave dive for a woman by reaching a depth of 186m at Boesmansgat. This was not enough for her, so on October 25, 2004 Verna went back to Boesmansgat to become the first South African woman to get her name in the Guinness Book of World Records by reaching an incredible depth of 221m.

In 2002 we had Gilberto de Oliveira making a very deep dive to the bottom of the 'Lagoa Azul', a sinkhole in Brazil, and reaching a depth of 274m. This was his second attempt – in 1998 he had reached a depth of 220m in the same crystal clear karst structure.

From October 2002 to September 2003 the team (Nuno Gomes, Leszek Czarnecki, Pieter Venter, Lenne Foster-Jones, Gareth Lowndes, Hermie Britz, Craig Kahn, Theo



Jim Bowden just before a dive in the Lost Blue Hole Bahamas 2006



Nuno 1996 - World Record Cave Dive

By Nuno Gomes

van Eeden, Sean French, Witold Smilowski, Joseph Emmanuel, Chris Serfontein and Buks Potgieter) dived Boesmansgat deeper and deeper with each trip. Eventually, Leszek and I reached a depth of 194m. This became the deepest cave dive done by a Polish diver. These deep diving trips prepared us for the world record attempt the following year in the Red Sea.

Late in 2003, Mark Ellyat made an attempt at the deepest dive in the sea, off the coast of the Philippines. When he surfaced he claimed to have dived to a depth of 313m, however, he could not produce either a signed depth tag, recovered from the line at that depth, or any depth gauge or dive computer reading showing the depth that he had claimed, apart from that there were no independent witnesses. In view of that, the Guinness World Record remained with John Bennett.

It was in 2004 that I tried ultra deep diving in the sea – the team went to the Red Sea to try and beat Bennett's record. The dive nearly killed me when my regulator stopped working at 271m (my depth gauge read 918 feet (280m) but because it was calibrated for fresh water I had to subtract 3 % to obtain the correct depth). I did not make the world record but I managed to set a new Red Sea record. National Geographic covered the dive and in my attempt I had managed to improve on Leigh Cunningham's Red Sea record by 31m. I would be back the following year for a second try at the world record.

Late in October 2004 Dave Shaw from Australia joined forces with Don Shirley from the UK. Don had settled in South Africa near



John Bennett



Nuno and Pieter Venter diving the Blue Hole in Dahab in 2004

Komati Springs but now they wanted to do some deep diving in Boesmansgat to find out just how deep these 'machines' could go. Dave Shaw got down to 270m and by chance or misfortune found the body of young Deon Dryer at the bottom – his body had been on the rubble slope for the last 10 years. He marked the spot with his reel and decided to come back the following year to recover the body. The dive was the deepest dive with a rebreather, and as such it was a new world record for Dave and his 'machine'.

Early in 2005 Dave and Don were back with a huge team of support divers, including Verna van Schaik, the deepest woman in the world. The idea was for Dave to go to the bottom and recover the remains of Deon Dryer's body, supported by Don at 220m. The other support divers would remain shallower. The dive went terribly wrong when Dave, at 21 minutes total dive time, stopped moving and breathing on the bottom. His death was attributed to suffocation (respiratory failure due to increased gas density at great depth and thus increased resistance of gas flow, both in the respiratory airways as well as the breathing circuit of his equipment). Don tried to help his friend by going deeper, in the process he nearly died, first when the electronics of his 'machine' imploded and later when he suffered from massive decompression sickness. Don has resumed diving but has become a more conservative diver in terms of depth.

In June 2005 the team and I returned to the Red Sea to give the world record one last attempt. This time all went well and I managed to get to 318,25m (321.81m if the rope stretch of 3,56m is included). It was the hardest dive of my life, I barely survived, and it took me 14

minutes to reach my maximum depth with the total dive taking 12 hours and 20 minutes. The dive was carried out following the procedures prescribed by the Guinness World Records and in July 2006 the record was officially awarded (more than one year after the dive). Guinness World Records do not recognise rope stretch, thus the official depth was 318,25m. The dive was filmed by Elena Konstantinou and her film crew and is documented in the film "Beyond Blue: Mankind's Deepest Dive".

In July 2005 Pascal Bernabe decided to give the world record a try in the Mediterranean Sea, off Corsica. When he surfaced he claimed to have reached 320m, however, he could not produce a signed tag, picked up from the line at his maximum depth. His VR3 dive computer registered a maximum depth of only 266m. Later his sponsor claimed that he had reached a depth of 330m because of the rope stretch of 10m (that is a lot of stretch). There was no proof for the dive, neither was there any film or verification by independent witnesses. Guinness World Records never recognised.

A dive by Ben Reymenants from Belgium to 240m in the Sra Keou cave, in November 2006, proved to the world that Thailand had deep and interesting caves. Until then Thailand was known only for great sea diving.

A final major technical diving event took place in May 2008 – it was the deepest freshwater wreck dive using rebreathers, and it took place in Lago Maggiore, northern Italy. Three divers, Pim van der Horst, Mario Marconi and Alessandro Scuotto dived the wreck of the Milano located at a depth of 236m. Proof for the dive was provided by an ROV located on the wreck, which filmed the three divers. Elena Konstantinou and her film crew documented the dive in the film "The Milano Wreck".

In closing I would like to point out that deep technical diving, either in caves or the sea, is extremely dangerous. If evidence is needed, three of the divers in this article are no longer with us, and most of the others, if not all, have had some very close escapes, myself included.

New world record was set on 18th September 2014. Read more in the next edition. □



World Record Team 2005



Nuno exits The Temple of Doom in Palau



Nuno ready to dive



Nuno Gomes



Rebreathers are here to stay, even with the increased risk! The oldest known rebreathers, based on carbon dioxide absorption, were patented in France as far back as 1808 by Toubolic, a mechanic in Napoleon's Imperial Navy. During WW II the Italian, the British and the US Navies all used rebreathers for military purposes.

Today all the navies in the world have the use of rebreathers for special operations, more so in the case of covert operations. The big question is, will sport divers change from open circuit to semi-closed/closed circuit? The answer is that some will and others will not.

The basic questions are:

- \* Do I need a rebreather for the diving that I am doing, considering that I have equipment right now? (In the majority of cases the answer will be 'no', especially if there is no extreme technical diving involved).
- \* Can I afford a rebreather and will I use it frequently enough so that the cost/benefit ratio becomes acceptable? (It all depends on how often one dives and on the depth and duration of the dives).

I would say that some technical divers will change to the use of rebreathers, even though the percentage of deaths that involve the use of a rebreathers among USA and Canadian divers has increased from approximately 1 to 5% of the total number of diving fatalities recorded by the Divers Alert Network (DAN) from 1998 to 2004.

Some technical divers are willing to take the risk due to the relative 'novelty' of the equipment. ▀

## Barry Coleman



More people are exposed to modern rebreather diving with the added benefits and some even take to rebreather diving purely because of the risks of diving such. Whatever the reason they are here to stay, making a revival

after many years of being shelved, and being the very first scuba units designed. Life goes in circles and with modern technology the rebreather is back and gaining in popularity. I and many others have always said the rebreather is a great tool for lots of applications, but not all. I sometimes think that people get so engrossed that they lose sight of why we are underwater in the first place; to explore the underwater world and see the beauty of the aquatic environment. It is not about what you are seen diving with or the latest equipment you have to show off with. Don't get a rebreather so you can look cool or because it is the latest trend, as you'll be disappointed. Rebreather units like to be used often and the more you use them to explore underwater the better. ▀

## Pieter Smith



Rebreathers have developed significantly in the last couple of years. In the technical diving environment, rebreathers were used successfully from the 80s on shallower, penetration dives by divers like Oliver Isler (France),

Jochen Hasenmayer (Germany) and Bill Stone (USA). Recently, cave penetration records were set using rebreathers. On deep dives, most of the leading divers preferred OC (Jochen Hasenmayer's 205m dive in

Fontaine de Vaucluse in 1983, Sheck Exley's deep dive at Manta, Nuno Gomes world record, etc).

In technical diving, rebreathers will continue being the preferred choice when doing penetration dives (shallower and further), whereas OC still has a place for deeper dives (+200msw). As sport diving tends to follow technical diving development, rebreathers will continue enjoying a bigger market share and as purchase prices and maintenance costs may subsequently start coming down due to demand, more and more divers will be able to enter the rebreather market. I am of the opinion that OC will continue maintaining a big portion of the diving market due to its robustness, easy operation and maintenance as well as simplicity. ▀

## Pieter Venter



The dangers of diving with rebreathers are not depth dependent and the costs, hassle and complexity of rebreathers prevents it from becoming mainstream for holiday and recreational diving. However, for the

enthusiast and technical divers the risks can be managed and the costs and hassle is well worth it. The 'super human' Nuno Gomes pushed deep open circuit diving to its absolute safety and logistical limit and I think that the only way to go deeper will be with a futuristic rebreather. To go to such extreme depths, some technical problems such as carbon dioxide build-up and the effort to move dense gas through the loop need to be solved, using pumps or something, which will increase the already complex nature of a rebreather. The more complex the rebreather, the bigger the reliability problem... Rebreathers are already used in numbers for technical diving and recently reliability has improved and I believe that the rebreather will become more reliable and that it is the future of technical and deep diving. ▀

# Instructor Diaries



When starting your diving career, what institution should you choose and who should your instructor be? I can tell you now that no matter what organisation you choose, all of them must comply with given standards to ensure a level of knowledge and safety. Some provide more material than others and it is up to you to do your research on which organisation will fit best.

Personally I prefer above average standards and exceptional training material to help and refer back to when needed. Instructors must be well trained and know what they are talking about – you are, after all, reliant on their training when you do your dive.

As you carry on with your career in diving I would suggest doing courses with different instructors, obviously well chosen ones and ones that comply with your skill requirements at that particular point in time. This will give you exposure to different training techniques and knowledge.

Remember that it is not always the case that the instructor with the most qualifications and medals is the best instructor. Find the guys that are passionate about the sport and who do what it takes to teach you the lifestyle that is diving and not just the skill. These are the real instructors and the guys I like to associate with.

Now I would like to address the GI Joe instructors out there... guys, remember why you became an instructor and remember where you came from. It is not necessary to shout at your students while swimming towards a drop point to make yourself seen – you do not impress anybody. The only thing you are achieving is belittling your students and losing the respect of your students and other people witnessing this spectacle. Instructors must have the correct attitude at all times – you are, after all, delivering a service to someone who actually paid you.



Not too long ago I was on a dive at the coast where I had the privilege of diving with an exceptionally bad dive master – the guy's dive brief was all of 30 seconds, after which he turned and walked away. An instructor in training with me on the boat asked me if this was standard around those parts. I could clearly see that she was shocked as there were other open water divers with us on the dive. "No," I said, "That is what you call a self absorbed, arrogant idiot." Needless to say, I will never dive with that charter again and I will never refer anybody to that particular charter, so instructors and dive masters be careful, you are not only doing yourself damage but also your employee and the organisation's name who you are so quick to mention when trying to impress people.

Dive students take a look at your past and current instructors. Did he/she present the course enthusiastically? More importantly, did you have fun? Will you be willing to travel with him for a dive break to Mozambique? If you are not sure or answer no, then I suggest finding a different instructor. The point that I am trying to make, is that there are very, very good instructors and dive masters out there, but the flipside of the coin is also true, so choose wisely.

My question to the instructors out there is this: Are you a good instructor/dive master or are you one of the 'know-it-all's'? I know past students and clients have already decided.

Safe and successful diving to you all! □

# A basic overview of rebreathers:

## Part I∞

Rebreathers are more gas efficient than open circuit systems. Generally the gas breathed is the optimum or best mix (mixture of nitrogen and oxygen) and warmer to breathe, which provides longer bottom/dive time. They are not as noisy as open circuit systems (blowing lots of bubbles!).

Although we say rebreather, it is a generalisation covering a range of equipment that has two common similarities: the exhaled gas is re-circulated within a breathing loop and the carbon dioxide is removed by an absorbent. The closed circuit rebreather will attempt to provide the best nitrox/ean for the depth. Normal air open circuit scuba is not the best mix of gas for scuba because the fraction of oxygen is only 21%. This fraction does not change; the partial pressure of oxygen (PpO<sub>2</sub>) will change according to the depth. The 'best mix' in recreational diving generally has a higher PpO<sub>2</sub>, from a tissue loading and non decompression perspective. The best mix would be able to keep the PpO<sub>2</sub> fixed and adjust the fraction of oxygen according to depth. The rebreather has a controller with a 'Set Point' which can control the PpO<sub>2</sub>.

The Set Point is a predetermined figure calculated on what the oxygen partial pressure should be at a given depth. The

oxygen controller attempts to maintain the partial pressure of oxygen (PpO<sub>2</sub>) in the breathing loop to match within say 0.02 bar of the Set Point. Therefore the fraction of oxygen within the loop will change to maintain the same PpO<sub>2</sub> and the Set Point. The amount of oxygen in the breathing loop is supplied via the solenoid in an electronic controlled system or via a manually operated valve.

The solenoid is an electronic valve which allows a small amount of oxygen gas to be added when activated by the electronic controller. Oxygen sensors, if fitted within the breathing loop, will provide information (with the help of electronics) on the partial pressure of oxygen (PpO<sub>2</sub>) via a visual display. The oxygen sensors work on a chemical process converted into an electrical current which in turn is interpreted by a computer which may then control the solenoid and flow of oxygen or the diver is required to manually add oxygen to the loop.



In some more advanced electronic systems a dive computer is integrated and calculates the NDL and other limits.

There are a wide range of rebreather designs and we will briefly look at some of them:

### Oxygen rebreathers

These are mainly used by the military. They are limited on the depth they can be dived, because they use pure oxygen in the breathing loop, and as you may have already learnt, 100% oxygen becomes toxic below 6m/20 feet. They are small and not common at all in recreational diving. These units do not have oxygen sensors.

### Semi Closed rebreathers

Semi Closed Rebreathers use a constant flow of premixed gas through a control orifice into the breathing loop. The excess gas not used is vented from the loop. Hence the term 'semi closed'. The size or diameter of the

orifice must match the depth range where the diver will be using the unit. Too small and the volume of supplied gas will not be enough and too large and the volume will be excessive and waste gas.

There are two types of Semi Closed rebreathers; Passive and Active. The Passive system will deliver gas into the breathing loop when triggered or activated due to the reduction of loop volume. As the breathing loop volume reduces from the diver's metabolism, the reduction activates a valve which opens and adds a pre-mixed gas to the breathing loop. This system generally reduces the amount of excess gas the unit vents. The Active system delivers a constant flow of gas into the breathing loop and has a higher amount of gas volume venting.

These units may have oxygen sensors, but they are not required, as the PpO<sub>2</sub> can be calculated and estimation figures based on depth, workload and metabolic rate projected for decompression purposes. □



# NITROX IT'S A GAS

© 2014 Institution of Invisible Gas Photographers

PICTURE OF NITROX IN ACTION, TAKEN WITH WIDE ANGLE LENS

## START YOUR COURSE ONLINE TODAY!

There was a time when the use of NITROX was viewed as extreme by many in the recreational dive world. Now it is fast becoming the gas of choice for mainstream diving and is available for all divers. Like so many changes to the industry it is driven by the top echelon of the technical diving community. That's one of the things that makes RAID different, the owners are real divers and in fact two of the directors are considered among the best technical divers in the world (see their profiles below). That means RAID training programs are at the cutting edge and in a class all of their own.

So what is NITROX and how does it work? It is essentially oxygen enriched air, it has many benefits over the use of traditional air, including potentially longer bottom times, less risk of decompression sickness and many people report increased energy levels. That's why all RAID dive centres actively promote the use of NITROX.



**Paul Toomer**

Paul is a force of nature in the diving world and his unique approach to training is legendary. Paul has reached the pinnacle of the world's leading diver training agencies writing the technical programs for a major training agency before becoming a partner in RAID. He is a sort after speaker at technical events and dive shows around the world and an expert in all facets of technical and rebreather diving. Paul is the International Training Director for RAID.



**Barry Coleman**

Barry is a pioneer in technical diving. Barry conceptualised the design of the world's first recreational rebreather and working closely with the design team at Poseidon, the Mk VI Discovery Rebreather was born. To support the diver training required for Mk VI, Barry wrote the initial training program which ultimately became RAID dive training, clearly demonstrating the power of adapting traditional technical products and training to the recreational market.

[www.diveRAID.com](http://www.diveRAID.com)

/diveRAID

Just like RAID there are loads of benefits to NITROX, the more you use it the more you'll see it.

## An Introduction to Diving with NITROX

### Want to Dive on NITROX? - This may be a familiar question

So what exactly is **NITROX** and how may it be of benefit to me diving?

Contrary to what many people believe, NITROX is not a deep-diving gas mixture.

In the SCUBA diving community NITROX refers to any SCUBA diving gas mixture composed of nitrogen less than 78% and oxygen greater than 22% and less than 40%. The trace gases are ignored. As you can see from the picture above, NITROX is a colourless and odourless gas and is available for all divers.

NITROX will extend your allowable no decompression limits or bottom time. It does this simply by reducing the amount of Nitrogen gas you are exposed to under pressure.

These benefits do of course have conditions associated with them and like everything can be abused. You will learn about these conditions and how to safely dive whilst breathing NITROX in RAID's NITROX course.

NITROX is known by many names: Enriched Air NITROX, Oxygen Enriched Air, NITROX, EANx or Safe Air.

If you see "NITROX32" or "NITROX36", the number is referring to the percentage of oxygen content in the gas mixture and in turn the diving cylinder you are using.

So "NITROX32" or "EANx32" or "Oxygen Enriched Air 32" contains 68% nitrogen and 32% oxygen. "EANx36" contains 64% nitrogen and 36% oxygen etc...

The two most popular blends are EANx32 and EANx36, developed by NOAA for scientific diving, and also named NITROX I and NITROX II, respectively.

It is very important that you check the gas mixture in your cylinder before each dive, because you need to know what mixture you have for calculating your dive times and to find out the maximum depth you can dive. You will learn how to do this in your RAID NITROX course.

Oxygen is toxic at depth for us humans! Yes the increased pressure at depth will increase the partial pressure of oxygen (PpO<sub>2</sub>) and this increased pressure can become toxic. With NITROX diving we have to stay within two limits, the NDL limit which as a diver you already know about and the other is the oxygen toxicity limits. Staying within these

two limits will allow you to dive underwater longer than an equivalent AIR diver at the same depth and more often than an AIR diver to the same depths.

It is all about balance!

When you complete your NITROX course you find how NITROX will be of benefit to you. You will use it as a means to help you diving, not as a macho status!

For example if you are planning 3 or 4 dives a day whilst on holiday then use NITROX, because of the benefits, but if you are doing one dive in the day to a shallow depth, there is little need for NITROX. This is a generalisation, and there are always reasons for and against. The important issue is to understand it and plan for using NITROX if it will be of benefit which you will learn more about on your course.

### History

NITROX gas mixture is nothing new and has been in use under differing names since before the Second World War.

The history and development is well known and risks associated with well documented. NOAA is perhaps the best known authority and has developed tables and working parameters that are still in use and followed today.

### Myths



- NITROX does not remove the risk of decompression sickness.
- NITROX does not remove the risk of pressure related injuries.
- NITROX does not reduce Nitrogen Narcosis

The RAID NITROX Diver course is designed to introduce you to the procedures and skills to safely dive NITROX. There are many benefits of diving NITROX and the course will give you a good grounding in the use of gas mixtures other than pure air.

This course is also a grounding set of theory and skills that will help you through the rest of your RAID journey. All other levels above the RAID Open Water and NITROX courses have gas analysing and calculations embedded. This means the information and skills you learn in your RAID NITROX course are valuable through all your RAID training programs.

**Sign up for RAID's NITROX course today in just 3 easy steps.**



STEP 1 head to [www.diveRAID.com](http://www.diveRAID.com) and click the button REGISTER at the top right. Then complete the form and wait for an email from RAID. STEP 2 on receipt of your registration confirmation email, open and follow the instructions. Step 3 complete the forms. You are now registered! Once you have completed your online training successfully you will have a great understanding of diving with Nitrox. Your RAID Dive Centre can then complete your training and issue your certification, this may include diving on Nitrox. For more information contact RAID at [admin@diveRAID.com](mailto:admin@diveRAID.com) or call 02 4088 0560.



# RAID™

Dive Training in a Class of its Own



## Eezycut – Professional line cutting tools

Redundancy – re•dun•dan•cy. Noun – the duplication of critical components or functions of a system with the intention of increasing the reliability of the system, usually in the case of a back-up or fail-safe.

The Trilobite Eezycut knife fits into the palm of your hand, but its size and simplicity of design must not fool you into underestimating its cutting power. The open faced design is notorious for its dangers but this double bladed knife is protected by plastic sides where the rope fits in easily. It can cut up to 8mm rope with ease and thicker rope with a little more effort – it must only be able to slide into the ergonomically designed blade opening. The blade is made of 440a stainless steel, which is known to hold its shape and possesses anti-corrosive qualities. If the blade becomes blunt or corrodes, it is easily replaced by the user. Affixing the Trilobite to your gear is easy as it has a pouch with a loop at the back which fits over a weight belt. I fit mine over my dive watch strap and can reach it very easily there – no fiddling to find it on my belt or shoulder. It is also small enough to fit in a pocket and won't damage BCD. The Velcro on the pouch and handle keeps the blade securely in its holster and allows it to pull out easily. Fit your thumb or forefinger into the hole and you have a secure grip to cut just about anything diving related – nylon rope, cotton rope, composite rope, weight belts, fishing rope, electrical cables, you name it, the Trilobite will cut it.

This little knife has a 'wow' factor like no other knife. As a back-up knife, or even as your primary, you could not choose anything better, be it for emergencies or as a working tool. It is also used by skydivers and firefighters. Search the web for videos of this little tool and you can see with your own eyes what it is capable of. 

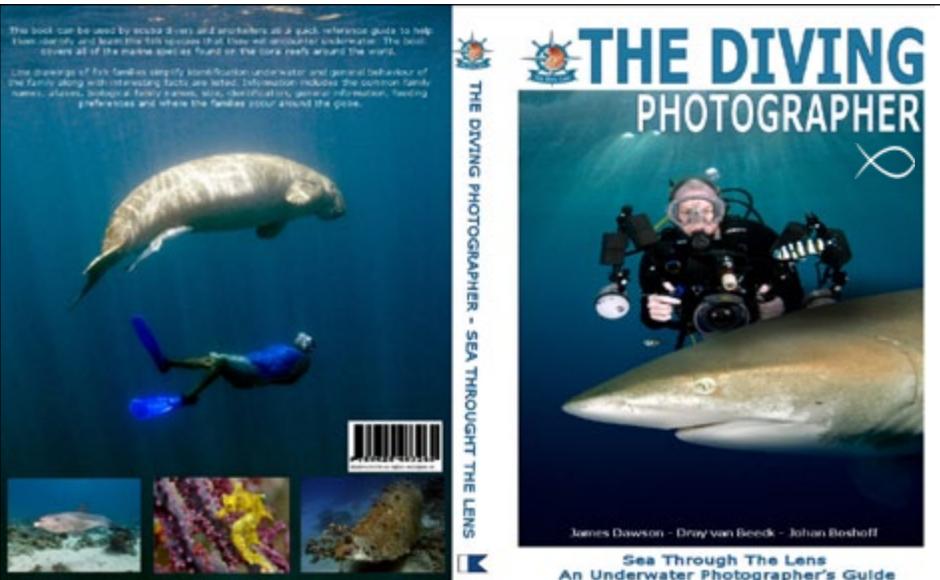
## Flashers – will last a life time

New hardy flashers for night and deep diving or if you just want to be noticed under the water.

Wet contacts so it turns itself on as soon as you hit the water and lasts around 500 hours. Depth rated to more than 100m. Available in blue, red, green and white. 



## The Diving Photographer –



As scuba divers, we are not always the best photographers, but we do learn very quickly. And if we have a handy guide book, the time spent with our cameras underwater will increase rapidly.

This easy-to-use guide book for the diving photographer can be used by all levels of photographers. It helps you with choosing the right type of camera for your ability – although with all the information presented you will learn so quickly that you will have to buy a better camera after working through

the book! Preparing and setting up your equipment becomes a breeze with easy pointers on how to check and replace o-rings, quick tips on keeping your housing dry and other small things we usually forget to check.

The technical advice on how to perform manual camera settings, lighting techniques and editing the not-so-perfect shot was a great help. One of the main things I took from this book was learning to back up my photographs and then trying anything and everything with them in the photo editing programmes until it looks like the professionally taken shot that you have been aiming for the whole time. Some other topics covered are strobe positioning, ambient light, photographing wrecks, long exposures and equipment maintenance.

I must say that this book has proved to be a great help in improving my photographing and editing techniques. Watch out Sodwana Shootout, here I come!

The Diving Photographer is available in all good scuba diving and book shops or online at [www.thedivespot.com.au](http://www.thedivespot.com.au). Cost: \$30 

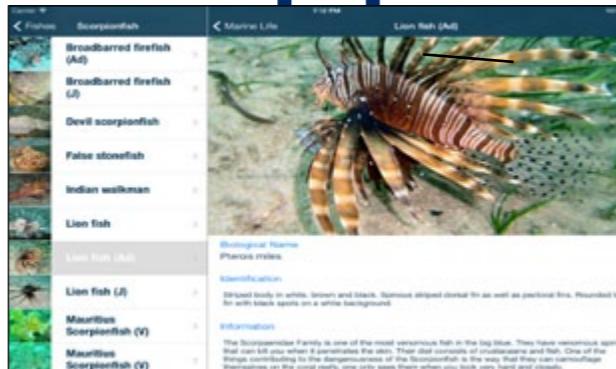


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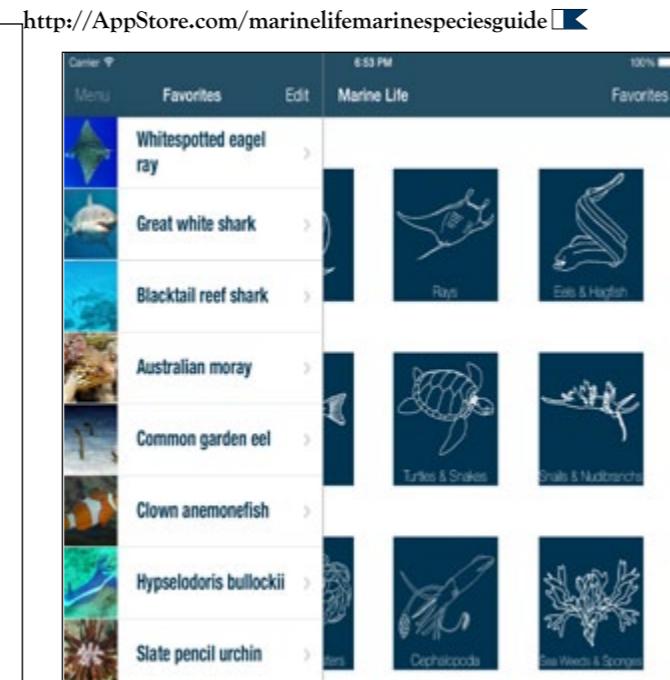
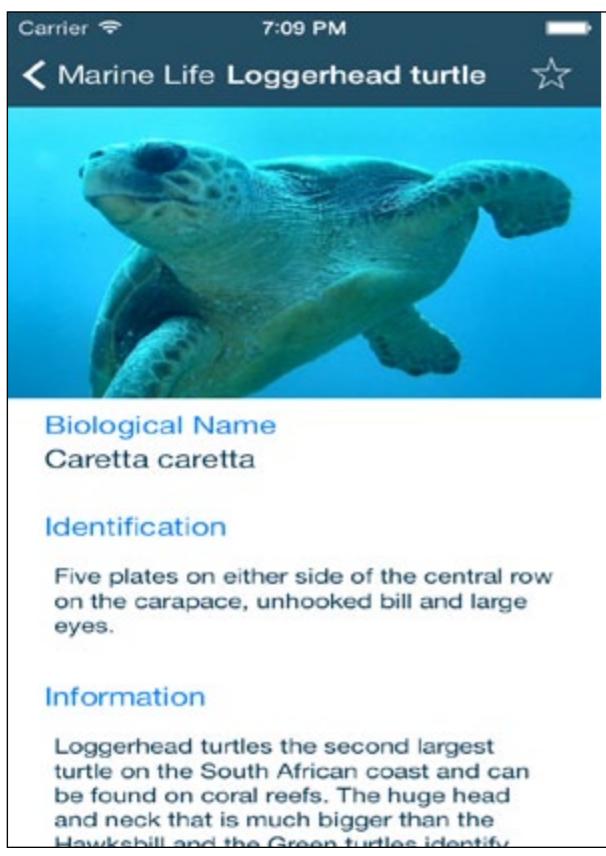
# Marine Life app



A user friendly app designed to assist divers with marine life identification and at the same time learn more about the fascinating lives of our ocean dwellers.

Learn about your favourite sea animals at the swipe of a finger, with more than 4000 full colour photographs of sharks, rays, eels, nudibranchs, hagfish, snails, crabs, lobsters, sea weeds, sponges, cineraria, turtles, snakes, dolphins, whales, worms, crustaceans, shells, cephalopodan, urchins, sea cucumbers, starfish, birds and many more. Displays information such as common names, aliases, biological names, identification, families, gender, size, life stag and much more.

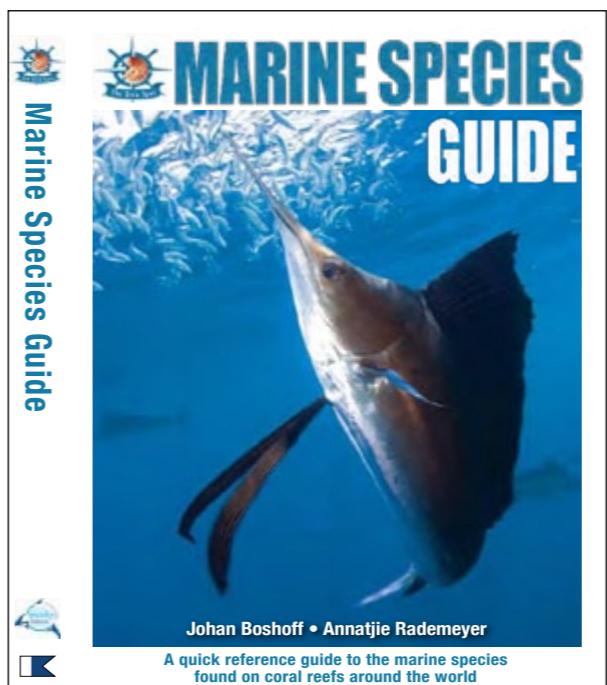
A leader in marine life identification and used in education programs all over the world, now available to you from Apple App Store for only \$6.



Available on the  
App Store

<http://AppStore.com/marinelifemarinespeciesguide>

# Marine Species Guide -



Johan Boshoff • Annatjie Rademeyer

A quick reference guide to the marine species found on coral reefs around the world

Yes, it happened...I had to buy a larger bookshelf. The latest book from The Dive Spot has landed on our shores - The Marine Species Guide.

A book for both scuba divers and snorkelers to identify and learn all about the different fish species they will come across under water. The book covers most of the marine species found within coral reefs around the world. Line drawings of fish families simplifies identification underwater, while general behaviour of the family along with other interesting facts are listed.

Information include common family names, aliases, biological family names, size, identification, general information, feeding preferences and where the families occur around the globe. Photographs of the most common of the species found when scuba diving or snorkeling are included and the fish families are organised for easy reference.

The book works very well in accompaniment with the Marine Species Slate, which can be taken underwater to help with fish identification.

To buy your copy for \$ 30, visit [www.thedivespot.com.au](http://www.thedivespot.com.au) or email [info@thedivespot.com.au](mailto:info@thedivespot.com.au)



## It's not the destination

## It's the Journey!

[WWW.THEDIVESPOT.COM.AU](http://WWW.THEDIVESPOT.COM.AU)

## Scuba Addiction

You know you're addicted to scuba diving when:

- Every morning the sound of shaving foam (psshhhht) makes you want to go diving.
- You actually like wearing a full-length wetsuit, hood, gloves, boots, fins, mask, snorkel, buoyancy compensator, compressed air tank, scuba regulator, dive computer, a knife strapped to your inside calf and 7kg of lead around your waist.
- The local dive shop people recognise you. On the telephone.
- You automatically breathe out when you walk up a flight of stairs.
- You suddenly discover a fervent interest in attending scientific conferences in Vanuatu, the Red Sea, the Caribbean, Thailand and the Great Barrier Reef.
- The value of money is measured by how much dive gear you could buy with it.
- No-one asks for your certification card any more.
- Fresh air is starting to taste funny.
- The most common word on your credit card bill is 'dive'.
- Your house always smells of wet neoprene.
- You put your left shoe on by dropping it on the ground, standing on the toe of the shoe with your right heel, and forcing your left foot into the shoe. 

## The top 10 ways diving would be different if Bill Gates were in charge:

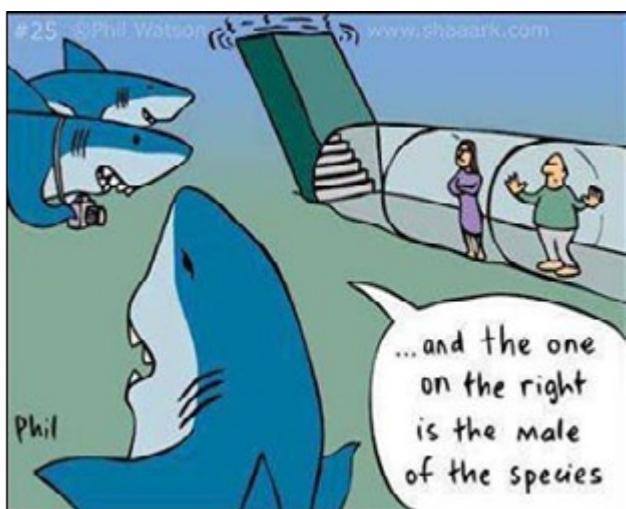
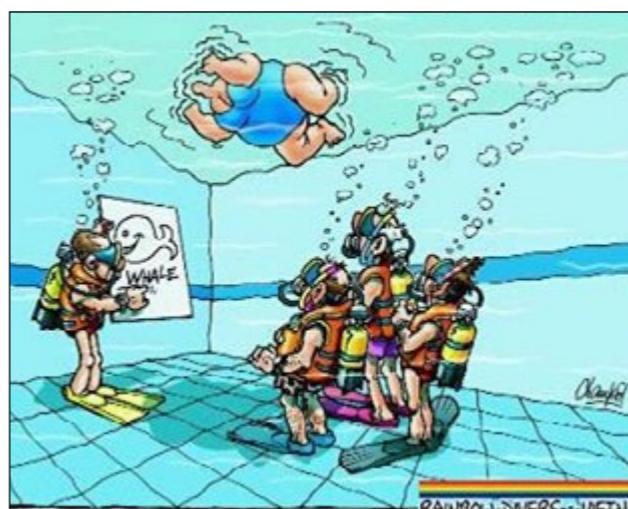
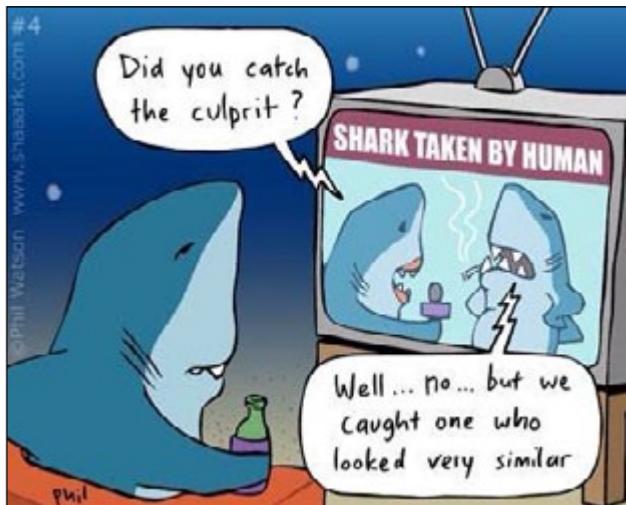
- 10) Useless tips would show up on your dive computer every time you turn it on.
- 9) You could never remove that darn Internet Explorer icon from your dive computer.
- 8) This year's promised equipment models would eventually be released two years from now.
- 7) None of your new gear would be compatible with any of your old stuff.
- 6) Equipment dealers would be required to bundle a parachute with every scuba package so Bill could eventually dominate the sky diving market (a natural tie-in).
- 5) When you called Microsoft to schedule a dive trip, you would be left on hold for a long time, and when you finally talked to someone you would be given a lot of information on diving that was absolutely correct but completely useless.
- 4) Every dive computer would be from Microsoft and any deaths from them would be explained as "beta version" problems. "Don't worry, we'll fix that in the next release."
- 3) Every time you were really close to your destination, your boat would crash.
- 2) Your air supply would stop and would have to be restarted every couple of minutes and you would accept this as normal.
- 1) Bill would steal all the good gear ideas from other manufacturers, copy and release them five years later under another name and call it "revolutionary". 

## A true story!

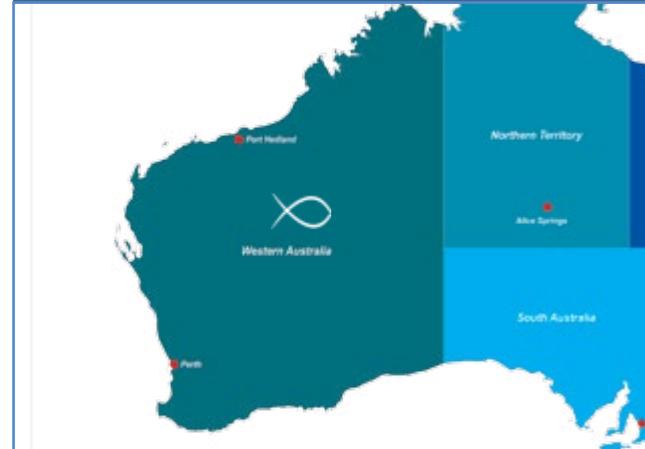
A dive master on a first night dive lead had to go down to secure the buoy line so that the reef could be found after dusk. Halfway down it was discovered that the torch was still on board but there was still sufficient light to do the job. The buoy line tied down on a rock, it was time for ascent. Halfway up, the reel was in front of the dive master's face. It had come undone... impossible but true. A descent was needed again, however, on the descent a friendly Potato bass came to visit from behind and scared the daylights out of the dive master. When retying the buoy line, the Potato bass kept trying to interfere, but the job was eventually done. The ascent was successful, however, during the descent down the line with the divers, with torches, it was again seen that the Potato bass had pulled the line off the rock and they were now all in the middle of the ocean and nowhere near the reef! 



Send your funnies to  
johan@ozdiver.com.au



# Western Australia



## Perth Region

### The Dive Spot - South Perth



We specialise in a wide variety of dive related activities. Our scuba training range from beginners to the more advanced including specialities and professional courses.

Phone: +61 (0) 44 887 9903  
Mail: info@thedespot.com.au  
Web: www.thedespot.com.au

### Astero Dive - Perth



We strive to provide excellent and safe training standards for anyone who want to learn to dive with us. We provide training from entry level through to Instructor Training.

Phone: +61 (0) 450 800 238  
Mail: scubainstructor@iinet.net.au  
Web: www.astegrodive.com.au



### Perth Scuba - Canning Vale



WA's largest dive shop, best range of snorkelling, free diving and scuba equipment. WA's PADI Career Development Centre offers courses from beginner to professional and TDI technical training. Perth Scuba has a free dive club offering twice weekly guided dives.

Phone: +61 (0) 8 9455 4448  
Mail: info@perthscuba.com  
Web: www.perthscuba.com

### Perth Diving Academy - Hillarys



PDA Hillarys for all of your dive and snorkelling requirements local and friendly staff to help you make the right choices open 7 days come and see us down at the Hillarys Boat Harbour just north of the boat ramp see you there

Phone: +61 (0) 89 448 6343  
Mail: troy@perthdiving.com.au  
Web: www.perthdiving.com.au

### OZDiver Dive Group - Perth



We focus on scuba diving at all levels and explore locations. We welcome any qualification level of divers including snorkel divers wanting to learn more about diving, and get onto club diving events to meet likewise divers.

Phone: +61 (0) 450 800 238  
Mail: izak@ozdiver.com.au  
Web: www.ozdiver.com.au

### Scuba Imports & The DiveTub - Perth



Since 2007 to service the Australian Dive Industry with the best scuba equipment available. We offer high-end gear, including recreational, technical and commercial equipment. Wherever possible we'll price match any online dive store to ensure you get the best deal!

Phone: +61 (0) 8 92400163  
Mail: info@scubaimports.com.au  
Web: www.scubaimports.com.au

### Dolphin Scuba Diving - Welshpool



Perth's friendliest dive shop. Learn to dive in as little as 2 days! Small groups with a flexible schedule. Weekly. FREE Sunday Morning Shore. Providing Instructor training, Rebreather courses and support. Technical diving tuition and trips. Local and international diving holidays.

Phone: +61 (0) 8 9353 2488  
Mail: dolphin@dolphinscuba.com.au  
Web: www.dolphinscuba.com.au

### Wizbang Diving Solutions - Perth



Technical Training for divers. The development of safe and technically competent divers through specialized training. Rebreathers, Mixed Gas or even just Nitrox, we will help you develop the skills and confidence that will carry you into a safe and enjoyable future.

Phone: +61 (0) 41 876 1727  
Mail: diving@wizbang.com.au  
Web: www.wizbang.com.au

### Western Blue Dive Charters- Mindarie



We are the only dive company north of Fremantle that operates seven days offering double dive charters, returning before lunch, and allowing you to catch crayfish if you wish. Being a small company we offer a personalised service at an affordable price

Phone: +61 (0) 40 954 5553  
Mail: info@westernbluedive.com.au  
Web: www.westernbluedive.com.au

### Geraldton

#### "A" Team Divers - Geraldton



A - Team Divers offers internationally recognized NAUI and SSI scuba diving courses. Small groups ensure personal attention during your training. We also have an active social club for after course adventures!

Phone: +61 (0) 45 828 5497  
Mail: geoff@ateamdivers.com  
Web: www.ateamdivers.com

### Scubanautics Diving Academy- Rockingham



Welcome to Scubanautics, where customer service and satisfaction is our main goal. Drop in to say hello, our friendly staff are happy to help. Check out our new "online Store"

Phone: +61 (0) 8 9527 4447  
Mail: info@scubanautics.com.au  
Web: www.scubanautics.com.au



### Bunbury

#### Octopus Garden Dive Charters



Just 1.5 hours south of Perth is Bunbury, home of the Lena Dive Wreck (18 metres) & abundant local & coral reef(0-33 metres), including "Blade Coral"—photographers paradise. Small groups—experienced & personalised service. Comfortable, enclosed diesel powered vessel.

Phone: +61 (0) 43 892 5011

Mail: kimroyce@gateway.net.au

Web: [www.octopusgardendivecharters.com.au](http://www.octopusgardendivecharters.com.au)

### Exmouth

#### Dive Ningaloo - Exmouth



Dive Ningaloo pride themselves in taking small groups to only the best dives on the Ningaloo Reef, Murion Islands and more. All courses welcome. With over 20 years experience diving in the Ningaloo, we know where the best diving is!

Phone: +61 (0) 4 567 02437

Mail: [info@diveningaloo.com.au](mailto:info@diveningaloo.com.au)

Web: [www.diveningaloo.com](http://www.diveningaloo.com)

### Snorkel Ningaloo - Exmouth



Take your snorkeling experience to a new level! Using your own Seadoo underwater scooter, you'll be propelled effortlessly through the beautiful Ningaloo, where you'll see the tropical fish and coral that makes Ningaloo one of the world's top snorkeling destinations.

Phone: +61 (0) 45 670 2437

Mail: [info@snorkelningaloo.com.au](mailto:info@snorkelningaloo.com.au)

Web: [www.snorkelningaloo.com.au](http://www.snorkelningaloo.com.au)



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Dive Charter

## South Australia



### Port Lincoln

#### Calypso Star Charters - Port Lincoln



PDA Hillarys for all of your dive and snorkelling requirements local and friendly staff to help you make the right choices open 7 days come and see us down at the Hillarys Boat Harbour just north of the boat ramp see you there

Phone: +61 (0) 86 82 3939

Mail: [info@sharkcagediving.com.au](mailto:info@sharkcagediving.com.au)

Web: [www.sharkcagediving.com.au](http://www.sharkcagediving.com.au)

### ND Scuba - McLaren Vale



We are a small business that go above and beyond .we pride ourselves on providing safe and fun-filled courses at affordable prices. You get trained on a more personal level through to one on one, or small group tuition.

Phone: +61 (0) 88 323 8275

Mail: [barrett80@hotmail.com](mailto:barrett80@hotmail.com)

Web: [www.nbscuba.com.au](http://www.nbscuba.com.au)

## Victoria



### Geelong

#### Australian Diving Instruction



Australian Diving Instruction is a PADI 5 Star IDC facility Offering everything for the Diver from Learn to Scuba Dive to Instructor including PADI Tec 40,45,50, Equipment Sales and Service National and International Dive Trips and Dive Holidays also Dive Charter Boat.

Phone: +61 (0) 40 836 5216

Mail: [adigeelong@optusnet.com.au](mailto:adigeelong@optusnet.com.au)

Web: [www.ausdivinginstruction.com.au](http://www.ausdivinginstruction.com.au)

### Bay City Scuba



Bay City Scuba is Geelong's premier dive shop. Offering all levels of training from Freediving through to Technical training and offering a huge selection of equipment to your diving needs. A RAID training facility offering extensive technical OC & CC rebreather training.

Phone: +61 (0) 35 248 1488

Mail: [info@baycityscuba.com](mailto:info@baycityscuba.com)

Web: [www.baycityscuba.com](http://www.baycityscuba.com)

### Rye

#### The Scuba Doctor Australia



The Scuba Doctor is an online and in-store dive shop stocked with quality brand recreational, technical and commercial diving products. Low prices on scuba, spearfishing, freediving, snorkelling and watersports equipment, plus Air, Nitrox and Trimix fills.

Phone: +61 (0) 3 5985 1700

Mail: [diveshop@scubadoctor.com.au](mailto:diveshop@scubadoctor.com.au)

Web: [www.scubadoctor.com.au](http://www.scubadoctor.com.au)

## New South Wales



### Killarney Vale

#### Pro-Dive Central Coast



Located between Sydney and Newcastle with daily boat dives to the ex-HMAS Adelaide artificial reef, only minutes from the local boat ramp.

Online booking and dive sales available 24/7.

PADI Instructor programs available.

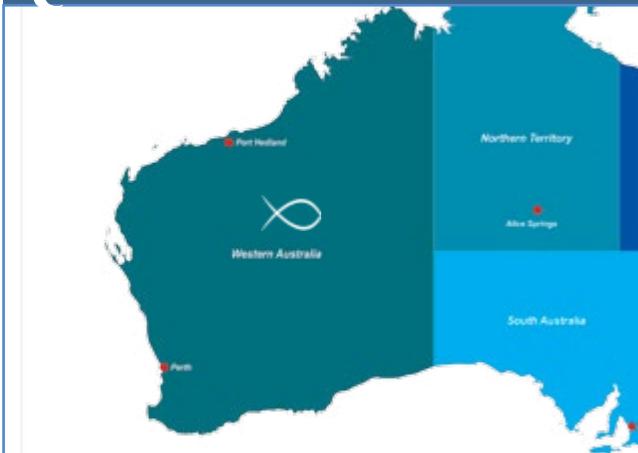
Phone: +61 (0) 2 4389 3483

Mail: [info@prodivecentralcoast.com.au](mailto:info@prodivecentralcoast.com.au)

Web: [www.prodivecentralcoast.com.au](http://www.prodivecentralcoast.com.au)



# Queensland



## Sunshine Coast

Sunreef Mooloolaba- Sunshine Coast



Sunreef Mooloolaba offers the ultimate water experiences on Queensland's Sunshine Coast. From diving the HMAS Brisbane and local reefs, to Swimming with Humpback Whales from July to November, to stand up paddle boarding, kayaking and bubblemaker kids programs.

Phone: +61 (0) 7 5444 5656

Mail: [dive@sunreef.com.au](mailto:dive@sunreef.com.au)

Web: [www.sunreef.com.au](http://www.sunreef.com.au)

## Brisbane

Ozaquatec- Brisbane



Brisbane's largest dedicated scuba service centre, Ozaquatec has all of your servicing needs in one place at competitive rates. Our fast, friendly and professional customer service gives you, the diver, complete peace of mind.

Phone: +61 (0) 404 043 869

Mail: [admin@ozaquatec.com](mailto:admin@ozaquatec.com)

Web: [www.ozaquatec.com](http://www.ozaquatec.com)



## Cold Coast

Devocean Dive- Gold Coast



Devocean Dive is South East QLD's Premier PADI 5 star Instructor Development Centre. We offer unsurpassed service in a safe, fun environment with qualified, experienced Instructors. We look forward helping you achieve your SCUBA diving goals.

Phone: +61 (0) 75 528 0655

Mail: [admin@devoeandive.com](mailto:admin@devoeandive.com)

Web: [www.devoeandive.com](http://www.devoeandive.com)

## Brisbane

Tech Dive Academy- Port Douglas



You deserve the multi-award winning service of the ORIGINAL bespoke private diver training company - Serving Port Douglas since 2003. First for Bespoke Diver Training, the Dive Centre offers all levels of Recreational and Technical Dive courses.

Phone: +61 (0) 422 016 517

Mail: [info@tech-dive-academy.com](mailto:info@tech-dive-academy.com)

Web: [www.tech-dive-academy.com](http://www.tech-dive-academy.com)

# Tasmania



## Bicheno

Bicheno Dive Centre



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Mail: [bichenodivecentre@bigpond.com](mailto:bichenodivecentre@bigpond.com)

Web: [www.bichenodive.com](http://www.bichenodive.com)



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