July - September 2020

OZDIVER

AUSTRALIA'S PREMIER DIVE MAGAZINE

MAUI MANTA'S

AUSSIE'S BIG SEADOGS

WRECK HEAVEN

GRAHAM WILLIS

COVID 19 & DIVING

NORTH PACIFIC




July – September 2020 Edition

Christopher Bartlett

Editor's Deco Stop

With all the current madness in the world and not knowing what tomorrow will brings, it is difficult not to go crazy as well.
Being in quarantine where you are cut off from the world is madness, but necessary.
A time where you cannot travel to dive favourite destinations, write articles and take photos for the magazine is a new experience for me. 2020 is the only year in the last 20 years, that I will not be traveling abroad for at least three months for the magazine.

But as they say, every cloud has a silver lining. With all the time on my hands at home, it was time to finish another project that was on my radar for the last year. After the success on my last book, The Dive Spots of Western Australia, it was time to do the next book. This time it was for the diving community of New South Wales. I met up with co-author Graham Willis, a local diver with years of expertise diving around New South Wales and we have just finished The Dive Spots of New South Wales, which will be available this summer.

The Dive Spots of New South Wales is an indispensable guide for all levels of divers and snorkelers, broadening their horizons on places to visit and dive/snorkel in New South Wales. Through extensive travel and diving, we bring you valuable information on more than 250 dive spots in New South Wales. Important guidelines on each coastal dive destination, including accommodation, facilities, travel tips and dive conditions. Complete with photographs and more than 100 illustrated maps of each dive site.

All spots are star rated to cover depths, marine life and other essential information for the diving and snorkelling community of New South Wales.

For more information on the book and when it will be available, please visit www.ozdiver.com.au

I hope you enjoy reading this magazine as I have included some very interesting articles for all level of divers.

Editor in Chief & Publisher

Johan Boshoff

But seek first the kingdom of God and His righteousness and...

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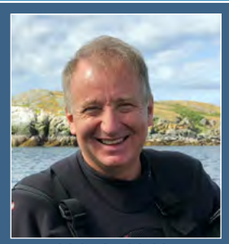
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Graham Willis

Christopher Bartlett

By: Kate Scollary

Owner of Bucket List Diver Kate has always been an ocean child. You may have seen her on our boat Moonshine11 or spent a few days training with her during your course. Read all about how she got into diving and started Perth's Women's only dive club...

I was born to be in the water and my parents knew it, as they enrolled me in swimming lessons at four months of age. Coming from a large family of 6 kids, we all learnt early. My mother tells me stories of how I would fall asleep while floating on my back in the pool during my baby swim lessons. I grew up in the Victorian suburbs and the nearest beach was an hour away by car. During the summer school holiday, we would all go to the beach for weekends. It was my favourite time of the year, playing in the waves and sunshine.

In 2004 I was traveling the east coast with a friend and thought I would give diving a try so I booked onto a liveaboard out of Airlie Beach. I booked my Open Water Course and enjoyed it so much, though I do remember feeling quite nervous before boat dives. I remember asking my Instructor 'are we going to see sharks'? He laughed at me and said YES. I was quite scared and anxious. Thinking back now, it's quite funny to think how scared I was, because now I just love to see sharks. I remember seeing a reef shark for the first time and Kapow – my fears were gone in a split second. I may have even chased after it.

In 2010, I did my advanced and rescue course in Borneo and this is where I totally fell in love with diving. I wanted to stay and do my Divemaster course but I didn't have the time or money so I had to wait a while. The next year, I had the opportunity to go to the Galapagos Islands off the east coast of Ecuador, South America. I loved watching documentaries as a kid and Galapagos was on the top of my Bucket List places to visit. It was remote, wild and full of adventure and amazing wildlife both above and below the surface.

I booked a week-long trip there and loved every second. Diving with hammerhead sharks was a huge thrill. One dive I remember, we were swimming out into the blue looking for sharks. In the distance, I could see shadows and as we got closer, we were watching a chain of what looked like hundreds of hammerheads. It was thrilling, magical and just as I had seen on the documentaries, I watched as a child. Galapagos was a highlight of my trip to South America and a place I would love to go back to one day.

I continued my travels throughout South America and ended up in Utila, Honduras, where I fell in love! I was on a schedule at the time for only 6 weeks to complete my divemasters internship and then I was to continue my travels to Canada. 6 weeks was not enough time! I met a French dive instructor (now my dive buddy/ business partner/fiancé) and together we fell in love with all things diving. Living in the Carribean was magical. Living by the sea, diving every day, meeting amazing people, diving wrecks and reef and filling in logbooks at a bar with cheap rum… what's not to love! After living together on a beautiful island in the Caribbean for 9 months (6 weeks turned to 9months quickly) we said our goodbyes and headed off for more travel. Finally, after travelling around the globe, diving in amazing places, landing awesome jobs as Dive Instructors/ Dive Shop Managers in the Great Barrier Reef, Fiji and the Ningaloo reef, we chose to settle in Perth, Western Australia.

In 2016 together with my French fiancé, Antoni Belmas, we started our own dive school, Bucket List Diver. We started out small with just a few sets of gear to hire and offered PADI scuba courses for 6 months, I found that women, in particular, were not returning for fun dives or returning to progress in scuba. I realised that one of the reasons women would not return to diving is because the majority of the dive clubs and shops were male-dominated, which was intimidating to for some, especially the newbies. On PADI International women's dive day July 2017, I had a few girls show up to my event, shore diving at the local and popular shore dive site, the Ammo Jetty at Woodmans Point, south of Perth. We all had a great morning and the girls loved it, asking me to do it more often. The more involved in the local diving scene I became, the more I was finding out that women weren't diving as much as I thought they could be. I realised some women felt intimidated diving in groups or going onto dive boats alone without having a dive buddy they knew. I wanted to create a safe, happy environment where women could meet fellow female divers, enjoy diving and find new dive buddies.

Since July 2017, I have been hosting a women's only dive morning to encourage women to continue diving after their course, by creating a friendly and supportive environment. From hosting these monthly events, I have seen a massive increase in women divers coming to enjoy the vibe

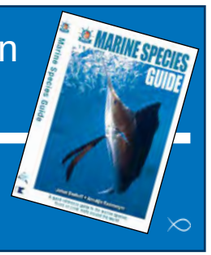
at Bucket List Diver (you can find us on Facebook). A lot of the women I dive with, now own their own gear, regularly join shore dives, boat dives and travel with us, which is fantastic to see.

My only regret in diving is that I didn't start sooner, although you can never be too old to start. For me, being a dive instructor isn't just a job, it's a life choice, something I love to do and an exciting experience I encourage everyone to do. It's so good for mental health. Diving is also a great way to meet new interesting people, explore new places and share the fun with others who need and want to get in the water every day. Recently I had one of my best aquatic experiences ever – snorkelling in Reunion Island last year with humpback whales. It was so beautiful I had tears of joy and found myself speechless. My advice for women divers is to get out there. Find a group you enjoy diving with and a buddy who is as keen as you, and see where diving will take you on this fabulous ocean planet of ours.

Your Dive Instructor: Kate

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 OZDiver Magazine and other divers, send an email to Log Book at info@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

Sea Shepherd Australia

Stellar international speaker line-up for the Underwater Tour 2020 Touring Brisbane, Sydney, Melbourne, Adelaide, Perth, Auckland 14-21 May 2020

Sea Shepherd Australia has awarded Django (AKA Tinny Man) a certificate of bravery for his courageous efforts in freeing a juvenile whale from a shark net off Burleigh Heads in Queensland.
Sea Shepherd Australia's Shark Campaigner Jonathan Clark was notified that a whale might have been caught in a shark net at Burleigh Heads off the coast of southern Queensland.
He immediately called the manager of the Queensland Shark Control Program who was monitoring via a remote camera but could not confirm that a whale was indeed in the net.
Jonathan quickly mobilised Sea Shepherd volunteers who went to monitor the situation. It was confirmed that a juvenile humpback whale was struggling for life and needed urgent assistance.
Sea Shepherd's Apex Harmony campaign has been exposing this cruelty since 2014 by recording footage, and monitoring the contractors who check the nets and hooks and are responsible for culling any targeted sharks.
The Queensland government has created a 20m exclusion zone around the culling equipment making it illegal for Sea Shepherd and other concerned citizens to even approach the gear. When the juvenile humpback whale was caught, many onlookers were feeling helpless and frustrated as they continued waiting for the Department of Fisheries official rescue team to arrive or give the green light to Sea World to disentangle the whale.

As precious time passed, and the delay in rescuing the magnificent creature increased, the luck of the whale changed when a man in a small tinny boat, unaware of the context, saw that the whale needed urgent help and jumped into the water to untangle it from the net.
Within minutes, the whale was freed and continuing its migration, and the man was back in his small boat.
Still unaware of the potential fine of up to $27 thousand that he might face for this courageous and potentially dangerous act.
The story of the entangled whale and Tinny Man's rescue made headlines across the globe.
Community members set up a GoFundMe page to help Tinny Man with the fine and donations poured in, yet the Department of Fisheries, responsible for the Shark Control Program, was aware of the mass support for Tinny Man's actions and must have realised it would reflect poorly on them if they issued a fine.
Tinny Man was relieved and has become a passionate advocate for the removal of nets and drumlines. He's asked that the funds that were donated towards his possible fine be given to Sea Shepherd so we can continue to protect precious marine life.
Sea Shepherd Australia would like to extend a heartfelt thank you to Django for his generosity and for being a voice for the oceans.

This is an amazing story of bravery. The community has rallied behind Tinny Man to demonstrate support for his kindness and express their concern for migrating whales.
Australians want these deadly nets removed.
In 2019 alone, five whales were unnecessarily caught in shark nets that are part of Queensland's Shark Control Program. As whales make their annual mass migration to Queensland's warmer waters, we urgently need the nets removed.
New South Wales has acknowledged the nets are dangerous to whales and has already removed them for migration season. Tell Queensland to follow their lead before more whales are harmed.

For more information regarding the Sea Shepherd visitwww.seashepherd.org.au

AUSTRALIA INTERNATIONAL DIVE EXPO (AIDE) 2021

In light of COVID-19 and the subsequent cancellation of AIDE2020, we are now gearing up for AIDE2021 (29 Jul – 2 Aug 2021).

With a new location on the fourth floor of the ICC Sydney featuring a more personal space dedicated to scuba diving and all things underwater. We look forward to reconnecting and welcoming with our fellow dive industry friends and speakers, and meeting new ones as well.

Save the date and stay tuned for more updates. Stay safe, stay healthy and safe diving.

STEPDive

DIWA Integrates STEPDive Products Into New Youth SCUBA Certifications

The future of youth SCUBA training took a step forward with the announcement of an expanded DIWA training program, which aims to attract the next generation of divers to the sport. Introduced at a variety of tradeshows this past winter, and rolling out to DIWA dive centers worldwide this spring and summer, the extensive youth training program represents a substantial industry change and investment into the divers of tomorrow.

With the vision of 'building young ocean advocates and explorers of the aquatic world', kids even as young as 6 years old can begin their training on the surface, learning key skills such as breathing, hand signals, regulator use and the importance of watching and staying close to the instructor.

From the age of 8, their journey can begin underwater - using slow, safe and progressive steps that take advantage of STEPDive's unique and patent pending capability to limit depth and create confined depth conditions in open water.

It builds a strong foundation of skills and technique, and is a great step towards the ultimate goal: a new generation of confident and experienced Junior Open Water Divers.

However, the industry benefit is not just limited to children, with STEPDive providing ideal opportunities for both handicapped and even older divers who cannot support the full weight of a BCD, tank and weights. With only the try dive, discover dives, and youth diving courses released so far, we are excited to see what further courses and innovations are ahead!

For more information, please contact Darren at STEPDive darren@stepdive.com or visit the STEPDive website at https://www.stepdive.com for further updates.

"STEPDive is a new and innovative Austrian diving product manufacturer, aiming to complement the global diving industry's training approach, by filling the gap between the accessibility of general snorkeling and the adult world of SCUBA diving. STEPDive's mission is to complement the SCUBA industry and provide greater diving accessibility to all; especially children and families where the focus is on core foundation skills and safety.

A smart step before Junior Open Water Dive Courses, STEPDive will thoroughly prepare the next generation of divers, progressing them to greater depths when age appropriate. For more information or to see STEPDive in more detail, visit https://www.stepdive.com or follow @STEPDive on Instagram."

Dive Schools / Operators / Organisers / Instructors

Do you have any interesting, newsworthy info to share with the dive 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

"The reef systems here are some of the most pristine I have seen anywhere in my dive travels around the globe, and Wakatobi resort and liveaboard are second to none. The diversity of species here is brilliant if you love photography." ~ Simon Bowen

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Dive the Continent
Dive OZ

By: Malcolm Nobbs & Jamie Watts

Aussie's Big Seadogs

We could see sealions basking on the beach, but getting close to them – or rather having them come and approach us - was not easy.





By: Malcolm Nobbs & Jamie Watts

Most were either standoffish and nervous or just not interested in these bizarre, clumsy human tourists at the edge of their bay. The occasional individual seemed to be curious and would briefly check us out, but they are fast, and these were fleeting glimpses.

But eventually we'd get the curious and delightfully charming individuals who wanted to come and play. And there are not many things cuter, more engaging and appealing underwater than an Aussie sealion.

One youngster did a quick fly-by at the edge of visibility, staring at us with that stare of permanent surprise that the white rings around the wide eyes give them. Then a pass behind, a little closer.

Then a tentative stretch forward with that big doggy snout, the coarse whiskers stretching out and forward towards me.

He's probably only a couple of years old, but he already outweighs me. His snout and head are reminiscent of a really big, chunky dog, with a solid mass of a spindle-shaped body.

They're the most seal-like of the sealions, the long, rounded snout, long body and (for a sealion) shortish back flippers somewhat reminiscent in build and character of the grey seals I used to see back in the UK.

Australian sealions are more solid-bodied and less snake-hipped than most sealions. But a quick beat of those big fore flippers and it's

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Dive the Continent
Dive OZ

By: Malcolm Nobbs & Jamie Watts

suddenly very clear that this is a sealion.

Like other sealions, these animals are active, fast, curious denizens of the near-surface.

The slightly downturned eyes, tiny ears and rounded snouts make them perhaps the cutest and most cartoonish of the sealions.
I've been lucky enough to dive and snorkel with Australian sealions several times over the last decade. These dives have always been as part of another trip, on a couple of occasions as part of a south Australian diving road trip (I live just north of Sydney), and once as part of a liveaboard trip to dive with great whites.

Starting point for these dives has been Port Lincoln, and from there a couple of hours out to tiny Hopkins Island, or a little further to Kangaroo Island, Australia's third-largest island.

These are two of the roughly fifty islands dotted around the south and southwest of Australia that each support a small colony of these fabulous beasties.

My visits to these islands have produced very different underwater conditions, ranging from 10 to 15 metres visibility down to a metre.

Obviously the character of interactions is rather different, but the limitation is really on me and my photos – the sealions can find their way around perfectly fine with their whiskers in one metre viz, and decide whether they want to appear at my shoulder and startle me.

By: Malcolm Nobbs & Jamie Watts

Seal Cove at Hopkins Island, like many of the places you can see these sealions, now has a monitoring camera.

It's a reasonable precaution in support of giving these animals space, and helping their slow recovery. Even those of with approved access must now follow strict rules or engagement, including staying away from the beach, not touching the animals, not standing in shallow waters and limited maximum times for a visit.

The Australian sealion's future is still far from certain. The entire species is thought to now number around 12,000, around 10,000 in South Australia and 2,000 in Western Australia. Among the world's sealion species, only the New Zealand sealion is rarer.

A handful of animals have made recoveries from populations this low (and even lower), but the slow maturity and slow reproductive rate of the Australian sealion doesn't make it easy.

They are rather slow to mature, and when they do only produce one pup over an eighteen month, a non-seasonal breeding cycle, after which they will probably not breed again for two to three years.

They also stay with the colony they were born to breed, and these colonies are often small and isolated, so interchange between colonies is minimal.

By: Malcolm Nobbs & Jamie Watts

At the most, 2500 pups might be born a year for the entire species, but survival of both the young and the adults is low.

Like any large marine mammal, they can only survive in particularly rich, productive seas, and their warmblooded bodies require massive feeding with oil-and protein-rich seafood.

Where they live are not perhaps the busiest seas in the world, but they do inevitably run into conflict and trouble with human activities around their colonies, and we do compete with them for space and food.

A few each year get struck by boats, a few suffer from oil spills and local pollution, occasionally one will be predated by a great white

By: Malcolm Nobbs & Jamie Watts

shark (although of course the great white populations have themselves plummeted in recent years).

The biggest nemesis for the Australian Sealion, though, is of course the gillnet. In one fishery area off South Australia nearly four hundred Australia Sea lions were recently killed in an 18-month period.

The Recovery Plan for the Australian Sea Lion came into effect in July 2013. Fisheries management measures, including gillnet closures were enforced around all Sea lion breeding colonies in South Australian waters in 2012 and in Western Australian in 2018.

It's not too late, and all in all people are rather fond and supportive of these lovely chunky sea dogs. But it'll be slow.

Dive the Continent
Dive OZ

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Jeweled Predators

By : Jill Holloway Photos: David Holloway

The leaffish is always exciting to see as they are fairly uncommon. Photographers love them, and divers are enchanted by them.

There is as much excitement in Bali or Aliwal Shoal, in Sodwana or Mauritius when one of these amazing little predators is spotted. The universal leaffish signal of swaying hand-on-palm-of-hand spans the globe.

Leaffishes (Taenianotus triacanthus) come in a huge variety of colours, but they are all part of the same family. There does not seem to be any reason for colour changes other than camouflage, but since some come in brilliant pink, others in mottles browns and blacks and others in whites and yellows, the colour variations seem to be random. It's hard to believe that a bright pink leaffish could possibly believe it was hidden from its prey, but they may not look pink to a shrimp or a small fish. They can even create a mottled effect using mottled colour camouflage, making themselves look like algae or like a rock or coral. They do not have scales and their bodies are covered in prickly papillae, like a porcupinefish.

Dive guides love them as they are fairly territorial, and can easily be found again once spotted. You will normally see a leaffish squatting staunchly down in a crevice with its pectoral fins gripping the edges of its protected spot like tiny hands and feet, clamped there, completely unmoving. But don't be fooled, it is not hanging on to stop itself from being swept away, it is hunting. If you watch and wait, it starts to sway, although there is no current.

It swings from side to side, and turns imperceptibly as it sways, eyes moving constantly. Then when an unsuspecting prey comes within reach, usually larvae or small fish up to half its own body size, occasionally crustaceans or shrimps, it hoovers them up .

Their eyes are set on either side of the head, but because of the narrow head

they do not see straight ahead, and this is one of the reasons why they sway – they need to get depth perception before pouncing. For added concealment they have a bead around their mouths, consisting of fine irregular appendages which break up the shape of the mouth to fool prey.

They are laterally compressed, so from in front they look like a stick with feet, with huge splayed pectoral fins which enable them to walk when they want to move small distances. The dorsal fin is soft and often quite spectacular, and is bonded to the caudal fin. This combination gives it a fin that is quite often almost the same size as the body.

They can be found at almost any depth, from 5m right down to 120m, and because their prey is so varied, they can live in almost any conditions, but they prefer to be in areas where there is current sweeping in small invertebrates, which stick in the sea weeds and among the rocks of its preferred hiding places. They are as much at home on our East African Coast as they are in the Galapagos or Japan, and from Indonesia to Hawaii to Australia.

The spines, like those of its relatives the scorpionfish (Scorpaenidae) are venomous, and if you put a hand down on a leaffish you would be stung by one of the concealed venomous barbs in its dorsal fin. The poison is painful but not fatal, and a sting from a leaffish can be treated with antihistamine cream.

By : Jill Holloway Photos: David Holloway

Fish Conditioning

Do fish become conditioned by contact with divers, and is chumming for sharks really a problem?

It's no secret that the dive masters in Mauritius conceal pieces of uneaten, cheap government bread in their BC pockets. Unnoticed by the naive resort course divers, the DM's crumble the bread into the water around them, and are soon mobbed by shoals of damsels, who like nothing more than a little French loaf for breakfast. When you dive with certain dive operators there you have to swat away the aggressively seeking damsels.

If you don't wear gloves, they bite your hands or the naked areas on your face. Their teeth are too small to draw blood, but the nip is painful nonetheless.

On reef structures the sergeant majors (Abdadufduf abdadufduf) lay their eggs in nests in the hollows of the eroded rocks and caverns. They can be seen hovering anxiously over their nests, but if a diver gets too close they dart away, and the wily wrasse pile in and gobble their eggs.

Incredibly, the wrasse know they fear divers, and we have often been plagued by colourful wrasse weaving seductively in front of the camera lens, and then darting towards the sergeant majors' nests hoping we will follow them. It's almost as though they are saying, "Come on guys,

come and look at these eggs, come and photograph these fish." We have often seen pairs of mournful-looking sergeant majors rushing back to their eggless nests after an oblivious dive group has finned down for a closer look.

Less obvious conditioning is on new or undiscovered reefs, where the fish are much more nervous when a group of divers arrives, and whole shoals will fin away from the intruders. Once they have got used to the fact that the air-breathers are harmless they go about their business happily, unafraid of the invaders. Potato bass are happy to interact with divers, lying on the sand, eyeing them hopefully, swimming beside them and rubbing against them. The legendary Bert was among these. In Mauritius, there are honeycomb morays who dance with dive masters at night.

The controversy over cage diving and chumming for sharks rages on, and although we enjoy the adrenalin rush of a Shark Dive, there is always a nagging doubt that we are supporting something that could lead to later danger. It is extremely rare for a diver to be attacked by a shark, unless he/she is in a bait ball, at the wrong place at the wrong time or is behaving foolishly.
The dive operators who offer these extreme experiences have never themselves felt in any danger. I watched a dive master on a shark dive brush a piece of sardine away from my buddy's head just as a black-tip was diving for it, and the shark veered away from his hand.

Is it a bad thing for fish to become conditioned to the presence of divers in their private domain? Theoretically, anything that changes the behaviour of a creature in its natural habitat is unwarrantable interference. However, the test of stress in a creature is whether it continues to live, to eat and to breed in the area, and the evidence of stress-free fish life is everywhere.

Perhaps just as we are learning about reef fish, they are learning about us – and if their behaviour is anything to go by, once they know us, they like us.

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By: Lesley Rochat

Sharks In Deep Trouble

With ever-increasing fishing pressures, sharks are being purged from the ocean and around the world their populations are plummeting. Part I

Sharks are generally considered to be ruthless man-eaters. Man himself, however, is this much-maligned creature's biggest predator – it us who feed on them. For all their evolutionary success and manifest menace, sharks are incredibly fragile and unable to withstand the increased pressures wrought by the voracious world fishing industry.

This is due to the fact that they are slow-growing animals that mature late and live long (up to 60 years in some species). They also have a low reproduction rate.

As resources worldwide lose the battle against human population growth, no shark is safe from overexploitation. Some species have declined by as much as 80% due to the international trade in shark parts, especially in their fins, meat, cartilage, skin, oil, teeth and jaws. The World Conservation Union (IUCN) states that each year up to 100 million sharks are being caught worldwide. Furthermore, since 1991 the number of sharks killed simply for their fins has skyrocketed some 2 000 % in parts of the world.

The explosion in market demand for shark fins has resulted in the barbarous and wasteful practice of 'finning'. This practice

Weird and Wonders
Environmental Affairs

is likened to the slaughtering of elephants for their ivory and is the primary cause for shark mortality worldwide. It involves hacking the fins off live sharks and tossing the hapless animal back into the sea to drown or bleed to death.

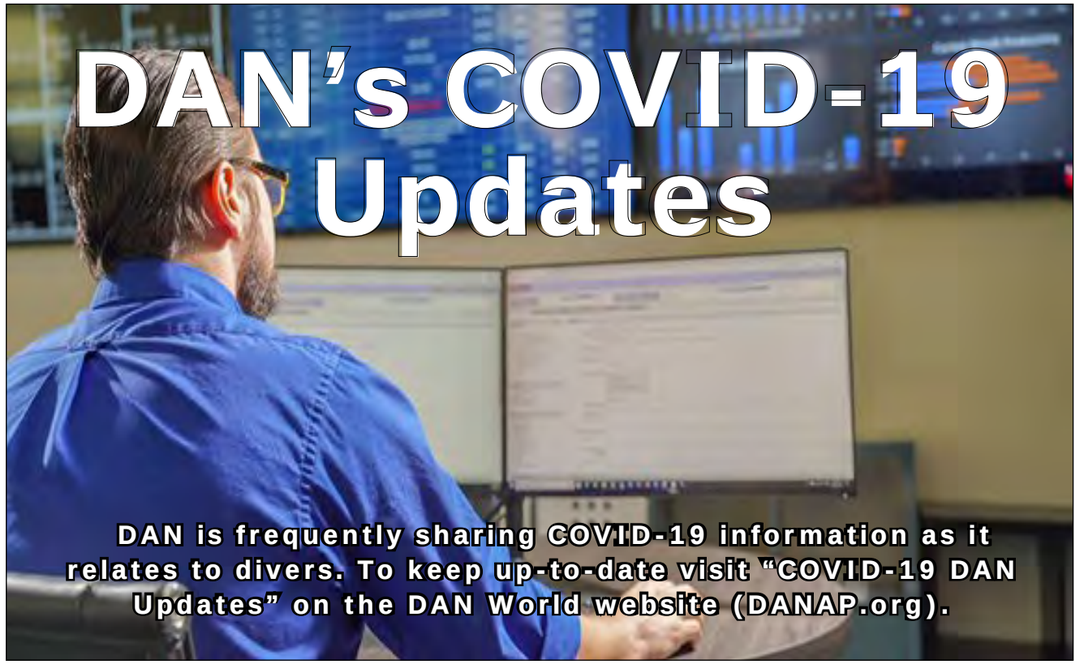
Not only is this practice brutally inhumane, it is also wasteful since the body is discarded and the fins constitute only 1 to 5 % of the animal's bodyweight.

In an attempt to reduce the number of sharks killed, some countries have banned shark finning. This ban does not stop the sale of shark fins, but it prohibits vessels from possessing fins without the entire shark carcass.

Given the vessels' limited storage capacity, the overall number of sharks killed per year should be reduced. However, the inadequate enforcement and lack of overall judicial fortitude in the high-sea areas globally result in perpetuated poaching and over-harvesting. A further concern is the exploitation of developing countries' shark resources for the benefit of developed nations.

Many of these developing countries do not have the political will or the resources to police against resource pirating, whilst some of them are interested only in short-term economic gain. In other regions piracy is overlooked because of political back-scratching between countries.

DAN's COVID-19 Updates



DAN is frequently sharing COVID-19 information as it relates to divers. To keep up-to-date visit "COVID-19 DAN Updates" on the DAN World website (DANAP.org).

Surface Survival Times
Cleaning rental equipment, especially that which comes in contact with the mouth and face, has always been an important practice to ensure cleanliness and safety. Because of the highly transmissible nature of COVID-19, the act of disinfection is now more essential than ever.

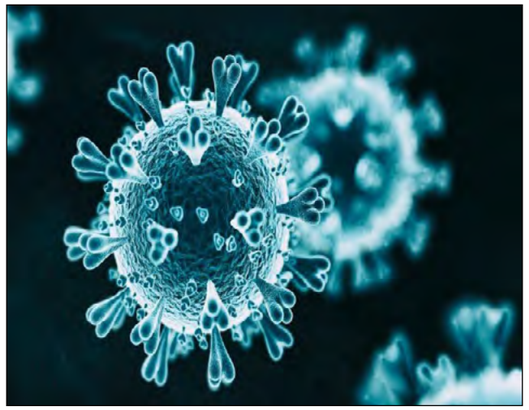
Experts expect that COVID-19 will continue to spread, even after resumption of business as usual, until a vaccine is developed and/or a large portion of the population has been infected. The dive community must now integrate the best available data on novel coronavirus survival times into its routine disinfection procedures.

Survival times of the virus are particularly important to consider on surfaces that cannot easily be decontaminated, such as fabrics. Research on the virus that causes COVID-19 is still developing, forcing researchers to apply knowledge about similar viruses to the novel coronavirus for answers. Because they are closely related, the coronavirus responsible for the 2003 SARS epidemic has been studied as a surrogate for the current virus. Other surrogate coronaviruses, such as human coronavirus 229E, have also been analysed.

READ MORE: www.danap.org/dan-surface-survival-times.php.

Diving After Covid-19: What we know today
COVID-19 symptoms range from mild to severe. Some people have no symptoms at all while others require complicated stays in ICUs with ventilatory support to recover. In addition to the impact of the primary viral infection, factors such as underlying medical conditions, age, secondary complications and more will affect recovery.

COVID-19 shares many features with other serious viral pneumonias and requires a period of convalescence before returning to normal activities. The amount of time needed to recover will vary, as will the long-term effects of COVID-19 such as pulmonary function. As information becomes available it will be incorporated into COVID-19



prevention, treatment and follow-up guidelines.

Determination of your fitness to return to diving after a COVID-19 infection will require assessment by your physician team confirming your full recovery and ability to safely perform unrestricted vigorous activity.

If your doctor needs to consult with a dive medicine specialist, DAN doctors are here to help. We also have a database of dive medicine doctors and can provide referral information.

In addition, we urge all divers who have recovered from COVID-19 infection to call DAN for up-to-date information. As always, continue to follow all recommended precautions and stay safe!

Scuba Units: Not Suitable Substitutes for Ventilators

DAN has received several inquiries about the use of scuba equipment to aid in the battle against COVID-19. Unfortunately, scuba units are not suitable substitutes for ventilators. Do not attempt to use a non-medical device to try to treat a person with compromised lung function; this could result in severe injury or death of the patient.

CPR and COVID-19
As most of us are aware, COVID-19 can be contracted by coming into contact with droplets of bodily fluid from an infected person. Performing chest compressions as part of CPR can mobilise droplets, much like coughing can. Since even asymptomatic people can carry and spread the virus, it is nearly impossible for a bystander to determine their risk of contracting the virus when intervening and performing CPR.

If a bystander did nothing other than activating emergency services, the victim's chances of survival would be very low, while intervention would substantially improve the odds. However, it would also increase the rescuer's risk of exposure to COVID-19. Ultimately the decision to act or not act is a difficult and personal one. If you determine that you need to respond, we recommend the following steps.

READ MORE: www.danap.org/dan-cpr-and-covid19.php.

DAN Remains Committed to Divers
Our medical and research staff are monitoring the pandemic closely and applying their expertise to identify information and solutions to keep divers as safe as possible during this outbreak.

The DAN Emergency Hotline (24/7), Medical Information Line and Membership Team are all operating on normal schedules. If you have questions, DAN is here to take your calls and emails.
The entire DAN team is committed to providing the full range of services that you have always relied on DAN to provide, but we need your help. We can only do this because of our members and patrons.

From everyone at DAN, thank you for your support that allows us to keep doing the work that we care about so much.

DANAP.org

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Whale Sharks, turtles, the Sardine Bait Ball, beautiful reefs: Moalboal has it all! With only 10 detached cottages, a house reef that's open 24/7 and with more than 30 dive sites to explore, Magic Island Dive Resort should be added to your next list of dive destinations!

GLOBAL NEWS

Lens Beyond Ocean (LBO) Photo Competition

In light of the Covid-19 pandemic, the Malaysia International Dive Expo (MIDE) will now take place from 4 – 6 December 2020.

As a result, the Lens Beyond Ocean Photo Competition will extend its final submission date to 1 November 2020.

Currently in its tenth year, the LBO competition continues to grow each year, drawing in more than 850 exceptional underwater pho¬tographers from around the world; as well as equally high quality prize sponsors.

Prizes
From dive travel pack¬ages to some of the best dive spots in Asia to top-of-the-line dive gear and camera equipment worth USD 25,000, participants have incredible prizes to look forward to in this competition.

Judges
The competition will be judged by renowned underwater photographers including Tobias Friedrich (Germany), Jason Isley (United Kingdom/Sabah) and Nurul Yazid (Malaysia).

Be A Winner
If you are a diver and passionate about sharing your underwater story and sightings, LBO presents a great opportunity for you to showcase your talent.

1st and 2nd place winners will be selected in each of the seven categories. Other im¬ages selected by the panel of judges will be awarded the honorable mention of “Memorable Pictures”.

Deadline
The final date of submission is 1 November 2020.

Winners’ Announcement
Winners will be announced on 27 November 2020. All winners will be awarded at Malaysia International Dive Expo (MIDE) on Saturday at 11.00am on the main stage.

Winners’ Gallery
All winning photos will be displayed during MIDE at the foyer from 4 – 6 December 2020 at the World Trade Centre, Kuala Lumpur. Winning videos will be showcased on the big screen on the main stage.

Call for Sponsors
Businesses and organizations keen to sponsor the event or donate prizes will benefit from expansive interna¬tional exposure. Your organisation’s logo will be present on all print and online promotions and collateral. This includes being listed as a sponsor on the Lens Beyond Ocean website with a link to your organization’s website; logo presence and brand promotion on social media; and placement on the Lens Beyond Ocean gallery banner as well as the venue banner displayed during MIDE 2020.

For more information, please visit www.lensbeyondocean.com

MALAYSIA INTERNATIONAL DIVE EXPO (MIDE) 2020

New Date Set for December 2020

In light of the Covid-19 pandemic, the Malaysia International Dive Expo (MIDE) will now take place from 4 – 6 December 2020 at the World Trade Centre, Kuala Lumpur.

Exhibitors and partners are assured that MIDE's organisers, AsiaEvents Exsic, have put together a solid plan to deliver the same targeted results as their usual mid-year event.

Entering its 15th year, MIDE promises to operate at full capacity in December to not only welcome water enthusiasts, its exhibitors, speakers and other delegates, but also to continue to provide the best available platform for B2B networking.

MIDE welcomes a minimum of 10,000 visitors each year. The show has recorded more than 160,000 visitors coming through its doors between 2006 and 2019. While 90% of visitors to the expo are scuba divers, the new inclusion of boating and other recreational water-sports at the show will no doubt draw in even more water lovers.
In terms of B2B interests, the new and improved dynamic networking platform will assist businesses and exhibitors to plan their visit more strategically over the three-day event. With a preview function to browse the profiles of potential buyers and sellers, meetings are to be scheduled in advanced prior to onsite meetings.
As usual, dive education will be a major feature at the show, where visitors can look forward to a
series of presentations including the annual Ocean Rescue Forum (themed "Eco Friendly Diving" for 2020).
New to MIDE in 2020 is an all-female line-up of presenters who will be sharing their experiences, challenges and journeys as women in underwater photography.
For technical divers, the cave diving forum will inform and equip them with valuable tips on safety, destinations and equipment.
There will also be a 'Persons with Disabilities' forum, where the panel will share their life changing experiences after discovering diving for people limited abilities. DAN World will also return with more tips on safety in diving in every situation.
For more information on the dubbed 'hottest and coolest dive expo in Asia, visit www.mide.com.my To visit the expo, register at 'Entry to Expo'.

Contact us
Please email us at info@mide.com.my or visit www.mide.com.my for detailed information. Stay updated with the latest news and inspiration via MIDE's social media pages under @Mideexpo.

Virtual consulting lifeline created to help struggling South Pacific tourism operators

BLP joins with SIDE Dive Munda to launch COVID-19 Virtual Consulting-

New Georgia, Solomon Islands - High profile Solomon Islands dive tourism entrepreneur, owner/operator of Dive Munda and SIDC, Belinda Botha has stepped up with a timely and proactive helping hand to offer virtual business coaching and business continuity planning advice to struggling South Pacific tourism operators.

Ms Botha's aim is to provide virtual consulting services and coaching to employers, entrepreneurs and employees across the South Pacific tourism and scuba dive sectors. Services can be 100% discounted during the COVID-19 crisis.

Key to everything, Ms Botha said, is offering small to medium sized enterprises (SMEs) the advice they need to navigate their way through the current pandemic, while at the same time helping them to prepare for a post-COVID-19 environment and be ready to kick-start their businesses the moment the world returns to normal. Services focus on providing customised advice ranging from business and career guidance, coaching and mentoring, as well as direction with recruitment, HR and outplacement, strategic and business continuity planning and organisational management.

Ms Botha has been approved to offer the services as part of a new program instigated by Business Link Pacific (BLP), an Auckland-based private sector development programme committed to supporting Pacific-based businesses and funded by the New Zealand Ministry of Foreign Affairs and Trade (MFAT).
Interested SME's can contact Ms Botha directly or via BLP to start the onboarding process.

E: dive@divemunda.com
W: https://businesslinkpacific.com/organizations/345-dive-munda-covid-19-human-capital-consulting-services-solomon-islands

WhatsApp: +27 63 745 0895

Facebook: https://www.facebook.com/Dive-Munda-Consulting-106707107708743/

Facebook Messenger: m.me/106707107708743

Dive the World
North Pacific

By: Jamie Watts & Malcolm Nobbs

Richest Seas On Earth

North Pacific

Where's the World's best diving? If you like wrecks, maybe Scapa Flow, or maybe Truk Lagoon. Warm water reefs? Probably the dazzling biodiversity of the thin skin of life on coral reefs around North Sulawesi or western Papua. But for three-dimensional marine ecosystems, a rich soup of life over a much greater area, the rocky reefs of the north Pacific are pretty hard to beat.

By: Jamie Watts & Malcolm Nobbs

Nearly twenty years ago I was first told about the 'best diving in the World' at the US dive trade fair DEMA; it was in the tidally-flushed channels around Vancouver Island, I was told. Any use of such a superlative description, of course, instantly red-flags hyperbole and over-statement. I've now dived off 33 different countries and territories (and snorkelled several more) in pursuit of spectacular marine life. I have somewhat different ways of gauging the quality of a given marine ecosystem than a casual, unsupported blanket 'best in the World' claim, but having spent a couple of trips diving around Vancouver Island and further north, and traveling topside around the North Pacific arc, I will say while the young man who made the comment was neither accurate nor completely correct with his sweeping statement, he was far from being completely wrong either; the marine life of the area is utterly spectacular.

The arc of ultra-high biological productivity, khaki-green sea, stretching over the continental shelves and beyond from the north of Japan up to the Kamchatka Peninsula, around the Commander and Aleutian Islands, to Vancouver Island (and arguably even a little further in either direction) is ecologically magnificent over a huge area. Whether diving amongst thick aggregations of giant invertebrates or topside, watching the rich fauna of whales, dolphins, seals, sealions, seabirds or bears, the whole area is tangibly, densely rich, a soup of marine life.

I vividly remember my first dive off the west coast of Vancouver Island. Dropping down the slope through the dense, green water, the first thing I came across was a giant plumose anemone. I was very familiar with plumose from British diving, but this was on a whole different scale, nearly a metre high. I photographed and stared, becoming aware that the local divemaster was looking a little confused and quizzically at me. Was I okay? No ear problems? Why was I stopping so shallow? We continued, and a few metres further on I understood his confusion. Dozens of plumose anemones, many of them even larger, erupted in massive tufts from the rocky reef. Orange sea pens equally as tall stood out, and breakfast-bowl-sized anemones of a variety of hues were everywhere. Bizzare hydromedusa jellies drifted by, some with their resident amphipod

Dive the World
North Pacific

By: Jamie Watts & Malcolm Nobbs

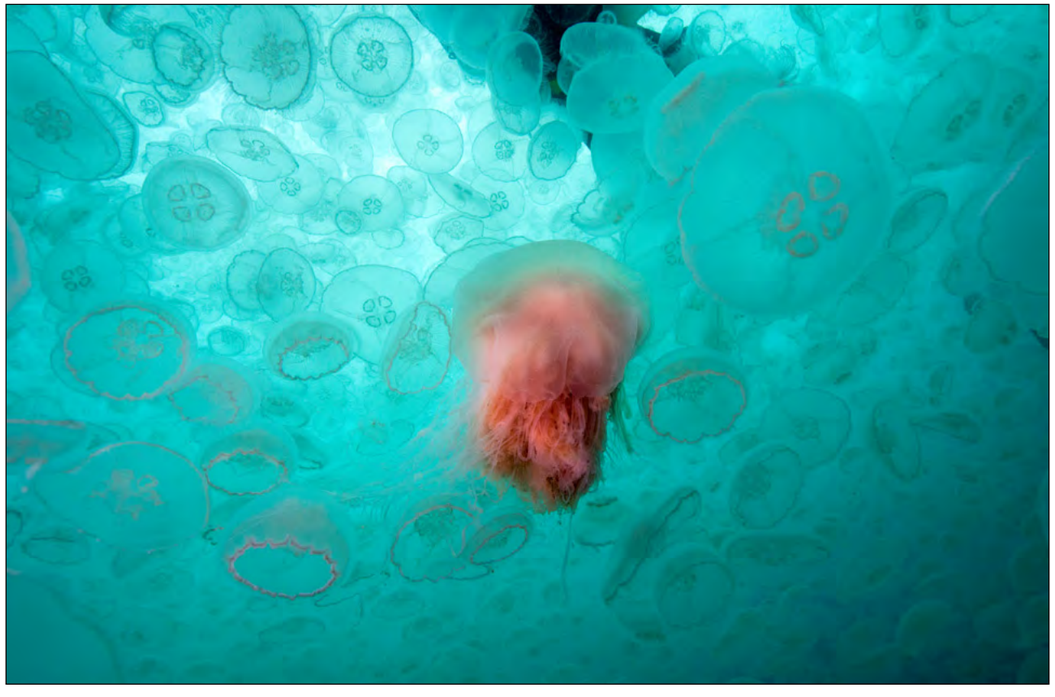
crustaceans. Everything was enormous – I had the feeling that I'd somehow shrunk to a quarter of my normal size. I swear one of the nudibranchs I saw on that first dive was as big as a Chiuhaua.

There are some celebrated dive sites, particularly around the Vancouver Island area. Browning Wall is carpeted in marine life – every bit as impressive as legend has it, with gigantic basket stars open to the currents. God's Pocket is booked up a year or more in advance. Race Rocks, off Victoria and rather accessible, has Steller Sealions and is occasionally buzzed by Orcas. But the whole huge area has so many islets, inlets, reefs, nooks and crannies – most of them less celebrated - that teem with marine life. The diving and the marine life is reminiscent of the richest UK, Norway, Iceland or Newfoundland diving, on steroids.

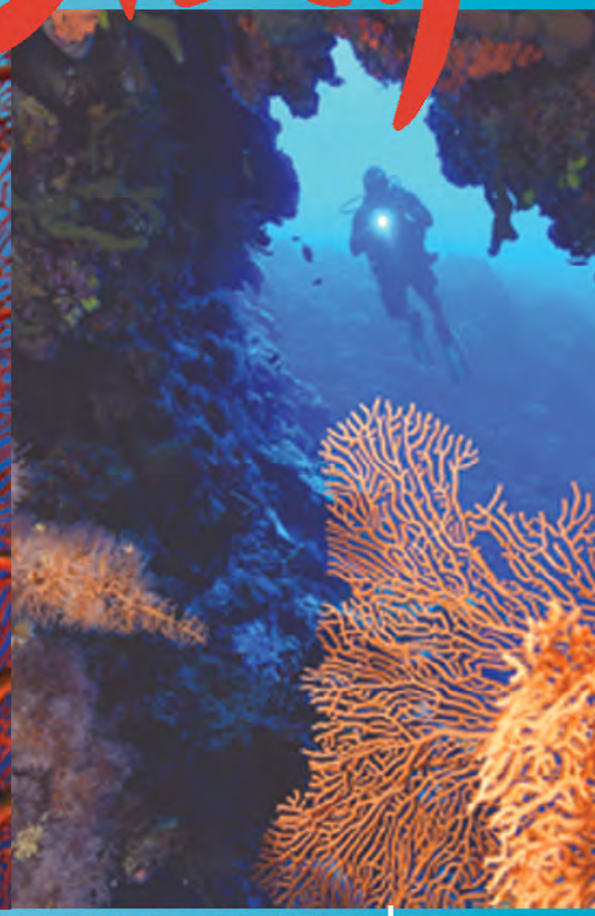
Above water, off Vancouver Island, at the start of the Inside Passage and along the Kamchatka Peninsula I've come across aggregations of Sea Otters or Harbour Seals. Orcas and Steller Sealions – gigantic, warm-blooded predators with enormous calorie needs - are pretty much the ultimate indicators of a rich marine ecosystem, and you can find aggregations of both around the northern rim of the Pacific. Along the coasts Black and Grizzly Bears and Bald Eagles – and the even more impressive Steller Sea Eagles on the Kamchatka side - are never far away from salmon streams.

Below and above the water it seems almost all the animals of the North Pacific rim are giants; Pygnopodia, probably the world's largest sea star, many-armed, the size of a bin lid, crawls over the rocky reefs, eating just about anything that doesn't move out of the way, often carrying embedded spines from recent urchin prey. Some urchins in the area are too big and chunky even for Pygnopodia; Mesocentrotus franciscanus, the gorgeous, chunky red, strong-spined sea urchin familiar to the area, is almost certainly the bulkiest on Earth. The chunky, heavily-armoured Puget Sound King Crabs Lopholithodes mandti are seen on many rocky reefs, and further north the 'Deadliest catch' fishery for the giant Kamchatka Crab is found. The North Pacific's Steller Sealion is more than twice the bulk of Earth's next-

Dive the World
North Pacific



Solomon Is. Diving



visitsolomons.com.sb

By: Jamie Watts & Malcolm Nobbs

largest sealion – males can weigh over a tonne. Even the seaweeds – the 40-50 metre Giant Kelp Macrocystis pyrifera, are Earth's largest.

Then there's that iconic octopus. The Pacific Giant Octopus Enteroctopus dofleini probably reaches a normal maximum of around 70 kilogrammes. Seventy kilos if you don't have a skeleton and are basically a mass of muscles and nerves is a truly massive animal. The head and body of a big giant octopus is about the size of a human torso, with the hyper-elastic arms spreading four or five metres across. The combination of an extremely acute sense of taste and feel through the suckers, and the power of the suckers and the arms, along with an extremely well-developed brain, make this a formidable predator. And it grows to that size in 18 months or so. There's an old report of an octopus nearly four times this bulk.

The fish life of the North Pacific's rocky reefs is equally phenomenal. The Ling Cod, Ophiodon elongatus is basically a giant scorpionfish, sometimes over a metre long, and the broad-headed Cabezon Scorpaenichthys marmorata, a little smaller but broad and stocky-headed, a very impressive denizen of the reef. The smaller cousins of these giants, the rockfishes and others, some of them blenny-like, some of them grouper-like, are everywhere. The bizarre wolf eel Anarrhichthys ocellatus looks like a comically mis-shapen giant sock puppet, with something of the large moray about it. They are not even vaguely related to true eels, their massive crushing jaws specialised to deal with the tough armour of the large crustaceans and urchins that abound on these rocky reefs.

If you've ever eaten a 'crabstick', then you've probably sampled the north Pacific's most heavily-exploited fish, the Alaska Pollock Gadus chalcogrammus. A smaller cousin to the Atlantic Cod, the Pollock has held the title the most heavily-fished species on Earth for much of the last three decades now. A staggering 30 million tonnes of fish a year were taken from the rich arc of the North Pacific rim in the late '90s, a quarter of global fisheries catches. Inevitably, catches have declined in recent years as they have

Dive the World
North Pacific

By: Jamie Watts & Malcolm Nobbs

elsewhere, but the region still manages a quarter of the world's (reduced) wild catch. Even today, over twenty million tonnes of seafood is taken from the area a year.

We in the North Atlantic have become used to our salmon being farmed – the scope of our single wild Atlantic species in the wild couldn't possibly support the appetite our species now has. In the rather richer North Pacific, though, there are several species of salmon, living wild at a whole different ecological order of magnitude. They've certainly been fished hard, and hatcheries are necessarily artificially restocking the wild populations. Yet there are still rivers around the North Pacific that produce summer and autumn salmon runs, and the wild young salmon are a significant part of the North Pacific's marine ecology.

For divers, there is a price to pay for this dense soup of life; it's rather 'spring-bloomy'. Visibility in spring and early summer, when myself and Malcolm have dived the area, ranges from two to six metres in many areas. Later in the summer visibility improves markedly, and I think my next trip out will be in September. With the incredible tidal range, particularly in the Vancouver Island area, the tidal currents and timing for slack water can also be a challenge. Then there's the depth – some of the really good life is to be found below the base of the kelp, which with the size of the kelp here can mean you're pretty deep. And you're also cold; this is definitely drysuit territory. Alaska and the Aleutians drops to just a couple of degrees in winter, occasionally up to 12o Celsius in summer. It's certainly not diving to be taken lightly.

The spring bloom, though, when the visibility is at it's worst, often has some fabulous plankton. There is a variety of hydromedusae, as well as true jellies. Malcolm had the experience of diving in massive blooms of the Moon Jelly, Aurelia aurita, probably to most abundant and successful jelly on Earth. The species takes advantage of the richest spring blooms to gorge on early season copepods – sesame-seed-sized crustaceans that make up the oceans' richest plankton food supply. Around the north Pacific, the spring plankton is so thick that the Moon Jellies explode like nowhere else. The blooms are so large and dense that it is easy to become

By: Jamie Watts & Malcolm Nobbs

disorientated. On one occasion Malcolm was completely unaware that the huge bloom he was in had divided into two, with the dive group split between the two blooms and separated quite some distance. Only after the dive did the boat reunite the divers.

Malcolm went to Alaska to find and photograph Salmon sharks Lamna ditropis. Found from Japan to California, Salmon Sharks are members of the apex shark family – the powerful, partly warm-blooded Mackerel Sharks. Cousins to the huge Great White and the sleek, athletic Mako, Salmon Sharks are smaller and more stockily-built than either, the big females reaching a maximum length of about three metres, but at that length weighing over 400 kilos. Their closest relatives are the Porbeagles, which occupy the same niche in the slightly less rich Atlantic Subarctic and temperate Southern Hemisphere.

Mackerel sharks are far, far more powerful, active predators than other sharks, pushing into cold waters where ecosystems are dense and competitive, and other sharks simply cannot hold their own – where the powerful, hot-blooded seals and dolphins dominate. The subtropical Makos generally prefer around 14oC, the temperate-living Great Whites can manage 10oC, allowing them to forage where their seal prey lives. Salmon sharks can keep their core temperature ten degrees or more above ambient, and have been found in water cooler than 5oC, although they seem to prefer a little warmer. The larger individuals seem to be able to tolerate cooler water, and can push deeper into this ecosystem each summer, after breeding in warmer water to the south during the spring. This remarkable thermoregulation ability brings them into the realm of the salmon they are named after, although that is far from their only prey – if you can survive in this cold ecosystem you have a wide range of prey choices. And they used to be a remarkable ecological success for an animal so high in the food web – Japan in particular used to fish tens of thousands of tonnes of Salmon Sharks in a good year.

The Salmon Shark might even be as fast, at least in a short sprint, as it's celebrated cousin the Mako, the supreme athlete amongst the sharks. Researchers say that they have clocked Salmon Sharks at over 80 kilometres per hour.

The sharks can be seen during salmon season in Alaska's Prince William Sound. They move fast, and live in 3 metre visibility water – so not necessarily an easy photo opportunity. Arguably Boone Hodgin of Alaska Sharks, just south of Valdez, is the best man to help you get that elusive close sighting. They are the only operation in the world offering snorkelers the chance to swim with Salmon Sharks, and are the authority on Salmon Shark migration, behaviors and feeding patterns.

Salmon Sharks are one of a handful of sharks that can deal with the cold here. In early summer, large Sixgill Sharks come into the shallows off Vancouver Island. Off the west coast of Vancouver Island and a little to the north you can also sometimes find Spotted Ratfishes – bizarre Chimaeras, distant cousins to sharks and rays, although they can be skittish and are often found deep.

Vivian Island on the Comox Peninsula on the east of Vancouver Island is one of a handful of places around the North Pacific you can dive with Steller Sealions. It ought to be mentioned, though, diving with them is not for everyone, and some experienced

By: Jamie Watts & Malcolm Nobbs

locals strongly discourage it. Several joined Malcolm underwater, playfully nipping away, reminding him of 'large happy puppies'. But these puppies can be half a tonne or more, are considerably faster and more agile than you in the water, and can be somewhat boisterous.

Think about an animal bigger than a Grizzly, smarter, much faster, mischievous if not a downright thug, and then put you both in an underwater environment where it is at home and you're not. Experienced divemasters talk about being pinned down, thrown around like a rag doll, beaten up and having hoods ripped off.
Perhaps my favorite underwater photo of all time is David Hall's amazing image of a group of curious young Stellers jostling each other and peering at him, but his story of the dive when he got the photo, being basically bounced around by these beasties is pretty scary.

Malcolm described being somewhat hemmed in by a group of Stellers;

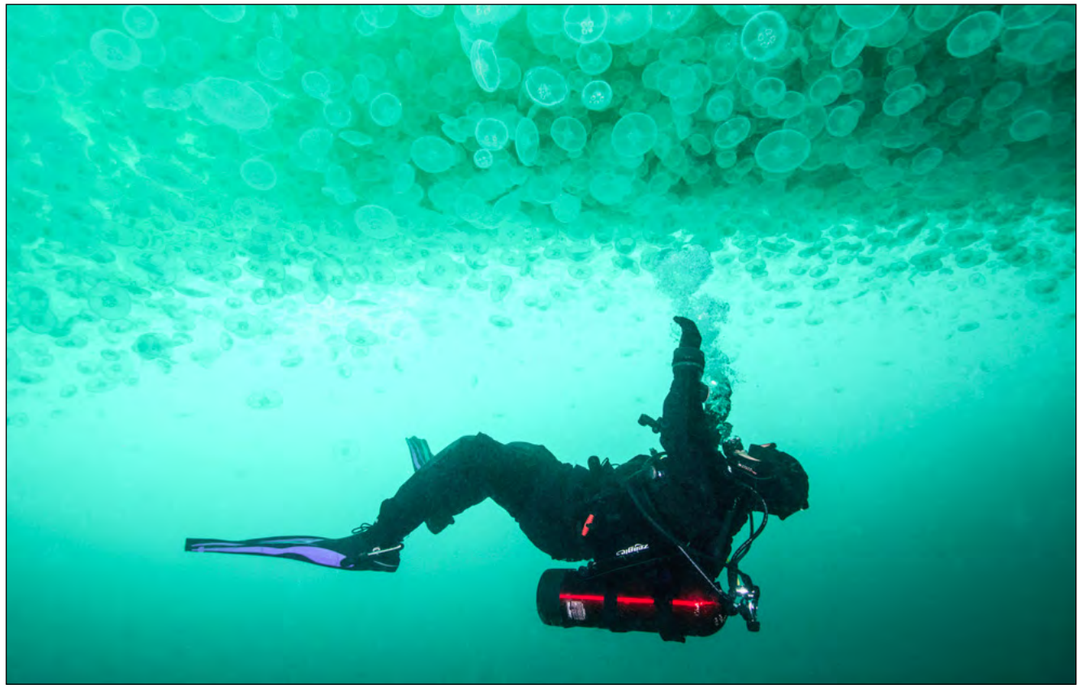
''Suddenly the mood changed. I did not know it but a pair of Orcas were now present and the rest of the sea lions decided to join my buddy and myself on the seabed. Being surrounded by so many was pretty intense, and the already poor underwater visibility was not helped by all this activity. We decided to abort the dive. It was only upon surfacing that we became aware of the Orcas, which were charging into the sea lions. Our skipper instructed us to quickly get back aboard!''

I have sought (and found) many rich areas and incredible marine life all around the world. The diversity and density of life around the best tropical reefs cannot be matched, and it's much easier diving than in cold water. But this is two-dimensional richness over relatively small areas.

Cold temperate hotspots feed themselves from right through the green water column. And the North Pacific is a swath of the richest temperate hotspots on Earth. It may well be the best diving on Earth.

'In the Forests of the Giants' – Diving with giant octopuses, Steller Sealions, Salmon sharks and jellyfish blooms amongst among the richest marine life on Earth in the Pacific Northwest. Vancouver Island through the Inside Passage to Alaska

Dive the World
North Pacific



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Dive the World
Maui Manta's

By: David Fleetham

Maui Manta Rays

My earliest underwater encounter with a manta ray was during a guided dive, at a cleaning station, at Molokini Crater. I initially spotted it heading my way as it effortlessly glided over a spot called "Reef's End" above a series of coral heads.

Maui Manta's

By: David Fleetham

As it approached me, it somehow slowed down without even the slightest indication of change in its body, which left me puzzled as how the manta did this. Its enormous wings were barley moving. It appeared to be using some undiscovered force of motion.

I ascended slowly, cautiously pushing my camera unit in front of me inch by inch, and then I stopped allowing some distance between me and the creature.

I could see the small, endemic, Hawaiian cleaner wrasse who were already busy under the manta, moving in and out of its gill slits, which the gentle manta had kindly flared open to give these hard workers enough room to operate.

Blacklip butterfly fish were also hard at work on the top of the manta, eating the small parasites, that were still big enough for me to see as they attempt to escape the cleaning process.

Since that first encounter, I have been lucky enough to have hundreds of other dives with these winged giants. But I will never forget that first experience.

The first time you see a manta, you can never forget it. But despite these creatures' size, they are somehow elusive. I have met many well-travelled divers, with over 100 pages in their logbooks, that have yet to experience these magical creatures.

I personally had over 500 dives before my first encounter. But most of my diving had occurred in British Columbia before moving here to Maui. Mantas do not inhabit cold waters. They can only be found in circumtropical oceans.

Mantas are scientifically grouped together with sharks and other rays. All these species share some common traits. They are cartilaginous, which means they do not have bones.

By: David Fleetham

A structure of cartilage throughout the animal constitutes what we would refer to as a skeleton.

Although they are closely related to stingrays and they have a similar tail, they do not possess the infamous "barbed spike" so they are unarmed. In fact, they do not even have teeth!

But when the word shark is used, their scientific relative, we often think of teeth. Big teeth. This is unfortunate for mantas, and some sharks too. Manta rays lost their teeth quite some time ago along the evolutionary trail.

You can still see some evidence of this, with close examination of the manta's lower jaw, by the rows and rows of tiny dots that were once teeth, which now resemble a course sandpaper texture (as like some sharks).

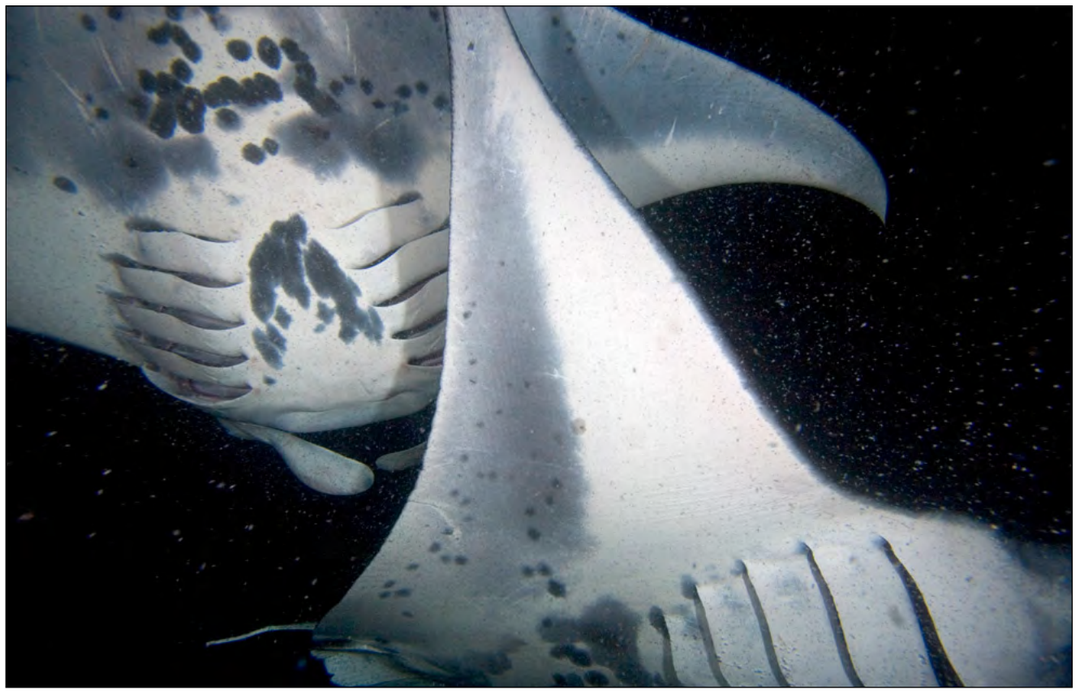
Despite their immense size they are harmless. Mantas can reach over 22 feet across, exceed 3000 pounds, and feed strictly on a diet of plankton. The term "plankton" actually refers to a large list of tiny creatures that float about the ocean.

This list includes mysid shrimp, copepods, all kinds of gelatinous organisms, coral spores, and the larvae of fish, mollusks, and crustaceans. The mouth of the manta ray is located on the leading edge of the animal which makes them unique. Most rays are typically bottom feeders so their mouths, therefore, are on the bottom of their bodies.

As manta's feeding habits evolved, not only did their teeth turn into sandpaper, but their mouth moved to the front and became quite a large opening. On either side are large "flaps" called cephalic fins.

These amazing appendages evolved to aid as "mouth scoops" that maximize the intake volume of plankton-filled

Dive the World
Maui Manta's



By: David Fleetham

sea water. This adaptation for filter feeding is unique and gives the manta its iconic look.

Once in the mouth, water passes over a set of filters that traps the plankton. Oxygen is also filtered at the same time, so this apparatus really works efficiently.

The water then exits through five slits on the lower side of the manta. When not actively feeding, the manta can roll these cephalic fins into a tight cone to become more streamlined.

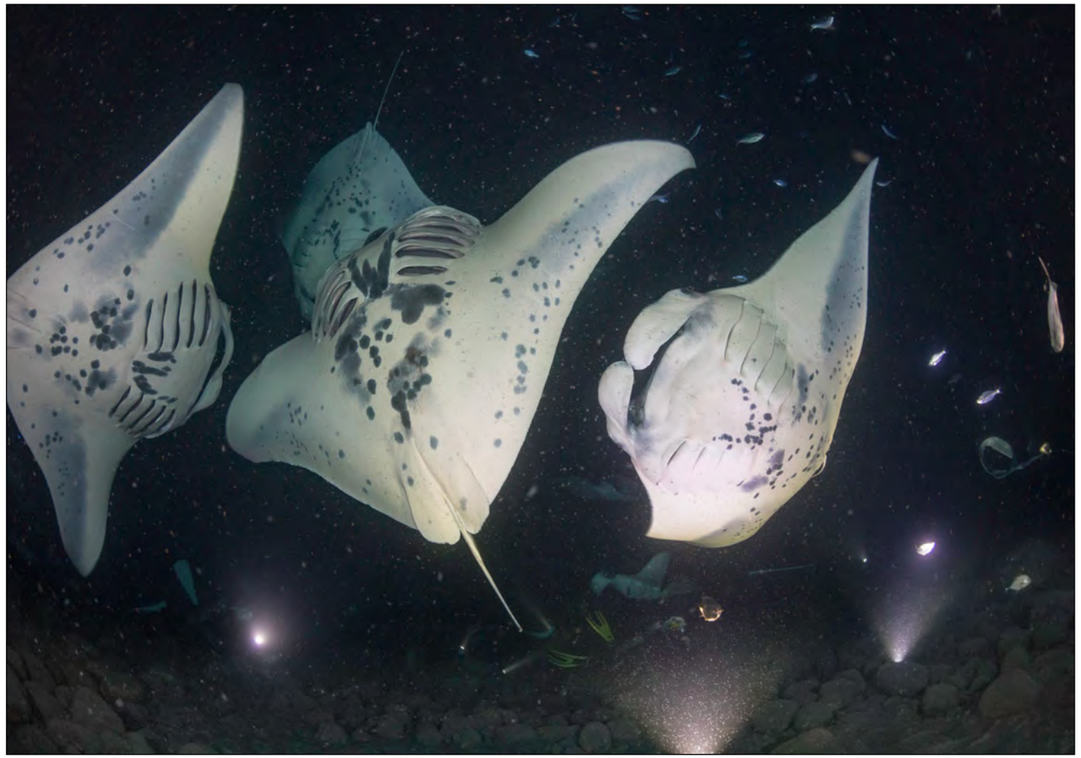
These cones, or "horns," are why mantas were first referred to as "Devil Rays." In the past, this moniker wrongfully demonized them, and cast a less than likeable public perception, despite their toothless mouths and intensely docile nature.

So, by now you must be asking, "where can I see these creatures for myself?" Well, Mantas are still sporadically spotted at Molokini Crater, but these encounters tend to be seasonal.

Additionally, they have been observed at most dive sites on Maui at some time or another. But for the largest number of mantas occurring together at one time on a regular basis, you will want to take a dive excursion in front of Ukumehame Valley off the coast of West Maui.

Divers have observed long lines of mantas, one falling the next, numbering well over a dozen. These are commonly referred to as "trains" and are a precursor to mating.

The first manta in line is a receptive female, while the remainder are all



Dive the World
Maui Manta's

By: David Fleetham

males hoping to end up in the right place at the right time. Mankind has similar rituals, that are often occurring most any night at many nightclubs and bars.

This same area off Ukumehame additionally has a shallow cleaning station where the mantas frequently line up to take turns having parasites removed.
One will hover above a combination of cleaner wrasse and butterfly fish while several others will circle the area waiting for a turn.

While this is going on it is best for divers to approach the area slowly. Find a spot, correct your buoyancy, and then just hang there and wait. The mantas may initially leave, but they will be back. Like most marine life, mantas are quite cautious. But they will warm up quickly to divers that do not move around too quickly or make sudden gestures.

Despite their massive size, they move faster than you would think possible. Therefore it is wiser to allow them to approach you versus attempting to chase them. Initially, it took me a few encounters to figure this out, after ending up with dozens of images of just their tails. The best shots I have are the result of waiting in a well-chosen spot and simply being patient.

If you can time it correctly, try to avoid exhaling if one passes directly over your head. Bubble blowing is considered "bad manta manners." Doing this results in the creature quickly departing.

Feeding has also been observed off Ukumehame and it often occurs quite close to the surface. When conditions are ideal, over a dozen mantas have been observed executing marvelous "aquabatic dance moves." This is the result of an unusual amount of plankton concentrated in one place.

Dive the World
Maui Manta's

By: David Fleetham

In order to consume as much as possible the mantas arch their backs and do repeated loop de loops. It is a remarkable sight.
When this happens, it is hard to tell whom gets the better show; the divers from below or the snorkelers from above.

Here is one critical tip: if you are lucky enough to get up close and friendly, you must resist the urge to reach out and touch them. In the past, it was thought that a gentle rub on a manta was harmless.

But through more research and better understanding, it was discovered that mantas actually have a thin mucus membrane over their skin that protects them from infections and disease. Disturbing this fragile membrane can cause them harm.

In the cartilaginous fishes containing sharks and rays, mantas have the largest brain in ratio to body mass. This is evident from just looking into their eyes.

I often talk to them and tell them how marvelous they look. I know it may sound silly, and yes, I am aware they can't hear or understand me, but I am convinced it changes my body language and affects their perception of me.

Before I did this "manta mantra" the time they lingered around me does not last as long as it does now.

So try this the next time you dive with the mantas off Ukumehame.

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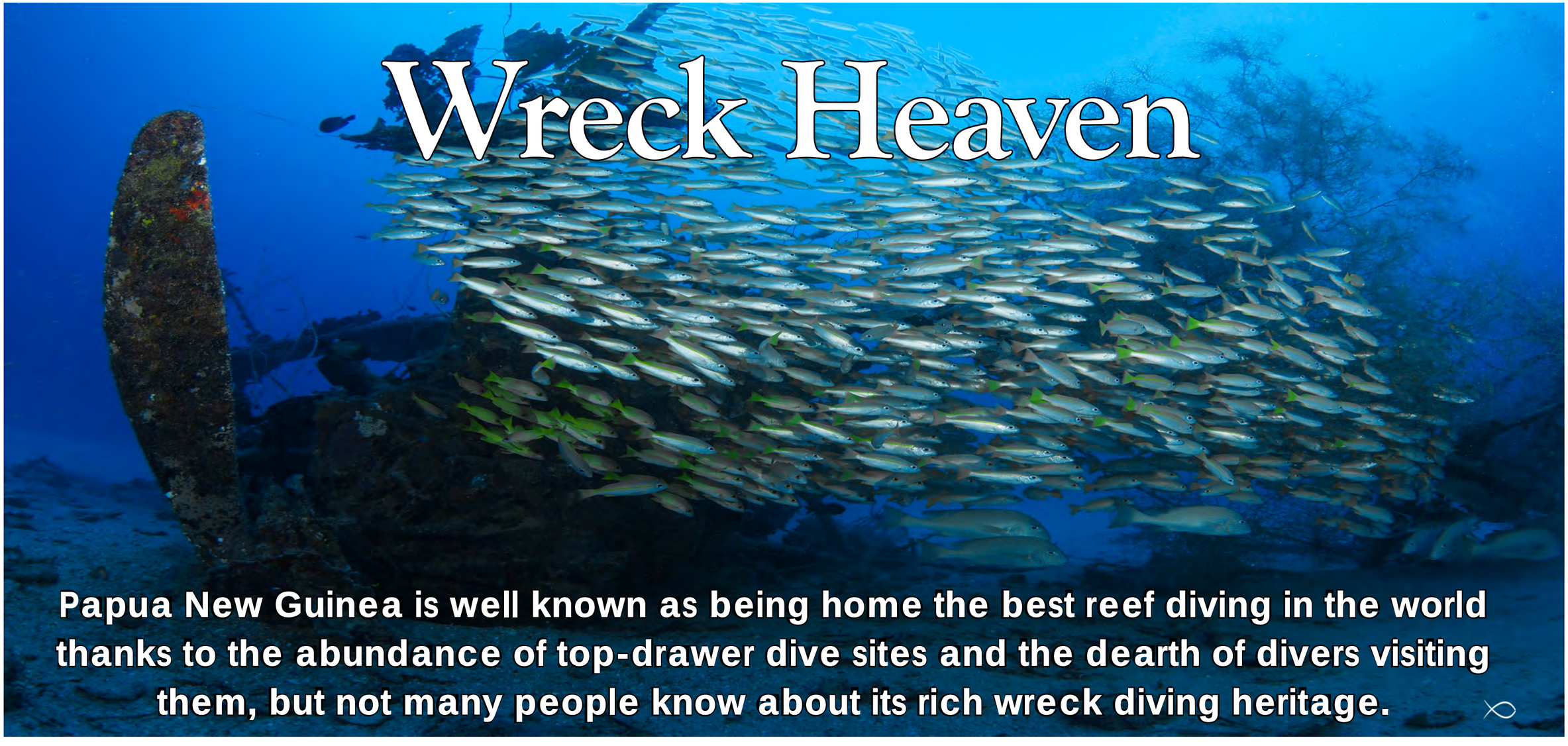
Exploration
Wreck Heaven

By: Christopher Bartlett

Wreck Heaven



Papua New Guinea is well known as being home the best reef diving in the world thanks to the abundance of top-drawer dive sites and the dearth of divers visiting them, but not many people know about its rich wreck diving heritage.





By: Christopher Bartlett

During the Second World War, the Imperial Japanese forces were determined to take the airport at Port Moresby to use it as a platform to isolate and possibly invade Australia. The Allies were determined to stop them. Early in the proceedings, the northern port of Rabaul on the eastern end of New Britain island fell and became the main Imperial base in the South Pacific Rim, and a rear supply base with multi-purpose single-engine seaplanes was set up in New Ireland Province to the northeast to protect ships coming from the Pacific.

Cape Gloucester, on the western end of New Britain, was the scene of a major Allied offensive in late 1943 early 1944, and battles raged at several points on the main island of New Guinea itself, in Oro province and Milne Bay province. The result is a historical diver's treasure chest of aviation and naval vessels.

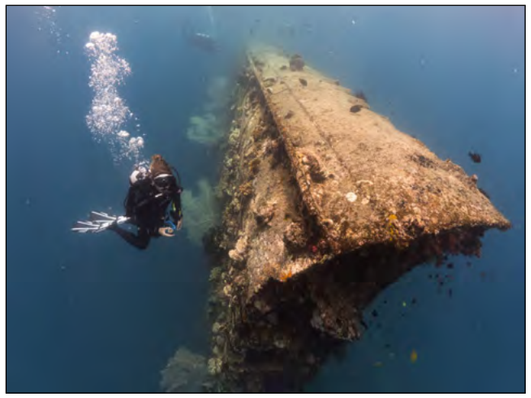
My love of PNG diving started in 2010, and grows every time I go back. I'm not a big wreck head per se, I haven't been to Truk as a week of wrecked ships isn't my idea of fun, but for some reason, WW2 plane wrecks do float my proverbial boat, and my first trip to Lissenung Island, near Kavieng, New Ireland province, got me hooked.

In 1944, Kavieng, on the western tip of the island of New Ireland, was an important supply base for the Japanese military. On 15 February 1944, one of the many US attacks resulted in major damage to installations including sinking numerous sea planes anchored in the harbour.

Unfortunately, the American Air Force suffered losses with four B25s of the 345th Bomb Group going down. Three remain undiscovered, but Stubborn Hellion sits in 12 metres of water in the mangroves close to Albatross Passage. The viz is rarely better than 6 to 8 metres, but the plane is easy to dive, just be wary of the spinecheek anemone fish manning the twin.50 calibre machine guns. If ever there was a fish that shouldn't be given heavy ordinance, it is this one!

In the harbour one can find a Pete biplane, three Jakes, an Allied PBY-5, a.k.a Catalina flying boat, and the remains of the Tenryu Maru. The metal skinned Japanese planes are still in excellent condition, whilst only the engine blocks, props, gear, and wing frames remain of the Catalina. Assorted munitions and even a 500lb bomb were dumped nearby. The harbour area is patch reef and a lot of fine sand, but on an incoming tide the viz is around 10 to 12 metres.

Five minutes' boat ride away, behind Nusa Lik island, is the magnificent "Deep Pete". Upside down in 38 metres of generally beautiful blue water it rests in the sand, a haven for schools of goat fish and snapper. Sometimes there are



By: Christopher Bartlett

so many fish, one can barely see the propeller.

The day after the four B25s were lost over Kavieng, the 345th Bomb Group found some Japanese ships by Three Island Harbour, Tunnung Island off the north coast of New Hanover. The Sanko Maru was an armed freighter and mother ship to two Midget Submarines, escorted by Subchaser CH39. At over 130 metres long, the Sanko Maru was an easy target and took many hits from 500lb bombs. The Subchaser attempted to flee, but instead ran aground on a shallow reef and became target practice for the bombers and machine gunners.

The Sanko Maru is probably the most beautifully overgrown shipwreck in the Pacific, festooned with fans and sea whips, glittering with fish, lying on her side in 22 metres of water, the port side a mere 5 metres deep. 50 metres off to the side, one of the midget subs sat, unfound by salvagers who took the props and boilers from the Sanko Maru, until 1987.

Subchaser CH39 is about a kilometre away, her stern in 4 metres of water, the engines down at 18 metres. In September 2016, the Sanko Maru kept us occupied for three dives, ferreting around the gorgonian fans, sea whips and superstructure, going inside the holds, and generally exploring her abundant life. The midget sub, one of 76 built between 1934 and 1944, was originally planned as a 15-minute side trip, but turned into two dives. She sits in the sand, conning tower open, with whip corals growing off her from her empty twin torpedo tubes and twin props transforming here into a giant hairy frogfish.

These wrecks can all be dived as part of a special itinerary from Lissenung Island Resort, on the way back passing by the

By: Christopher Bartlett

east coast of New Hanover to dive a wonderfully preserved Japanese Kate single-engine bomber, in 13 metres of clear water, next to the small island of Enelava.

Rabaul, being a major base for the Japanese, has numerous wrecks from Allied attacks. Extensive salvage had been carried out on many of them, and the major volcanic eruption of 1994, that covered parts of Rabaul in six metres of ash, have covered many of them up.
However, a 90-minute ride down the coast, sits a Pete bi-plane in superb condition, 26 metres deep, in clear blue water. This Pete was shot down at anchor by the submarine base, next to George's wreck, a cable layer converted to a mine layer. The ship is unidentified, but named after the diver who found her. Her bow is at 14 metres, her stern at 60 metres, and it is possible to penetrate the hold and the bridge. There is also Zero close to shore near Kokopo town.

Walindi Resort in West New Britain is home to another Zero, a mere 12 metres deep, that was found in 2000 by a local spear fisherman.

The north doesn't have the monopoly on wrecks though. The B25 "Pistoff" is 17 meters below the surface at Wanigela, 32 km SW of Tufi Resort on Cape Nelson, Oro province. The natural harbor in the fjord by the resort is home to the remains of two PT boats and torpedoes, and further south at Cape Vogel, halfway between Tufi Resort and Tawali Resort, is the superb B17 Blackjack.

At 49 metres deep, Blackjack is for experienced divers only, but generally the viz Is 30 metres on this iconic plane.

Another deep dive is the transport ship S'Jacob, sun by the Japanese air force in 1943, now lying off Porlock Harbour in 48 metres of water, covered in fish life. Both resorts can arrange long range trips to dive these sites, but the best is way is on a Spirit of Niugini liveaboard, with one of her three itineraries visiting the Blackjack, the Pistoff, and the S'Jacob.
For safety's sake, the S'Jacob must be dived when there is no current though, which is not always possible. I will be doing this trip in early September 2018, so fingers crossed.

The Spirit of Niugini also does a cruise to southern Milne Bay where a P38 Lightning rests in 25 metres of water amongst some bommies.

With an A20 Havoc in Bootless Bay, close the capital Port Moresby, Papua New Guinea has a great diversity of known and diveable plane wrecks, with more yet to be discovered, and a number of interesting wartime shipwrecks too.

Getting there:
There are regular flights to Port Mreosby from Singapore, Hong Kong, Tokyo, Manila, and Bali, as well as from Cairns, Brisbane, Sydney, Honiara and Nadi.

Getting around:
There are two domestic carriers, Air Niugini and PNG Air.

Resorts with wreck diving:
New Ireland / New Hanover: Lissenung Island Resort
East New Britain: Rapopo Plantation Resort
West New Britain: Walindi Resort
Oro: Tufi Rsort
Milne Bay: Tawali Resort

Liveaboard visiting wrecks:
The Spirit of Niugini Tawali – Tufi combination trip

Further advice:
Contact the PNG dive travel specialists, Best of PNG at cb@bestofpng.com or visit www.bestofpng.com. They can put together a bespoke itinerary for you covering multiple resorts, and are running a trip combing Tawali Resort, the Spirit of Nuigini, and Tufi, visiting the B17 Blackjack, the B25 Pistoff, and the S'Jacob.

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Through the Lens
Photographer

Graham Willis

Graham Willis

A journey through the Lens

Graham Willis

I have been diving since the early 80's and reckon I am now the hang of it! I do most of my diving in and around Sydney, where I live, but, like pretty much everyone else, I take the opportunity to dive in warmer seas and better viz whenever I can.

I have two underwater loves; instructing and photography. The instructing is a chance to introduce new divers into a whole new world and remind oneself of the wonder of what lies beneath…not to take the smallest things for granted.

The feeling of weightlessness, the chance to be surrounded by shoaling fish, the sounds that the reef makes, the way the sunlight filters through the water are all things we tend to think are normal: there is nothing normal about them…unless you are a diver.

I have always been a keen photographer, getting into the 35mm SLRs with a Canon A1 and a Canon F1…both great cameras.

My underwater photography started out with a Sea and Sea camera (film of course) which was a present from my brother…that unfortunately flooded at some point and my underwater photography was on pause for a few years.

Then in 2015 there was a chance to pick up a whole second hand DSLR rig from Des Peroz who was making a late career run to the Royal Australian Navy…RAN's good fortune and mine.

That gave me a couple of Nikon D200's in an Aquatica Housing with two Inon Strobes …plus a range of lenses, ports and other paraphernalia.

That really changed my underwater photography game and I started to learn a) there was a lot more to diving b) it's a lot trickier underwater than on land and c) there is a whole load more to learn about life under the surface.

I have now gone back to my land camera system which means I am using a Canon 5D Mk IV in a Nauticam housing with twin Inon Z330 Strobes.

I use three lenses underwater a Canon EF 100mm f2.8 L Macro IS USM, a Canon EF 17-40mm f4 L USM and a Canon EF 8-15mm f4 l Fisheye USM. I do not use the fisheye that often because I find the distortion gives a certain 'look' that is a bit too obvious if used repeatedly…probably means I should use it more!

I have also relatively recently purchased a Nauticam SMC-1 Macro Converter…which, to be honest, I am still looking to get the best out of.

As I always say to people…unfortunately it is extremely rare that there is ever anything wrong with the camera, lens or housing…the photographer on the other hand is a different issue.

I love the fact that there is so much to learn and experiment with and that the underwater world holds an almost infinite number of forms of life to try and capture on 'film'.

I hope you enjoy some of these photos.

This editions cover shot of a Porcelain Crab on a soft coral taken in April 2016 Lembeh Straits, Sulawesi, Indonesia. Nikon D200 using a Nikon 105mm Macro lens. 1/100 @f 8.0, ISO 60.

Through the Lens
Photographer

This picture of an Oceanic Manta was taken in September 2018 at 'Shotgun' , between Gili Lawa Darat and Gili Lawa Laut in Komodo, Indonesia. A great dive site where the mantas sweep through the current with consummate ease. Canon 17-40mm f4 L USM lens (at 17mm) 1/125 @ f13, ISO 400.

A Barracuda Ball at Sipadan, Indonesia in December 2017. There are just 100s of Chevron Barracuda swirling around …it is a magnificent sight. Using EF 8-15mm f/4L Fisheye USM Lens (at 14mm). 1/125 @ f5.6 ISO 400.

Graham Willis

A Nudibranch (Goniobranchus hunterae) At Bare Island, Botany Bay Sydney...it is not only in warmer waters that you get deep colours! Using Canon 100mm f2.8 L IS USM Macro lens. 1/160 @ f20, ISO 400

A False Clown Anemone Fish on one of the Raja Ampat dive sites taken in February 2019. Using Canon 100mm f2.8 L IS USM Macro lens. 1/250 @ f25, ISO 400

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Grey Nurse Shark at Broughton Island, Nelson Bay, North of Sydney in February 2018. Using EF 8-15mm f/4L Fisheye USM Lens (at 14mm). 1/125 @ f8 ISO 400.

Through the Lens
Photographer

Grey Nurse Shark at Broughton Island, Nelson Bay, North of Sydney in February 2018. Using EF 8-15mm f/4L Fisheye USM Lens (at 14mm). 1/100 @ f8 ISO 400.

Grey Nurse Shark at Broughton Island, Nelson Bay, North of Sydney in February 2018. Using EF 8-15mm f/4L Fisheye USM Lens (at 14mm). 1/125 @ f8 ISO 400.

Graham Willis

Harlequin Shrimp taken in Lembeh, Sulawesi, Indonesia in June 2018. Using Canon 100mm f2.8 L IS USM Macro lens. 1/125 @ f16, ISO 400

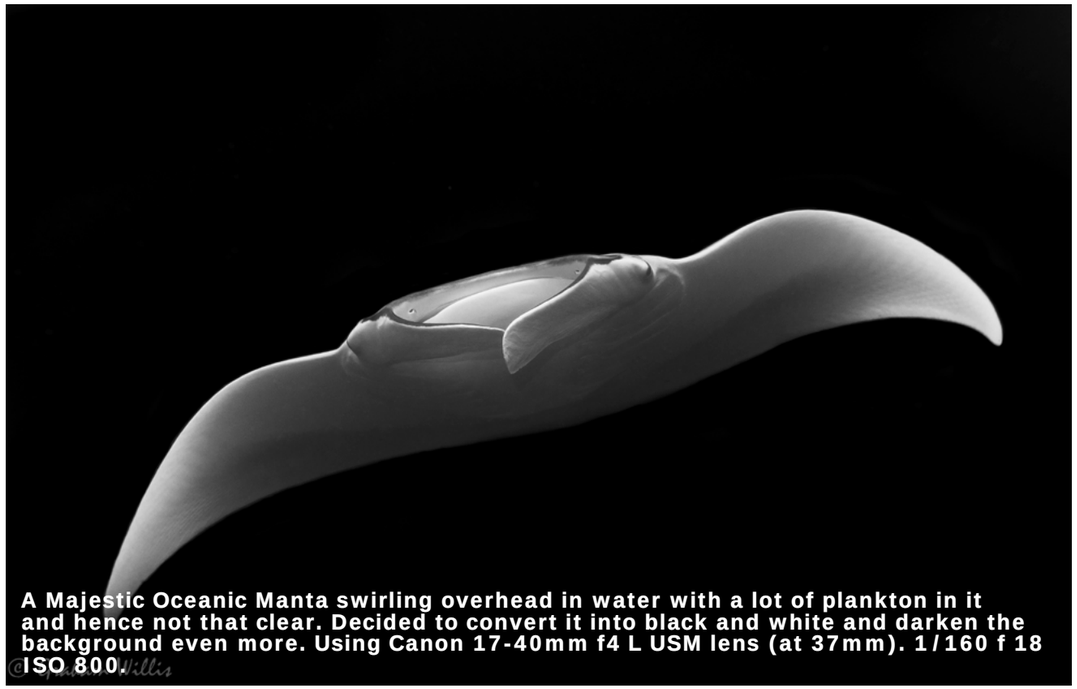
A False Clown Anemone Fish having a quick peek out from behind the safety of their anemone. Taken in Bunaken, Sulawesi, Indonesia in June 2018. Using Canon 100mm f2.8 L IS USM Macro lens. 1/125 @ f13, ISO 400

Graham Willis

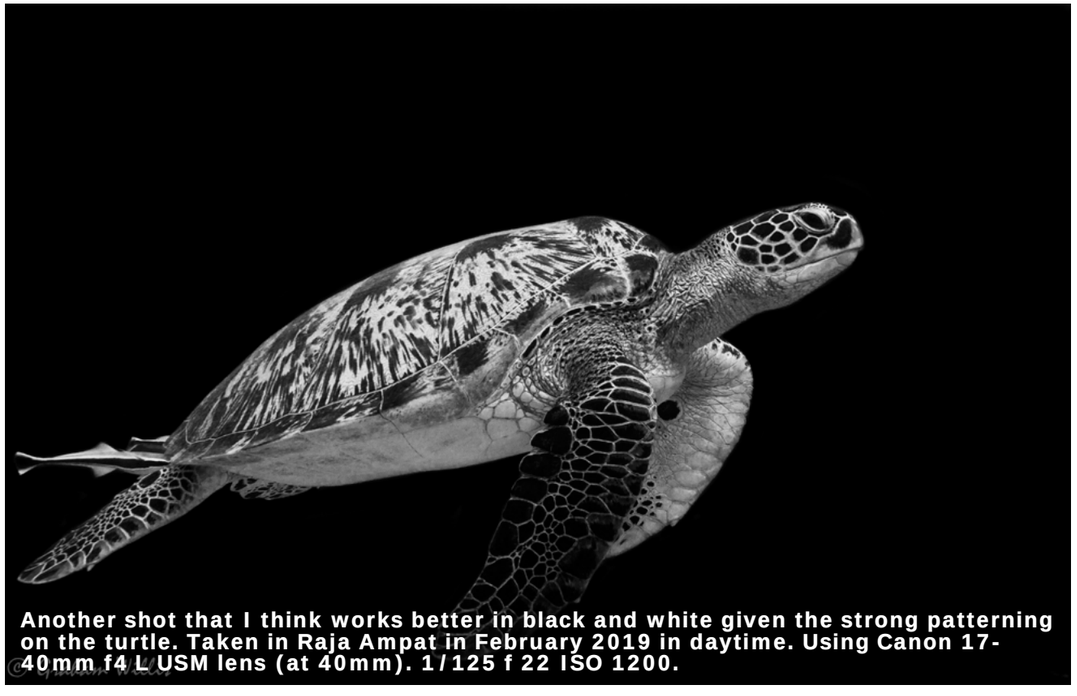
A Weedy, or Common, Sea Dragon at 'Old Man's Hat' just inside the North side of Sydney Harbour. Using Canon 100mm f2.8 L IS USM Macro lens. 1/100 @ f7.1, ISO 400

A beautifully camouflaged Candy Crab (Hoplophrys oatesi) on its coral taken in Buhaken, Sulawesi, Indonesia in July 2017. Using Canon 100mm f2.8 L IS USM Macro lens. 1/160 @ f18, ISO 640

Graham Willis



A Majestic Oceanic Manta swirling overhead in water with a lot of plankton in it and hence not that clear. Decided to convert it into black and white and darken the background even more. Using Canon 17-40mm f4 L USM lens (at 37mm). 1/160 f 18 ISO 800.



Another shot that I think works better in black and white given the strong patterning on the turtle. Taken in Raja Ampat in February 2019 in daytime. Using Canon 17-40mm f4 L USM lens (at 40mm). 1/125 f 22 ISO 1200.

A cuttlefish displaying on a night dive in Raja Ampat, February 2019. I think this shot works better in black and white. Using Canon 100mm f2.8 L IS USM Macro lens. 1/125 @ f32 ISO 200

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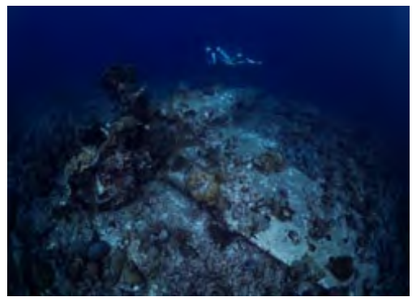

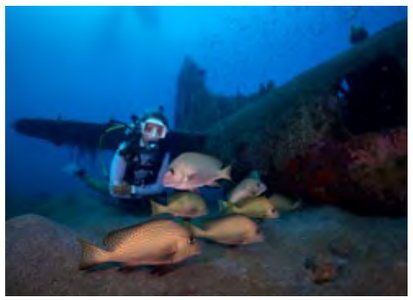

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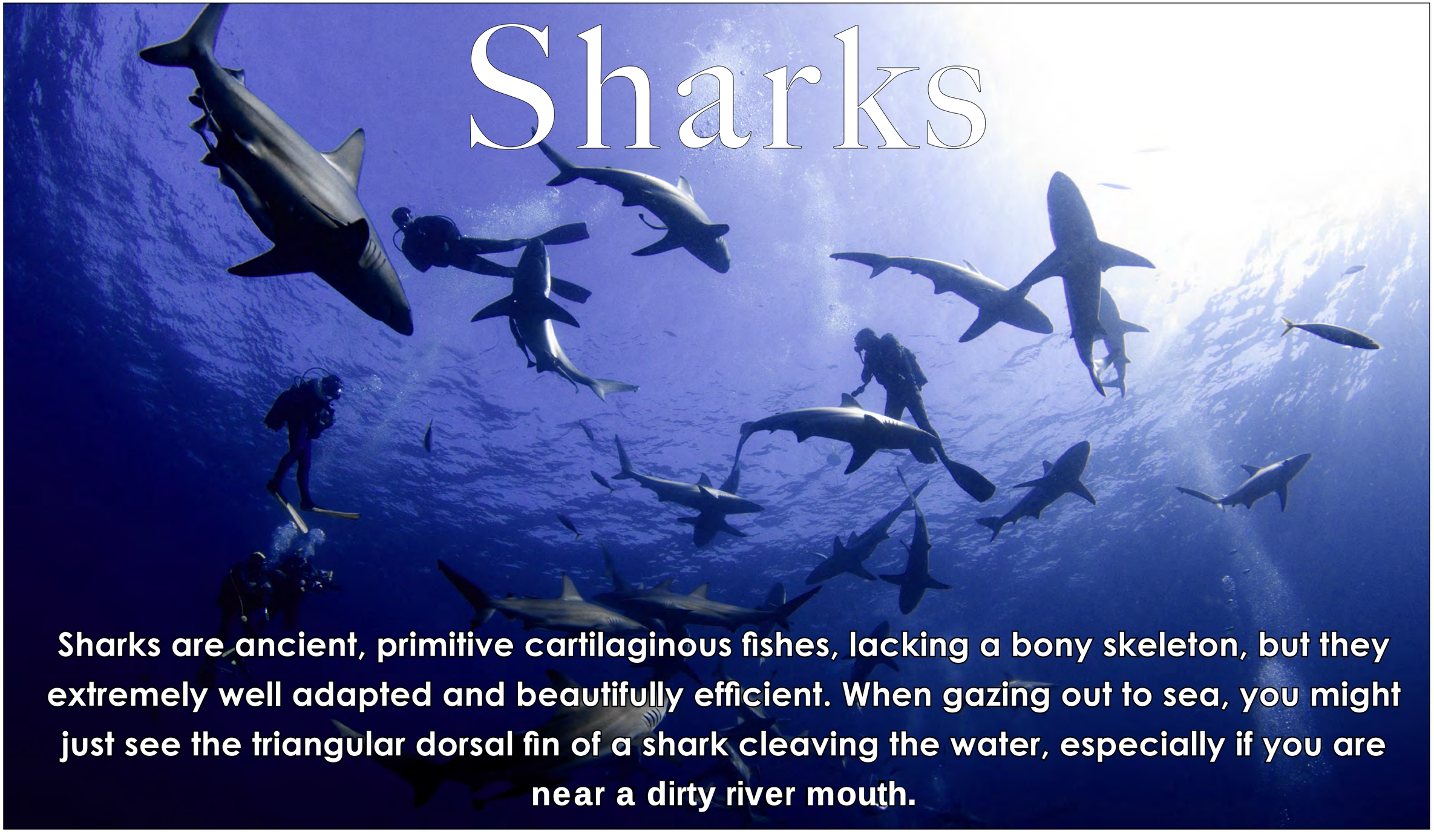
Giant Stride
Sharks

Sharks



Sharks are ancient, primitive cartilaginous fishes, lacking a bony skeleton, but they extremely well adapted and beautifully efficient. When gazing out to sea, you might just see the triangular dorsal fin of a shark cleaving the water, especially if you are near a dirty river mouth.

It is easy to distinguish between the fin of a shark and that of a dolphin, since these animals have different swimming styles owing to the shape of their tails. A shark has a vertical tail fin and swims by moving its body and tail from side to side.

This causes the dorsal fin to zigzag along, but it remains at the same height above the water. A dolphin, on the other hand, has a horizontal tail and swims by waving it up and down so that the dorsal fin wheels in and out of the water.
You should not rely too much on the belief that there will not be any sharks where there are dolphins.

Although dolphins have been known to gang together, rush at and bash into a shark to chase it away and so protect the weaker members of their school, sharks often follow at a distance to clean up scraps of food, or to catch a straying baby dolphin.

Not all sharks are classified as man-eaters. Some, such as the basking shark and the whale shark, feed on plankton. At the other extreme is the great white, which is the most ferocious, aggressive and unpredictable of all. In-between are others such as the Zambezi, tiger and hammerhead.

All these different sharks have teeth characteristic of their species. Because of this, the experts can examine a shark victim's wounds or the bite marks on a boat and decide which species of shark was responsible for the attack. The teeth of the great white are sharp, triangular blades and it can close its mouth on a very large animal and bite off a chunk.

The ragged-tooth has a jagged array or round, pointed needle teeth. These sharks usually hunt smaller fish that can be swallowed whole. If they seize something larger, the cut is not clean and they must shake their prey to rip off a piece. Shark's teeth are unusual in that they do not have roots securing them in the jaw. The teeth grow in the gums and are often broken out.

Rows of new teeth are continually growing further back in the mouth and move forwards to replace missing ones.

Some shark species lay eggs enclosed in tough black rectangular capsules. Curly threads projecting from the corners intertwine with seaweed and secure the egg cases against buffeting currents.

After the pups have hatched, the empty shells are often washed ashore and you will find them scattered along the drift line. They are often called mermaids' purses. Skates lay similar egg capsules, but theirs have pointed corners instead of threads.

Although a few shark species lay eggs, most give birth to young called pups.

Giant Stride
Sharks

Some unborn babies have the grisly habit of eating their brothers and sisters while still inside their mother. This is not their only cannibalistic tendency.

Once, a shark dissected on board of a ship was thrown into the sea together with its innards, and the dying animal was seen swimming around, devouring its own entrails.

It is therefore safe to say that sharks are not very discriminating about what they eat. Sheep, pieces of crocodile, boots, tin cans and even a human skull have been found in the stomachs of sharks.

In order to minimize the chances of being attacked by a shark, do not swim in the muddy waters where rivers enter the sea, as sharks often feed in such areas.

A large section of a shark's brain is associated with its sense of smell. They have little colour vision, but good contrast vision, which enables them to discern the shape of objects by their highlights and shadows.

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WHITE TIP REEF SHARK (BLUNT HEAD SHARK)
Triaenodon obesus
Av. 100 cm
Max. 200 cm

Its stout body and short, broadly rounded snout easily identify this species. So, too, do the conspicuous white tips to its first dorsal and caudal fins, and its relatively large second dorsal fin. Wide-ranging throughout the tropical Indo-Pacific, the white tip is confined to the coral reef habitat and therefore is found only in shallow water.

During daylight it normally rests on the bottom of dark caves, often oblivious to

any intrusion by divers.

At dusk, however, this territorial shark emerges to patrol its limited home range in pursuit of nocturnal prey such as small coral reef fishes, octopuses, crayfish and crabs.

It is a poor swimmer and may remain motionless for hours. Litters of up to five pups have been recorded and it is possible that this species can reach an age of 25 years. Although edible, it has been responsible for cases of ciguatera poisoning.

TIGER SHARK
Galeocerdo cuvieri
Av. 250 cm
Max. 550 cm

The tiger shark is an unmistakable species. Not only are the body markings of this huge shark conspicuous, but the short snout, keels on the caudal peduncle, slit-like spiracles and curiously shaped teeth are most distinctive.

Distributed throughout the world's temperate and tropical seas, the tiger shark is a relatively common resident along our east coast. It appears as content in very shallow water, such as coral lagoons, as it does crossing

oceans. Often found in the vicinity of flooding rivers, it is known to scavenge on dead or injured animals. Human remains are not infrequently found, emphasizing its potential threat to man. In addition to a great variety of fish and shark species, other dietary items include birds, turtles, dolphins and especially tin cans, plastic bags and other garbage thrown overboard from ships at sea. The tiger shark is the only ovoviviparous species of the requiem shark family and produces large litters (up to 80 pups) during summer. Many tiger sharks are caught on long-line and by other means, their flesh being quite edible, skin good for leather and liver rich in vitamin A.

BLACK TIP SHARK (BLACK FIN SHARK)
Carcharhinus limbatus
Av. 150 cm
Max. 255 cm

These and other requiem sharks are often collectively called black fin sharks. The C. limbatus is distinctive, however, and may be positively identified by its pointed snout, absence of a dorsal ridge, its erect pointed teeth and black tips to all fins except the anal. The conspicuous pale band along each flank on the otherwise grey body also aids identification.

This tropically distributed shark is one of the fastest and most active inshore predators along our east coast, frequently leaping out of the water in pursuit of its prey. The black tip feeds predominantly on bony fish and it is particularly abundant during the May mullet run at St Lucia and the winter sardine run.
Although this bold shark often harass spear-fishermen, no authenticated records of attack exist. There is a one-year gestation after which females give birth to a maximum of ten pups. Black tip sharks are fine sport fish and taste good as well.

SHORT-FIN MAKO
Isurus oxyrinchus
Av. 180 – 250 cm
Max. 400 cm

A typical mackerel shark with its spindle-shaped body, pointed snout, vicious teeth, lateral keels and small second dorsal and anal fins, the short-fin mako is best identified by its pectoral fins that are shorter than it head length. As one of the swiftest fishes known, along with its spectacular jumping behaviour, this widely distributed oceanic shark is one of the most sought-after game fish. However, it is also known to be dangerous and is particularly unpredictable when hooked or otherwise molested. The mako feeds actively on a large variety of tunas, bonitos, other gamefish and smaller fish prey, but surprisingly few marine mammals are ever attacked. Uterine cannibalism occurs in this ovoviviparous species, and females produce between four and 16 young, each measuring about 70 cm at birth. Makos are fine fare and the catches made by long-liners are marketed mainly in the USA and Japan.

SILVER TIP SHARK
Carcharhinus albimarginatus
Av. 150 cm
Max. 275 cm

The conspicuous white tips to the rear edges of all fins and the presence of an inter-dorsal ridge and small second dorsal fin render this shark unmistakable. Widely distributed throughout the warmer Indo-Pacific, the silver tip is pelagic and seldom ventures close inshore, although it is

particularly common around oceanic islands. They are often seen following ships at sea, but this shark has also been caught at depths exceeding 600 m, which demonstrates its wide dietary preference for both surface- and bottom-living fishes. Viviparous, the silvertip produces litters during summer of up to eleven pups, each measuring about 80 cm. They spend their adolescence in shallower waters. Despite the absence of documented attacks on humans, this very bold and aggressive shark should be considered potentially dangerous and treated with circumspection, especially when one is spearfishing. It is edible and mostly caught on long-line.

WHALE SHARK
Rhincodon typus
Av. 8 m
Max. 18 m

This is the largest fish on earth. With its distinctive pattern and prominent body ridges, it cannot be confused with any other. Although distributed worldwide, it shows a preference for warm tropical waters, such as those off the northern Natal coast. It is most common near the surface, ranging from the immediate surf zone to mid-ocean. Whale sharks often congregate in shoals of up to a dozen individuals. The enormous terminal mouth and sieve-like gill rakers are perfectly suited to its filter-feeding habits, which involve sucking in a variety of planktonic organisms such as krill, shrimps, anchovies, squid and even small tuna-like fishes. Floating organisms (nekton) are also consumed when the whale shark cut through the surface. This huge but harmless animal is often accompanied by game fish such as cobia and is easily approached underwater. There is some uncertainty about its mode of reproduction, but it is thought to be oviparous with the seasonal birth of some 16 pups, each about 55 cm long.

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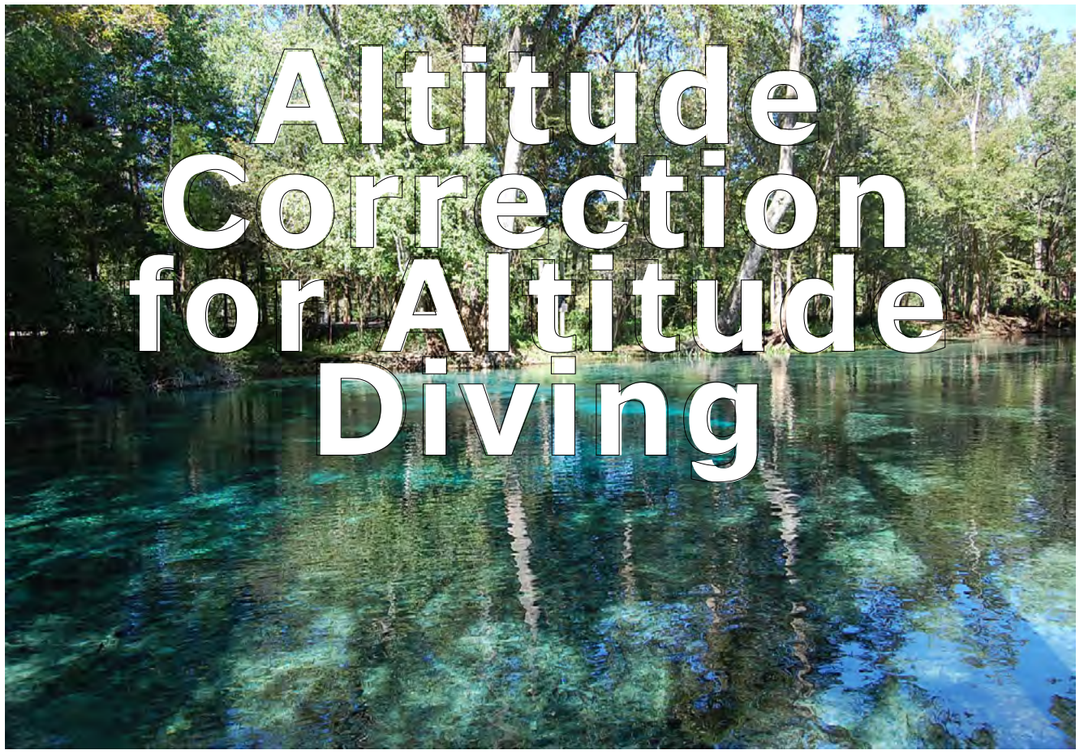
By: Nuno Gomes

Altitude Correction for Altitude Diving



The higher the altitude above sea level, the deeper is the relative exposure in terms of the sea level equivalent depth. When diving at altitude, the actual depth, the ascent rate and the depth of the decompression stops has to be corrected because of the reduced atmospheric pressure at altitude (see table 1 below).

Altitude above sea level (Metres)	Altitude above sea level (Feet)	Atmospheric pressure (fsw)	Atmospheric pressure (Kpa)
0	0	33,0	100
305	1 000	31,9	96,4
610	2 000	30,8	93,0
915	3 000	29,7	89,6
1 219	4 000	28,5	86,4
1 524	5 000	27,5	83,2
1 929	6 000	26,5	80,1
2 134	7 000	25,4	77,2
2 438	8 000	24,5	74,3
2 743	9 000	23,6	71,5
3 048	10 000	22,7	68,8

The reduced atmospheric pressure at altitude is not able to keep the gases in solution, in the diver's body, following a dive if the standard decompression procedures are followed.

Much research has been carried out over the years by various researchers, such as Buhlmann, Cross, Wienke and others on the topic of high altitude diving.

In Switzerland and other mountainous or plateau countries, located at ambient atmospheric pressures lower than the atmospheric pressure at sea level, it becomes imperative to correct the depth, ascent rate and decompression stops depths for altitude (see table 2 below), in order to avoid serious decompression sickness.

Dives at high altitude, because of the relative increased depths and thus longer total decompression times, carry a far greater risk than same depth dives at sea level.

For example, a dive to 100m (328,10 feet) at an altitude of 2 700m (9 000 feet) above sea level:

Corrected depth is: 100m x 1,40 = 140m (for the calculation of deco times).

Corrected depth is: 328,10 feet x 1,40 = 459,34 feet (for the calculation of deco times).

Corrected ascent rate (Buhlmann): 10m/minute / 1,40 = 7m/minute.

Corrected ascent rate (US Navy): 60 feet/ minute/ 1,40 = 40 feet/minute.

Corrected decompression stop depth: 3m / 1,40 = 2m (applies to all deco stops).

Corrected decompression stop depth: 10 feet / 1,40 = 7 feet (applies to all deco stops).

ALTITUDE ABOVE SEA LEVEL (Metres)	ALTITUDE ABOVE SEA LEVEL (Feet)	CORRECTION FACTOR
0	0	1,00
305	1 000	1,04
610	2 000	1,07
915	3 000	1,11
1 219	4 000	1,16
1 524	5 000	1,20
1 929	6 000	1,24
2 134	7 000	1,29
2 438	8 000	1,34
2 743	9 000	1,40
3 048	10 000	1,45

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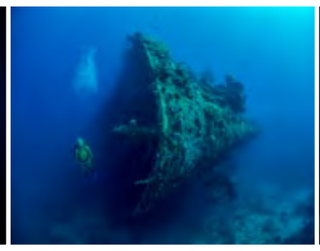
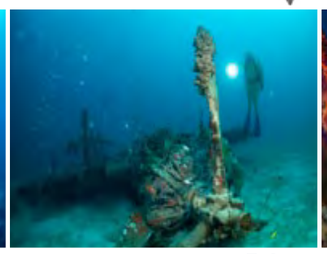


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What different gasses can we use to Dive?

Q & A

Nuno Gomes

TRIMIX is a diving gas , consisting of oxygen, helium and nitrogen , it is often used in deep diving when technical dives are carried out. With the mixture of the three gases it is possible to create mixes suitable for different depths by adjusting the percentages.
The main reason for adding helium to the breathing mix is to reduce the percentages of nitrogen and oxygen, below those of air, to allow the gas mixture to be breathed safely on deep dives. A lower percentage of nitrogen is required to reduce nitrogen narcosis and other physiological effects of the gas at depth, helium has less narcotic effect.
A lower percentage of oxygen reduces the risk of oxygen toxicity on deep dives.
The lower density of helium reduces breathing resistance at depth. Helium also off-gasses quicker and so it does not enter slow tissues as readily as nitrogen.
Helium conducts heat 5 times faster than air; often helium breathing divers carry separate gas supplies to inflate drysuits.
Divers using helium suffer from high pressure nervous syndrome (HPNS) during descent. Helium in-gasses quicker and it requires deeper decompression stops than for a similar decompression dives using air.

Barry Coleman

Helitrox is a mixture of Helium, Oxygen (content 22 percent and above) and Nitrogen. This mixture is used extensively for deco and dives between 35m and 49m based on a PpO2 of 1.3.
The theoretical advantage is similar to Nitrox diving, for example, reduced equivalent nitrogen depth and reduced nitrogen loading.
Obviously this is more beneficial the shallower the depth – the Helium is used in recreational diving to reduce the narcosis levels.
There are a few courses on the market today using this mix, such as recreational trimix.
In decompression diving the benefits are that it may be used as a transition gas mixture from a high Helium or Nitrogen content to a lower mix, whilst increasing the Oxygen to accelerate the Nitrogen or Helium off-gas until the final decompression gas is in use, which may very well be a Helitrox mix.

Pieter Smith

The air that we breathe and we fill our cylinders with consists of mainly 79% Nitrogen and 20% Oxygen.
If you increase the percentage of Oxygen in the gas it's known as Nitrox.
Nitrogen is absorbed by our bodies when we dive due to increased pressure. This saturation of Nitrogen under increased pressure will, with a decrease in pressure, come out of solution into our bloodstream and our bodies need to get rid of it through our lungs.
The 'workers' in our blood stream that need to transport the Nitrogen to our lungs so that we can get rid of it, are Oxygen. It then makes sense that if we increase the percentage of Oxygen in the gas we breathe, we have more 'workers' to get rid of the Nitrogen.
Nitrox gives us the advantage of getting rid of Nitrogen faster and more effectively.
Nitrox is used as a decompression gas in technical diving and as a safer gas to dive with in sport diving. You will feel less tired after a day's diving on nitrox that on air. Oxygen becomes toxic when under pressure for the human body.
You may recall, from training, that the safety margin for Oxygen equal 1,4bar (partial pressure). Nitrox as a gas with increased Oxygen levels will become toxic at a shallower depth than air (partial pressure again).
The risk diving with nitrox is that you need to know your depth limit of the gas you use and that you dive within your limit.
Maintaining good buoyancy when diving with nitrox becomes more important as Oxygen toxicity is more dangerous that Nitrogen narcosis.

Pieter Venter

Air is what we are all thankful for breathing everyday. It comprises roughly of 80% Nitrogen and 20% Oxygen and a small percentage of Carbon Dioxide and water. Humans evolved such that this gas mixture is optimum at one atmosphere.
This gas mixture, with the water removed, gets compressed in our cylinders about 200 times to 200 atmospheres.
Unfortunately, the moment we breathe it in a compressed state, when diving, it is not biologically optimal anymore, even as shallow as 10m on low exposure dives and any depth for high exposure dives.
Beyond about 40m it can be debilitatingly narcotic due to the high partial pressure of Nitrogen and beyond about 70m fatally toxic due to the high Oxygen partial pressure.
However, air is free and you only pay for its compression into your cylinder and, thankfully, our bodies can tolerate compressed air comfortably up to 40m recreationally. Furthermore, air is simple to use during mixed gas diving excursions where mixing gas takes time and wrong mixtures can be fatal.
Even when breathed for short periods accidentally or in an emergency at depths up to 100m, it should not cause instant death like many mixed gasses at their non intended depth.
Air is therefore still the preferred recreational breathing gas for most and my preferred descent gas on mixed gas dives.
In short, air is not ideal for diving but we can thankfully comfortably tolerate it to save money, time and prevent accidents from overcomplicating a dive with too many optimum gas mixes to be used at their respective specific depths only.

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DAN Encourages Divers and Dive Operators to Disinfect Gear Properly

DURHAM, NC – March 11, 2020 – In light of the recent outbreak of the novel coronavirus (COVID-19), questions have arisen in the dive community about disease transmission when using rental equipment, especially regulators. With the threat of coronavirus on everyone's minds, divers want to know what precautions are being taken against the spread of disease.

Properly sanitizing equipment is paramount. Keep the following in mind:

According to the CDC, household cleaners are as effective against COVID-19 as they are against the common cold and flu viruses. Therefore, cleaning and disinfecting equipment meant for personal use (such as second-stage regulators, masks, snorkels and BCD oral inflators) is very important.

Equipment can be effectively sanitized by submerging it in a 10% bleach solution or using a cleaning product such as Steramine™ tablets or any other quaternary ammonium compound. Be sure to use these products according to the manufacturer's directions and then rinse the equipment with fresh water.

Products that are commonly used to clean dive gear but are ineffective against coronavirus include antibacterial and chlorhexidine mouthwashes or sprays. Hot soapy water must be paired with mechanical action such as scrubbing with a soft toothbrush to be effective.

If you're a diver using rental gear and would like to take extra steps to protect yourself from transmissible diseases, thoroughly wipe the following equipment with a household disinfecting wipe and then rinse with fresh water before use:

- Regulator mouthpiece
- Snorkel
- BCD oral inflator
- The inside of your mask

If you do not have access to wipes, you may wish to ask the shop you're diving with to properly sanitize the equipment before you take it with you.

For a list of household cleaning products effective against the coronavirus, see the American Chemistry Council Center for Biocide Chemistries' list of products that have an "emerging viral pathogen claim" from the Environmental Protection Agency. When using a household cleaning product, it might be prudent to change the active ingredient every so often to avoid breeding resistant strains.

As always, frequent hand-washing (with soap for at least 20 seconds), regularly cleaning high-traffic objects and areas (bathrooms, door handles, countertops, etc.), avoiding contact with people who are sick, and staying home when you are ill are some of the best ways to stop the spread of disease. For more information, see the CDC's coronavirus page.

You can also check out the EPA's diving safety manual for its guidelines on decontaminating scuba equipment.

For more information, email RiskMitigation@DAN.org.

About DAN: The world's most recognized and respected dive safety organization, Divers Alert Network (DAN) has remained committed to the health and well-being of divers for 40 years. The organization's research, medical services and global-response programs create an extensive network that supports divers with vital services such as injury prevention, safety and educational programs and lifesaving evacuations. Every year, hundreds of thousands of divers around the world look to DAN as their dive safety organization. Join the DAN community or learn more at DAN.org.

Dry Suits

What you need to know about dry suits.

Hydration is a big thing in diving – you always hear about drinking lots of water, and you will always see me topping up before and even during the dive. This causes certain issues though...

There are two types of divers – those that have urinated in their wetsuit and those that will one day. It's a fact that if you are hydrated correctly, you should need a pee when entering the water. All very well in a wetsuit, but what if you wear a dry suit? This can be a messy and smelly affair.

If you spend a long time in a suit on the surface, a convenience zip (a small version of the entry zip) strategically placed, works well – just make sure that you don't fall overboard while using it. Another and more popular way around this predicament is to use P-Valves. These are available for men (condom or catheter) or women (she-p). For men it is an easy fit as a sheath is used with

self adhesive glue, and the bottom is inserted into a tube. The tube allows the diver to have an 'off board exhaust' which keeps the suit dry. The same system is available for women, but the sheath has to be glued into place.

Both systems work well, until removal, when it's guaranteed to make your eyes water when you pull it off. The male sheaths are disposed of after use, and the female ones are washed and reused. In both cases, the tubing should be washed after dives. Adult nappies can be used if you don't have or want off-board dumps. Always wash the suit if there is any spillage.

To get the best life out of your suit, there are a number of things that you should do to keep it in good order:
Latex wrist and neck seals must be cut to the user's size with a pair of very sharp scissors. Seals should lay flat on the skin surface when donned. Always use purified talc on the seals – never use baby powder or other perfumed powder – it will eat through the latex (this is due to our temperatures). You can order the purified talc through your chemist. In our hot weather it is always a good idea to talc the seals just before you put the suit on. This makes for easy donning without stretching the seals beyond their limits. Also talc after use and when in storage. It boils down to using talc all the time really!

If you are donning in wet conditions, you can use soapy water to ease the seals on. Some water-based lubricant that will not react with the rubber (KY jelly for example) can also be used.

Watch out for fingernails or rings as they will easily tear a seal. Carry a bike repair kit as you can always patch a small tear, thus preventing an aborted dive weekend.

The patch won't last long, so the seals will need to be replaced soon afterwards. Other specialised glues, such as Aquasure, can also be used.

Next to the seals, the zipper is the next

defence against water ingress. They are clever devices – once closed they are quite rigid and will not let water in.

The first line of care is to lubricate the outer part of the zip with either bees wax or the manufacturer-supplied zip lube. Do this every four to five dives. Wipe off the excess so that it does not collect sand or grit. If you are in sandy/muddy conditions make sure the teeth of the zip are clean.

If you have a back entry zipper, get someone to close and open it for you. Make sure that they know not to catch the under suit. Put your arms in 'coat hanger' stance to keep tension. If resistance is felt, don't pull through it – back up 15cm and try again.

Tip: When closing the zip, keep one finger under the zipper as this will keep the undergarment away from the zip.

Yes, you can use some fancy techniques to open or close it yourself, but one day you might damage the zip.

Life is a lot easier with a front entry zip as you can self-don. The suit inflator connector, shoulder and wrist dump should be rinsed in fresh water after each dive. They should be serviced annually or when leaking.

To store the suit, make sure that it is fully dry. Talc all seals, leave the zipper open, (it allows the membrane to be 'at ease'), and lubricate the zip. Be careful when folding/rolling the suit as you don't want to put any stress on the zip. Don't store in extreme cold or heat.

Don't forget your thinsulate – these are generally made of pretty high-tech materials and require special washing to maintain their insulation quality. Follow your manufacturer's guide lines. A very light soap powder such as 'Charlie's Soap' works well.

Like all good gear, including your body, drysuits need looking after. They will last a long time if you take care of them, but they are unforgiving if you don't!

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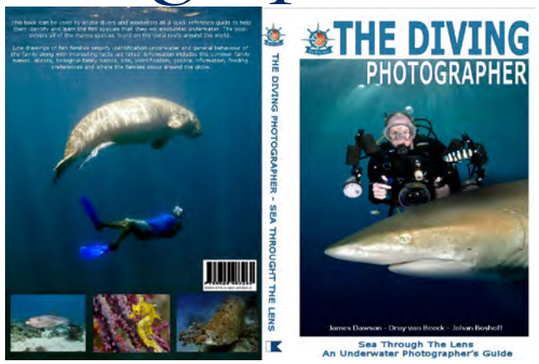
The Diving Photographer –

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 programes 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. Photographer is available in all good scuba diving and book shops or online at www.ozdiver.com.au. Cost: $19

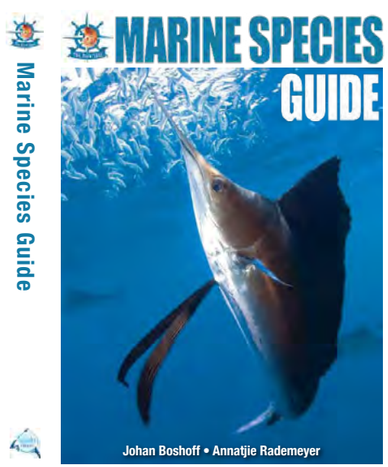
Marine Species Guide –

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 behavior of the family along with other interesting facts are listed.

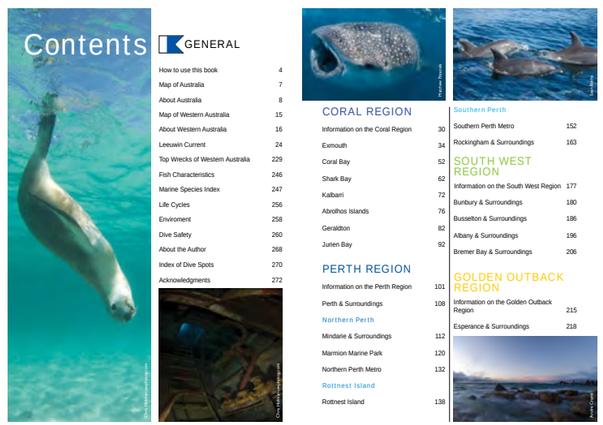
Information include common family names, aliases, biological family names, size, identification, general information, feeding preferences and where the families occur around the globe. Photographs of the most common of the species found when scuba diving or snorkeling are included and the fish families 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 $ 29, visit www.ozdiver.com.au or email info@ozdiver.com.au



The Dive Spots of Western Australia

The Dive Spots of Western Australia is an indispensable guide for all levels of divers and snorkelers, broadening their horizons on places to visit and dive/snorkel in Western Australia.
The book has more than 175 dive spots in Western Australia. Important guidelines on each coastal dive destination include accommodation, facilities, travelling tips and dive conditions. Complete with photographs and more than 100 illustrated maps of each dive site, all reefs are star rated to cover depths, marine life and other essential information for the diving and snorkelling community.



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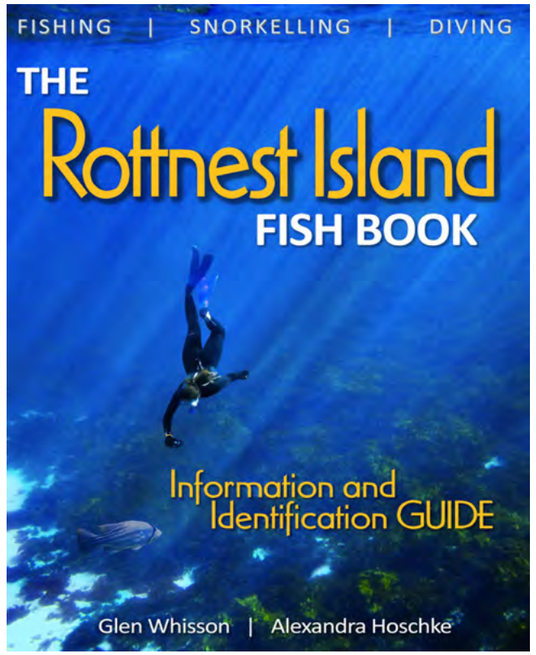
The Rottnest Island Fish Book

Dr Glen Whisson
Alexandra Hoschke
Aqua Research & Monitoring Services



Many visitors to Rottnest Island are fascinated by the amazing marine environment. The beaches, the swimming, the reefs and fish life are an integral part of the Rottnest Experience. Even the Aboriginal name 'Wadjemup' refers to Rottnest as being the 'Place across the water'.

The Rottnest Island Fish Book, originally published in August 2017, is the result of many years hard work by authors Dr Glen Whisson and Alexandra Hoschke. The first printing sold out in just 18 months, which is not surprising given the wonderful presentation and incredible photographs of the hundreds of fish species found around Rottnest Island. In 2019 the authors produced an updated version that includes several additional species and updated photographs. Containing over 420 colour images, The Rottnest Island Fish Book is the most comprehensive fish guide ever produced for Rottnest Island - one of Western Australia's most popular destinations.

This publication is an essential resource for visitors who wish to engage with the stunning marine environment through snorkelling, fishing or diving. It contains fishing advice and cooking tips for over 20 commonly caught species, snorkelling maps of several beautiful bays, feature articles about Rottnest's unique marine life, and an identification section describing the key features of all the fish species likely to be encountered around Rottnest Island.

Feature articles include interesting insights into Grey Nurse Sharks; ocean temperatures; marine habitats like coral, seagrass, etc; herring life cycle; tropical fish species; and even the fascinating subject of sex change in fish!

The beautifully-presented book is 176 pages long and contains colour photographs of over 250 fish species seen around Rottnest Island. It would be an ideal publication for the general public interested in beginner/intermediate level fishing/snorkeling/diving; advanced marine enthusiasts wanting a comprehensive photographic identification guide; or anyone generally interested in the WA marine environment. Many featured species are also found on the Perth Coast, so local divers and fishers will also find this book an ideal addition to their library.

ABOUT THE AUTHORS:
Dr Glen Whisson and Alex Hoschke have spent many years conducting marine research at Rottnest following extensive academic careers at Curtin University in the aquatic sciences. Their other research includes internationally published studies on Grey Nurse Sharks, ocean temperatures at Rottnest and Exmouth, and marine biodiversity monitoring programmes around WA.

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The PowerRay and The PowerVision

Ever wondered what is happening under the water. Now it is possible without scuba gear using the new PowerRay. An underwater drone that allows you to go and explore the ocean secrets and to top it off, you can add the PowerVision so your underwater drone becomes a fish finder with so much more possibilities.

The PowerRay is not just an amazing good looking toy but for fishermen, videographers, photographers and underwater enthusiast a great device to use to explore the surrounding waters.

This Underwater ROV can dive down to 30 meters in salt, fresh or even chlorinated water for up to 4 hours. With its amazing lights and camera that is situated in front of the unit the camera can capture 4K footage or 12-megapixel still photographs and stores them all on-board on its internal storage device.

If you are a fisherman, you can add fantastic accessories like the PowerRay Angler package that was specifically designed for fishermen, accessories include Precision Remote Bait Drop which allows you to place the fish bait at a desired position and the PowerSeeker/Fish-finder can dock directly into the PowerRay or be used separately as a standalone device.

This PowerSeeker provides you with detailed information on depth, fish distribution, underwater landscape and temperature. If you love fishing, you should certainly consider these added benefits to the PowerRay.

The PowerRay is really easy to operate with its PowerVision App Interface. PowerVision has included a unique live streaming.

If you have an Android or iOS device you can connect directly to the PowerRay to live stream 1080P video at 30 frames per second by docking your smartphone into the remote controller that allows full range of motion and speed control.

The PowerRay also has an option to use a VR headset to have a first-person perspective of the drone and also impressive, you can connect to multiple goggles/devises simultaneously and switch between basic viewing mode and control mode.

This allows you and multiple friends to all share the same first person viewing experience.

The PowerRay is a great underwater drone with so many features that gives you a spectacular real-time view underwater and allows you to sapture just the right shot or fish.

For more information on The PowerRay or The PowerVision's visit: www.powervision.me

The Dive Spots of NEW SOUTH WALES

The Dive Spots of New South Wales is an indispensable guide for all levels of divers and snorkeler, broadening their horizons on places to visit and dive/snorkel in New South Wales. Through extensive travel and diving, Johan Boshoff and Graham Willis bring you valuable information on more than 250 dive spots in New South Wales. Important guidelines on each coastal dive destination include accommodation, facilities, travelling tips and dive conditions. Complete with photographs and more than 100 illustrated maps of each dive site. All spots are star rated to cover depths, marine life and other essential information for the diving and snorkelling community.

For more information on the book, visit www.ozdiver.com.au

DIVE & SNORKEL GUIDE – TWEED HEADS TO EDEN

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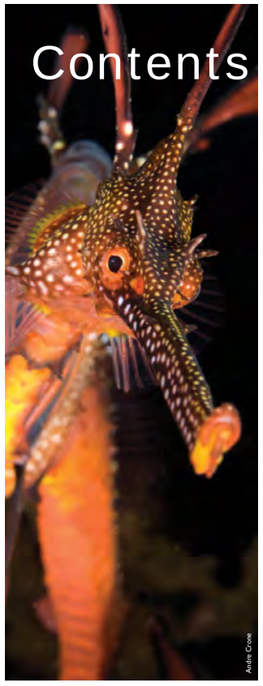

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Scubapro Everflex Steamer 7/5mm Wetsuit

As we all know, Scubapro have extremely good scuba diving equipment, and when it was time for me to upgrade my wetsuit there was no other option to go but Scubapro.

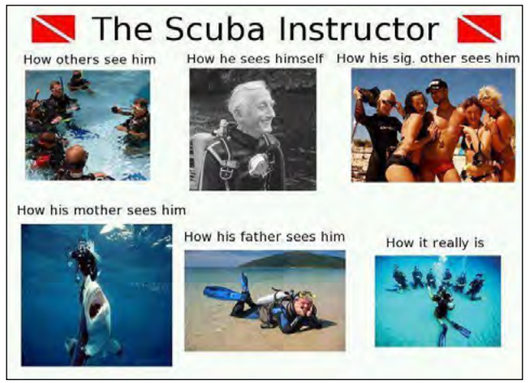
By Johan Boshoff

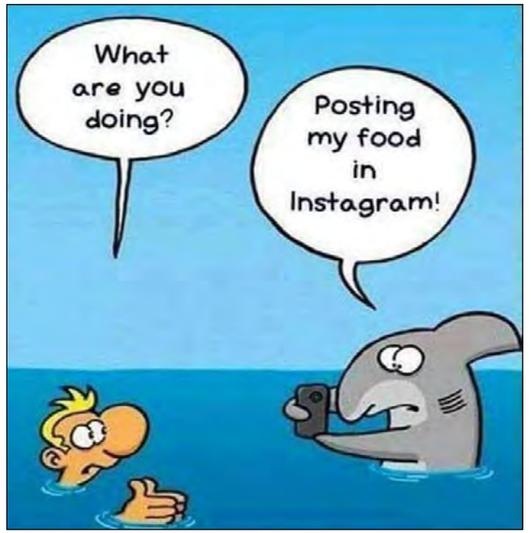
After many years of diving it was time for an upgrade as a standard 5mm wetsuit doesn't work for me anymore, especially when I do long tech dives. The one option was to use my dry suit, but as all dry suit divers know, a dry suit is high maintenance and it gets really hot in the suit before a dive.
There was no way I would be able to dive in a dry suit the whole year round...
So what was my next option? To switch to 7mm, but that's lot of rubber and it makes it very difficult to move around, not to mention the buoyancy issues. Then I heard about the solution; a wetsuit that has a combination of 5mm and 7mm Everflex neoprene and best of all, it was made by Scubapro.

The new Scubapro Everflex Steamer 7/5mm Wetsuit is made of Everflex neoprene (I don't know what that means exactly, but it's a very stretchy neoprene that makes donning and doffing very easy and also offers outstanding thermal protection).
It was exactly what I needed, and as I know that the Scubapro designers work tirelessly to improve and restyle their wetsuits and try to expand the features of all their suits, I was confident that it would be what I was looking for. My mind was made up and I knew that I had found my suit for many years to come.

Extra features:
• Equipped with a compression-moulded combination zipper flap/spine pad to reduce water entry and improve back protection.
• Added heliospan lining in the torso area of the steamers, for added protection and insulation.
• Kneepads: a thermoplastic rubber (TPR) that is applied without glue or stitching.
• Safe-straps on both arms for a securing of wrist instruments such as dive computers, depth gauges or compass.
• Diamond Span thermal inner liner has a second lining that increases stretch by 20 percent.
• Glued and stitched seams for durability
• Glide Skin Seals: Keeps You Warmer-Longer
• Ankle zippers aid in donning and doffing the suit.
• Tatex knee and shoulder pads offer protection against abrasion.

To find out more, visit www.scubapro.com or contact your local Scubapro dealer.





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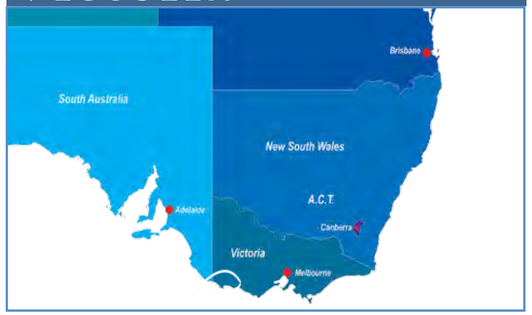

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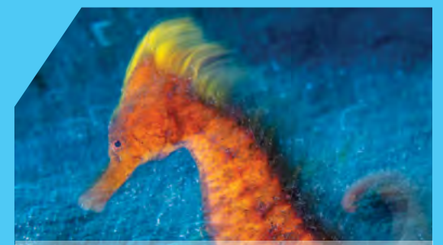

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