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RACING EXTINCTION WITH ORBI DUBAI • **EDA'S BOOK RELEASE** • UAE HYPERBARIC CHAMBER
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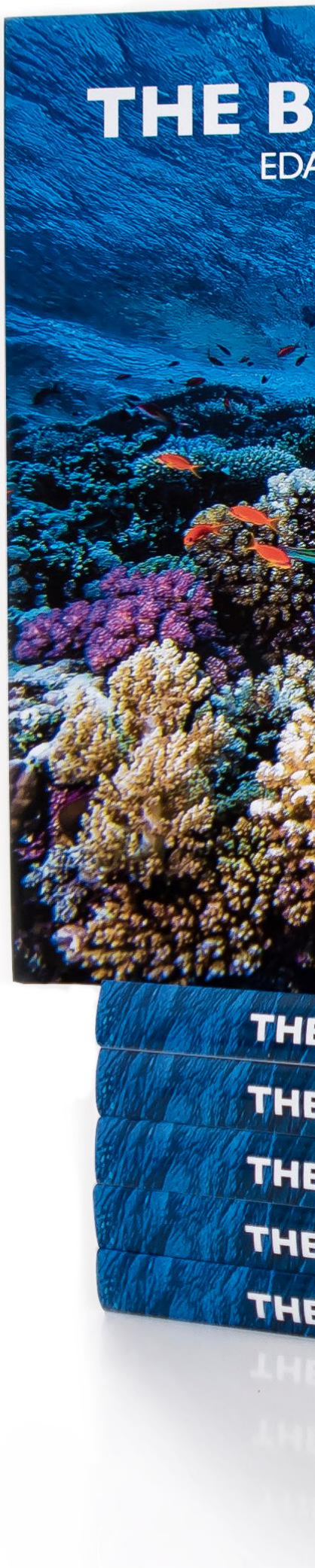


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The Magazine Reaches: Dive Centres, Dive Clubs, Dive Equipment Retailers, Business and First Class Dubai and Abu Dhabi Airport Lounges, Recreational Divers, Dive Educators, TEC Divers, Travellers, Photographers and Videographers.

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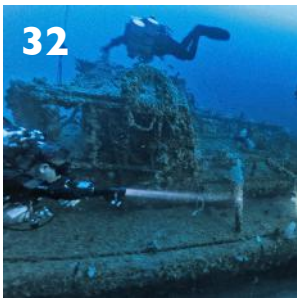
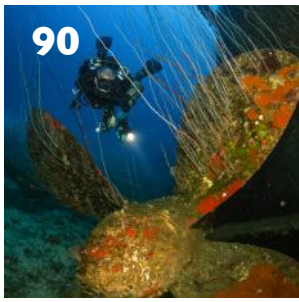




REGULARS

NEWS

KIDS CORNER

REEF CHECK

FEATURES

UW PHOTOGRAPHY

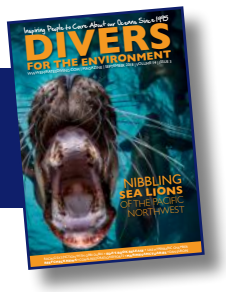
DIVING DESTINATIONS

DIVERS FOR THE ENVIRONMENT

Please note that EDA's magazine, 'Divers for the Environment' includes articles written by individuals whose opinions', whilst valid, may or may not represent that of EDA's. The magazine is a platform for individuals to voice their opinion on marine and diving related issues. You are welcome to suggest an article for the next issue released in December 2018. Send all articles, feedback or comments to: **magazine@emiratesdiving.com**

COVER

PHOTO BY STEVE WOODS
Sea Lions of the Pacific Northwest, in British Columbia.



REDUCE REUSE RECYCLE

DIVE PHILIPPINES

HEALTH

KIDS CORNER – FONT USED: **DYSLEXIE FONT**

Dyslexie font has developed a typeface especially for people with dyslexia called Dyslexie. People with dyslexia have problems distinguishing some letters. They sometimes turn, mirror and switch letters whilst reading. The Dyslexie typeface targets these problems by altering the shape of the letters so they are clearly different from any other letter. As well as this, the spaces between the letters are improved and capitals and punctuation are bolder so people with dyslexia don't read words or sentences together anymore. Representative research among many dyslexics has now shown that the font actually helps them with reading texts faster and with fewer errors.

EDITOR & DESIGNER

ALLY LANDES
Ally is EDA's Project Manager, Graphic Designer, Writer, Editor, Photographer & Videographer. She created and introduced 'Divers for the Environment' back in December 2004 as an educational tool to share information by professionals, conservationists, scientists and enthusiasts from all over the world, to better care for and protect our underwater world.

COVER STORY AUTHOR & PHOTOGRAPHER

STEVE WOODS
Steve Woods is an underwater photojournalist working in and around Indonesia as a conservation photographer. He founded the Gili Shark Foundation in Lombok, Indonesia and works for various other marine conservation organisations either on location or shooting/donating imagery to them. Steve's commercial clients have ranged from The Guardian, The Times, The Washington Post, New York Times, filming Americas Next Top Model underwater, Rough Guides, SCUBA Diver magazine, Dive magazine, as well as various other national and international publications. He has also contributed to a number of marine conservation documentaries focusing on Sharks and Manta Rays.
www.stevewoodsunderwater.com

THE QUARTERLY CONTRIBUTORS

Meet the regular quarterly magazine contributors who share their passions, interests and the expertise of their fields for our readers. Want to contribute?
Email: **magazine@emiratesdiving.com**

JESPER KJØLLER
Professionally involved in the diving industry since he started diving in the early nineties, Jesper ran a successful Scandinavian divers magazine for many years. His articles and photos have appeared in books, magazines and websites all over the world. Today he lives in Dubai, involved in marketing but finds time to teach diving to Global Underwater Explorers.

SIMONE CAPRODOSSI
Simone is an Italian underwater and travel photographer with a passion for diving and the sea. Simone uses his photography to support environmental initiatives and is heavily involved in local shark and turtle conservation projects.
www.simonecaprodossi.com

PHILIPPE LECOMTE
Having followed in his father's and brother's love for the sea, French diver and underwater photographer Philippe, took to underwater photography in 2006 after having moved to Abu Dhabi in 2003 and now seldom travels without his camera.
www.plongee-passion-photo.over-blog.com

PATRICK VAN HOESERLANDE
Diving opens up a whole new world. Being a writer-diver and co-editor of the Flemish divers magazine Hippocampus, I personally explore our underwater world and share it through articles with others, divers and non-divers. You'll find a collection of my articles on **www.webdiver.be**

CORAL REEFS
THE PLANET'S DEFENCE LINE

IBRAHIM AL-ZU'BI
EDA Executive Director

It is my great pleasure to present to you our September issue of 'Divers for the Environment'. As always I am overjoyed with the support, not only in our diving campaigns and clean ups, but also in the quality and quantity of articles we regularly receive from our loyal readers, fellow divers and friends; including those from around the world who send in their experiences or advice to other divers and keep us updated on international diving and other marine environment and conservation efforts.

It has been a hot summer – if not the hottest in years for many people around the world, global temperatures are rising and most of us are living in the midst of climate change now. As you may know, rising temperatures have a direct effect on rising sea levels and a huge impact on the fragile marine life. Most Scientists consider marine life, and especially coral reefs, the planet's first defence line against climate change. They are the first ecosystem to be impacted by the rise of temperatures – we have all heard about the coral bleaching in some countries as a result of global warming. We are responsible divers – we must act as ambassadors and eco-warriors because we see the change happening to the marine life, whether it is positive or negative. We live it, we photograph and film it, and we report the status of the coral reefs, but most importantly, as environmental divers, we should raise awareness to as many people as we can, even if they are not divers, as everyone on this planet has the responsibility to protect our planet, either on land or in the sea.

Some of you may think an amazing photo you took underwater and published on a social media platform may not make a difference, but the beauty of that photo may make some think just how beautiful our plant is. Since our establishment in 1995, EDA has been committed to marine conservation. Reef Check and Coral Conservation projects are a platform for scientists, divers and activists to take practical action to protect our coral reefs by studying them, collecting data, raising awareness based on scientific approach and sharing the results regionally and globally.

EDA's annual 23rd Clean up Arabia will be starting in November this year in partnership with the UAE Ministry of Climate Change and Environment and the local municipalities. I am sure you are all excited to join us to ensure we do the best we can to keep our oceans as clean as possible. We are looking forward to seeing you all there and a big thank you in advance to all our clean up volunteers and of course, to all our sponsors.

I hope you have all managed to have a diving holiday and explored somewhere new this summer. It's a wonderful world.

Dive Safe!

Ibrahim Al-Zu'bi

Ibrahim N. Al-Zu'bi

عام زايد

YEAR OF ZAYED

AN EDA MOVIE NIGHT WITH ORBI DUBAI
RACING EXTINCTION

ORBI DUBAI

EDA teamed up with Orbi Dubai on the 29th of August to give their members an extra special treat with the screening of EDA's August Movie Night. Racing Extinction was shown in Orbi's centrepiece attraction, the Earth Theatre with its 35 metre wide screen and powerful 3D sound system.

Members were later able to go through the 12 different nature zones designed to create experiences that would be impossible in the real world. Orbi is a unique multi-sensory attraction experience that delivers nature supercharged…

www.orbidubai.com

RACING EXTINCTION SYNOPSIS

Scientists predict that humanity's footprint on the planet may cause the loss of 50% of all species by the end of the century. They believe we have entered the sixth major extinction in Earth's history, following the fifth great extinction which took out the dinosaurs. Our era is called the Anthropocene, or "Age of Man," because evidence shows that humanity has sparked a cataclysmic change of the world's natural environment and animal life. Yet, we are the only ones who can stop the change we have created.

The Oceanic Preservation Society (OPS), the group behind the Academy Award® winning film The Cove, is back with the new ground breaking documentary Racing Extinction. Joined by new innovators, OPS brings a voice to the thousands of species teetering on the very edge of life.

This highly charged, impassioned collective of activists is out to expose the two major threats to endangered wild species across the globe. The first comes from the international wildlife trade, and the bogus medicinal cures and tonics that are marketed to the public at the expense of creatures who have survived on this planet for millions of years. The second threat is all around us, hiding in plain sight. It is a hidden world of carbon emissions and acidified oceans that are incompatible with existing animal life. It is a world, revealed with state-of-the-art photographic technology, that oil and gas companies don't want us to see.

Director Louie Psihoyos has crafted an ambitious mission to clearly and artfully pull into focus our impact on the planet, while inspiring us all to embrace the solutions that will ensure a thriving, biodiverse world for future generations.


BBC earth
SEGA
Orbi Dubai
FROM THE ACADEMY AWARD® WINNING FILMMAKERS OF
THE COVE
RACING
EXTINCTION
IT'S BETTER TO LIGHT ONE CANDLE THAN CURSE THE DARKNESS
WWW.RACINGEXTINCTION.COM

DAN EMERGENCY OXYGEN FOR SCUBA DIVING INJURIES COURSE

EDA purchased 22 DAN packs in total and PADI Course Director, Francis Uy ran the remaining 9 DAN Emergency Oxygen For Scuba Diving Injuries courses to our registered EDA members in July.

14 JULY 2018

Congratulations to Arun Sasi, Usman Dawood, Abdulla Ibrahim Jassim Al Jawi, Leah Marie Valderama, Mohamed Hayek, Alastair Earles, Hassan Abu-Minshar, Charina Bunuan, and Ella Jessica Pausal for completing the course.

WHY TAKE THIS COURSE

When a diving accident occurs, being able to recognise the problem and respond with the appropriate care can speed the diver's recovery and minimise lasting effects.

Oxygen first aid provides needed oxygen to body tissues, enhances the elimination of inert gases such as nitrogen obtained from breathing gases, and helps shrink any gas bubbles that may have developed during ascent – bubbles that contribute to decompression sickness and arterial gas embolism. Supplemental oxygen also can help minimise or eliminate existing symptoms and reduce further injury until medical services are engaged.

WHAT YOU WILL LEARN

This course will teach you the techniques of emergency oxygen administration for suspected diving injuries and nonfatal drowning. You will learn the fundamentals of recognising dive-injuries along with response and management.

You will learn about:

- Atmospheric gases
- Respiration and circulation
- Decompression illness
- Oxygen and diving injuries
- Oxygen safety

You will develop the following skills:

- Oxygen equipment identification, assembly and disassembly.
- Scene safety assessment.
- Initial assessment.
- Use of Demand inhalator valve, Non-rebreather mask.
- Use of Bag-valve mask, Manually triggered ventilator.
- Creation of an Emergency assistance plan.

HYPERBARIC CHAMBER NOW AVAILABLE
EMERGENCY NUMBER TO CALL: **04 609 9999**

What is a Hyperbaric Chamber?
It is an enclosed metal chamber compressed by air where a patient is placed inside to breathe 100% oxygen. There are different types of pressure chambers: one is small in size and contains a space to accommodate one patient only, and the other types are bigger with two spaces to accommodate two patients inside at once.

The patient in the larger chamber can be accompanied by another person whose function is to intervene in the event of an emergency and to assist the patient or the injured person in need of assistance. More than one patient can be treated in this chamber simultaneously.

How does the treatment work?
The pressure inside the chamber is increased by 3 times the normal atmospheric pressure. Patients breathe pure oxygen through a special mask or hood.

In this way, the lungs get more pure oxygen than breathing under normal pressure. The blood carries oxygen to the body in larger quantities, helping to fight the bacteria that causes infections which cannot be eradicated and accordingly activates cells to help heal.

The Hyperbaric Chamber in Dubai Police:
It is the vision of the Dubai Police General Command to prepare for crises and disasters with great effectiveness represented by the search and rescue department. The pressure chamber was constructed with the latest standards and qualities known internationally for such purposes, taking into account the safety and security conditions of the patients. Professionals have been trained with high standards and qualifications in order to secure the accreditation of Dan Europe and the US Armed Forces for use in emergencies.

What is Hyperbaric Medicine?
Hyperbaric medicine includes hyperbaric oxygen treatment, which is the medical use of oxygen at greater than atmospheric pressure to increase the availability of oxygen in the body; and therapeutic recompression, which involves increasing the ambient pressure on a person, usually a diver, to treat decompression sickness or an air embolism by eliminating bubbles that have formed within the body.

Other illnesses can also be treated by oxygen therapy under pressure such as infections and wounds that cannot heal because of diabetes or radiation.

Hyperbaric oxygen therapy is used to treat the following conditions:

- Decompression illness
- Carbon monoxide poisoning
- Burns
- Radiation injuries
- Anaemia (severe)
- Brain abscess
- Nonhealing wounds
- Deafness (sudden)
- Gangrene
- Infection of skin or bone that causes tissue death cultivation of skin
- Vision loss (sudden)

For more information or to book an appointment, call: +971 4 609 9999

شرطة دبي
DUBAI POLICE

NEW SHARKS EDUCATIONAL INSTITUTE REPRESENTATIVE IN THE UAE

BY **FERNANDO REIS, SHARKS EDUCATIONAL INSTITUTE (SEI)**

The Sharks Educational Institute is an international non-profit NGO dedicated to raising marine conservation awareness with shark conservation at its forefront. SEI's mission is to create new educational events geared towards better understanding the marine life balance with sharks.

In recent months, we have been working to develop a new structure for the Sharks Educational Institute (SEI) in the UAE. Following new opportunities of collaboration and promotion for marine conservation, we have based the development of this new structure on the volunteer work of some personal friends we have in the country.

We are proud to announce our new representative in the UAE – Kathleen Russell – a highly experienced PADI Course Director based in Abu Dhabi. Kathleen has vast experience on running several marine educational initiatives and has direct knowledge in regards to the small Arabian Bamboo Shark community that is found in the Arabian Gulf right on Abu Dhabi's doorstep. To learn more about Kathleen, please refer to 'Our Team' section on our website.

Kathleen Russel is happy to share her experience at all levels to teach marine conservation and shark awareness dives in general. She is also involved with dugong conservation as well as other educational activities in the UAE.

With Kathleen's guidance, SEI is looking to certify Bamboo Shark Divers to directly observe them in their natural habitat in Abu Dhabi waters. As far as we have studied and researched, little is still known by scientists about the species population's numbers, and due to progressive habitat degradation we believe they need much more protection while there is still time to do something for these small and beautiful sharks (*Chiloscyllium arabicum* and *Chiloscyllium griseum*).

The Arabian Bamboo Sharks (also known as Arabian Carpetsharks) need to be better known, and with Kathleen Russel's help and support, we at SEI can all work together to bring them to common public knowledge.
We are certain that with Kathleen as SEI's representative in the UAE, our NGO will become an active and a more accessible Shark conservationist and educational organisation, open to welcoming all volunteers.

For more information, please contact us:
SEI's Executive Director
Fernando Reis
SEI's UAE Representative
Kathleen Russel

Email: info@sharksinstitute.org
Website: www.sharksinstitute.org

AL-BAWRA CONSERVATION PROJECT

THE LOCAL HERITAGE NAME GIVEN TO AN ANCHOR IN THE ARABIAN GULF

INTRODUCTION

There are many dive sites in the UAE, most of which are shipwrecks with the majority found on the west coast of the country, in the sea of Dubai. These sites are some of the best places to practice diving and are frequented by many with a love for wreck diving – whether for fun, further learning, inspection, documentation, exploration or photography. From years of experience, it is important to keep these wrecks in good condition and protect them from further damage caused by anchors. The Al-Bawra Conservation Project is proposed to have permanent mooring buoys placed at most dive sites in the country with different stages on approval, starting with an experimental dive site in the Emirate of Dubai.

The name chosen for the initiative, is Al-Bawra. It is the local heritage name given to an anchor in the Arabian Gulf.

WHAT IS A MOORING BUOY?

A mooring buoy is an object that floats in water and used out at sea as a locator or warning point for marine vessels. Buoys are generally bright in colour to stand out from a distance. Mooring buoys are a type of buoy to which ships can be moored in deep oceanic areas. A mooring buoy weighs more than a regular type of buoy. Mooring buoys are designed in a manner that there is a heavier weight located at the bottom of the sea. This weight is like an anchor holding the buoy afloat in the water. A mooring buoy has ropes or chains attached to its top that floats on the surface of the water. These chains are provided so that boats can be effectively moored to them.

The entire application of a mooring buoy works in such a way that the buoy floats while boats are moored to a very firm support without using the anchor system of halting a ship. In some parts of the world, mooring buoys are also used to moor boats away from areas where wrecks and coral reefs thrive.

Ships use mooring buoys to protect coral reefs because traditional types of anchors tend to dig and uproot the coral that lie deep under the water's surface. This causes a huge loss to the marine ecosystem. By using a mooring buoy, two purposes are served – the ships are moored correctly and loss to marine life is prevented.

BENEFITS OF MOORING BUOYS:

1. Mooring buoys are environmentally friendly and safe as they facilitate the safe anchoring of boats to the seabed.
2. They contribute in the promotion of diving tourism, making Dubai one of the preferred destinations to divers around the world, as well as other dive sites within the UAE.
3. It achieves the Department of Tourism and Commerce Marketing's (DTCM) main goals to enhance Dubai's image as an ideal diving destination, attracting divers from all around the world.
4. To make Dubai one of the top diving tourist destinations in the world, with easy access to wreck sites.
5. Divers and dive centres struggle with being unable to pinpoint the exact location of some sites due to choppy seas, currents, poor visibility and no markers, causing discomfort to divers and a loss to the industry.
6. Currently, anchors are thrown onto the wrecks to moor boats which damages the hull of the wrecks after a short period of time. Mooring buoys contribute effectively to conserving these wrecks.
7. Mooring buoys help to preserve the marine life present on the wrecks such as algae, sponges and coral, as well as fish and other life.
8. They help to avoid fishing nets tangling on the wrecks. Dive sites are destroyed each year by fishing nets, especially when fishermen do not know that there is a wreck at the location. Mooring buoys are the best solution to protect wrecks from them and steer fishermen away from the area.

THE PLAN

To install mooring buoys on 10 of the most popular wreck sites in Dubai as Phase 1 of the project. Other locations will be selected for the rest of Dubai and the other Emirates for Phase 2.

The Dubai Voluntary Diving Team (DVDT) will conduct a periodic inspection of all the mooring buoys throughout the year in order to maintain their effectiveness and conditions over the period of their use.

Instructions will be provided for divers and fishermen on the mooring buoys, along with a contact number in the event of light failures or to report any damages.

REQUIREMENTS AND INSTALLATION METHODS:

MOORING BUOYS

The polyethylene mooring buoys comply with the government's Maritime Navigation specifications and standards. They will each have a Solar Marine Lantern for night visibility corresponding to the laws of navigation.

SYNTHETIC MOORING

Unlike chain, the synthetic mooring minimises damage to the sea bed whilst the smooth stretch of the unique nylon core absorbs shock loads in the wave and tidal conditions of the marine environment.

SIGNAGE

3 signage panels clearly visible on the top of the buoy including information, contact numbers and sponsor's logo.

THE DUBAI VOLUNTARY DIVING TEAM'S EXPERIENCE WITH MOORING BUOYS:

The Dubai Voluntary Diving Team have placed small, temporary buoys on most dive sites in the Emirate of Dubai in the past. However, they have all been cut, whether it was intentionally or not, some only lasted between one or two months periods. The team have years of experience in handling ropes, recovering nets, fishing cages and fishing waste, as well as maintaining buoys such as the mooring buoy on the Sheikh Mohammed bin Rashid Barge SMB wreck. The team have also fixed a UAE flag on the same wreck with a chain and buoy on the occasion of the 2016 Flag Day and are ready to commence work once the Al-Bawra initiative is launched.

HOW TO MAINTAIN THE MOORING BUOYS?

1. A sign will be placed on the buoys with clear instructions in the event of a malfunction, or if the buoy is disconnected from the mooring line. The number to contact will be that of the Coast Guards from that Emirate, or the Dubai Voluntary Diving Team's number.
2. The Ministry of Climate Change & Environment, the Ministry of Transportation and/or the Coast Guards should include an additional item to the legal documentation for annual registrations/renewals for the owners of private boats, fishing boats, cruise ships, commercial liners etc., informing them to not cut/damage the mooring buoys/ system for any reasons, and to immediately report any malfunctions, damages, breakages or disconnections.
3. All fishermen must be notified to not practice any kind of fishing activities with nets and cages or any illegal fishing methods at the areas near the mooring buoys and dive sites.
4. All dive centres, diving instructors and dive shops must inform divers to take care of mooring buoys.
5. The Dubai Voluntary Diving Team will regularly inspect all the mooring buoys, and they will continue to monitor the dive sites and clear them of any fishing debris as part of their conservation voluntary work.

PROPOSED WRECK SITES FOR MOORING BUOYS OF PHASE 1:

1. SMB Sheikh Mohammed Barge – A
2. SMB Sheikh Mohammed Barge –B
3. Maryam Express
4. Zainab
5. Car Barge
6. MV Zaraf Barge
7. Neptune
8. Hopper Barge
9. Anchor Barge
10. Cement Barge
11. Victoria
12. Ludwick

Other sites which are thought to be a general attraction to divers can be proposed to be added.

WE ARE LOOKING FOR SPONSORS

We would like to open the invitation to potential sponsors interested in the opportunity to gift a mooring buoy to the diving community.

Sponsors logo will be included on one of the signage panels at the top of the buoy with date of the dive site's mooring buoy inauguration.

1. THE MOORING BUOYS BY NORTH WEST MARINE:

- North West Marine shall fabricate and supply polyethylene mooring buoys free of cost as a means to support diving activities and give back to the community.

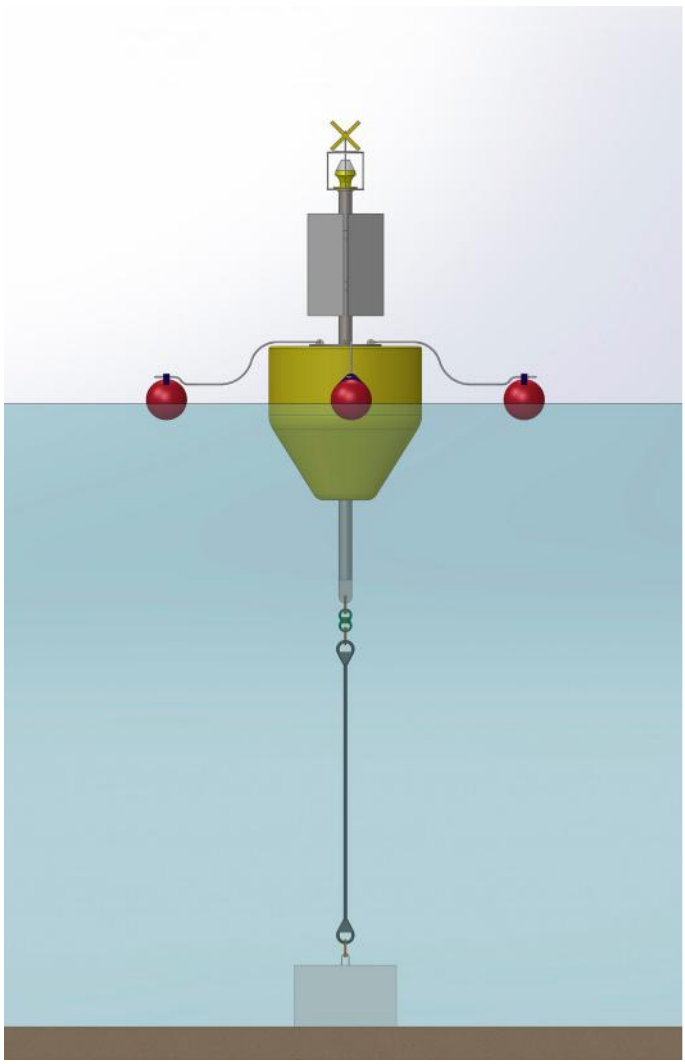
2. THE MOORING SYSTEMS BY SPONSORS:

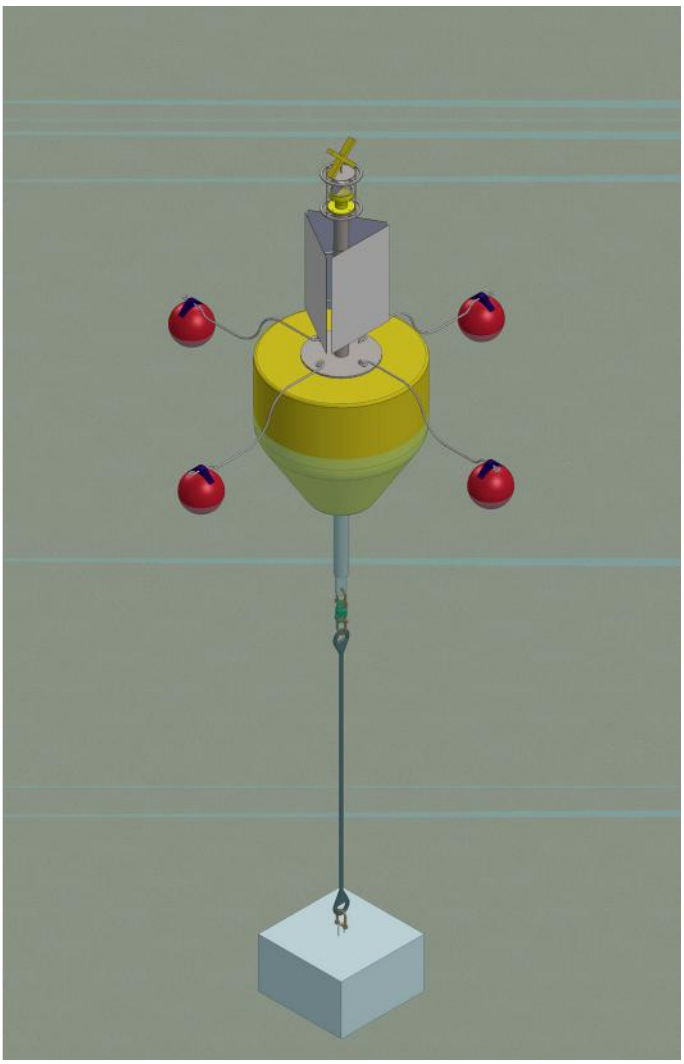
- The mooring systems, including the Sealite 20T synthetic strop 30m long (considering water depths of 15-20m), U2 grade shackles, swivels and 4T concrete sinkers shall be supplied at cost price by North West Marine – AED 12,285.
- North West Marine shall supply the Sealite SL-75-5D-GPS-Bluetooth Solar Marine Lantern for night visibility at cost price – AED 2,730.
- The mooring buoy signage panels (3) will be supplied at cost price by North West Marine – AED 1,140.
- Mooring buoy inspection (petrol costs) for one year to DVDT – AED 3,845

TOTAL COST FOR EACH SYSTEM: AED 20,000

3. MOORING BUOY INSTALLATION BY THE DUBAI VOLUNTARY DIVING TEAM:

- North West Marine will supply a pontoon for the mooring buoy installations and the Dubai Voluntary Diving Team will install them.





فريق دبي للغوص التطوعي
DUBAI VOLUNTARY
DIVING TEAM
Est. 1995

DUBAI VOLUNTARY DIVING TEAM

To learn more about the Dubai Voluntary Diving Team, visit the Emirates Diving Association (EDA) website at the following link: **www.emiratesdiving.com/dive_clubs**

DVDT Social Network Sites:
Instagram: dubai.voluntary.diving.team
Twitter: @dubai.voluntary.diving.team
Facebook: Dubaivoluntary divingteam

For more information:
Tel: +971 55 223 4975
Email: Dubai.voluntary.diving.team@gmail.com

NORTH WEST MARINE

North West Marine was established in 2005 and is a leading supplier of marine products including Aids to Navigation, Marine Barriers, Environmental Protection equipment and other ancillary items within the United Arab Emirates and wider MENA region.

For more information:
Tel: +971 4 514 7478
Email: info@nw-marine.com
Website: www.nw-marine.com

EDA
جمعية الإمارات للغوص
Emirates Diving Association

CONTACT US TO SPONSOR A MOORING BUOY

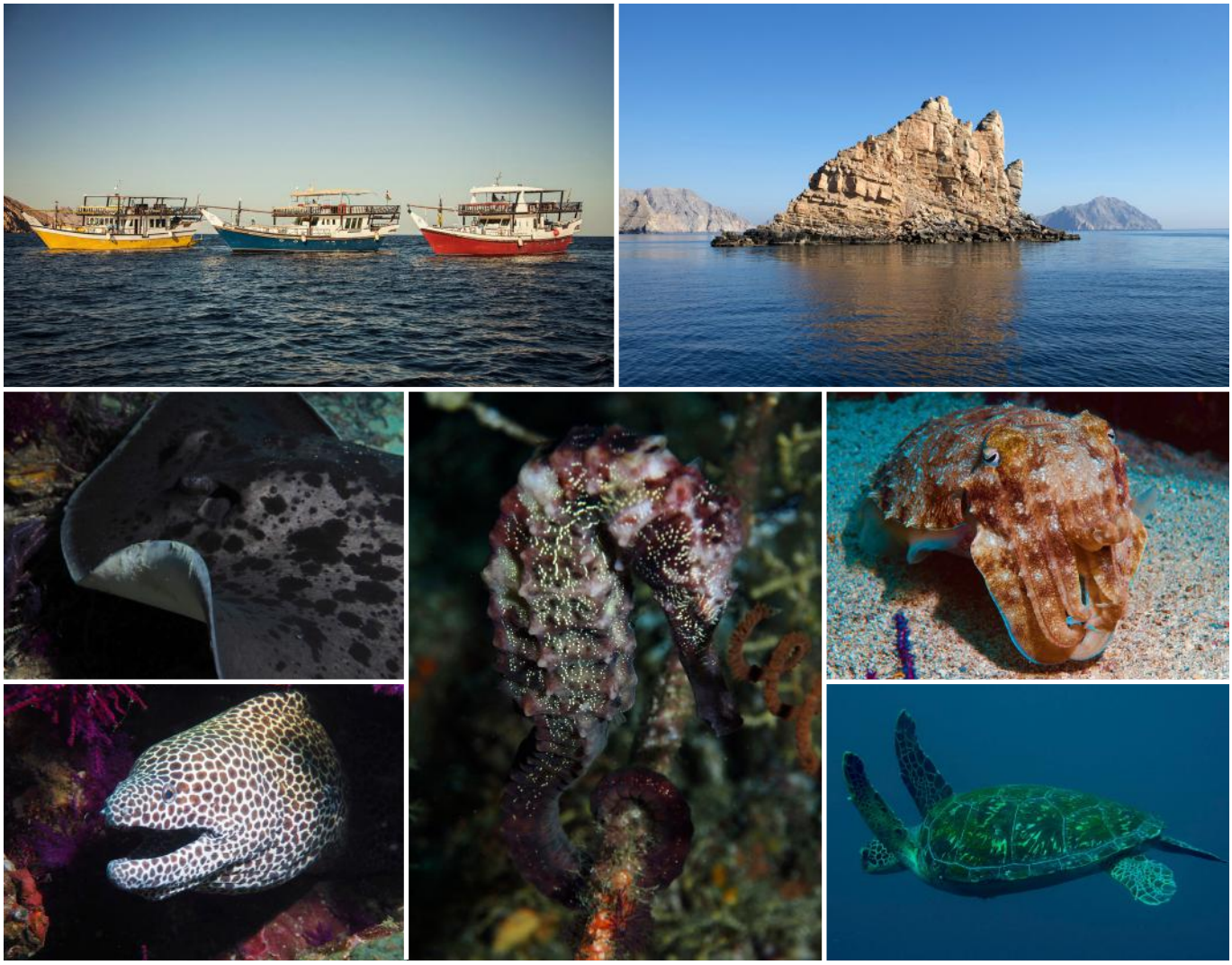
We're working together to conserve our environment and give back to the Diving Community, and we need sponsors such as yourselves to make it happen!

For more information:
Tel: +971 4 393 9390
Email: projects@emiratesdiving.com

OMAN

AL MARSA TRAVEL & TOURISM – MUSANDAM

BY **AL MARSA TRAVEL & TOURISM – MUSANDAM**



In the extreme north of the country lies the Arabian Horn of the Musandam, a territorial enclave, including the famous Strait of Hormuz which has been open to visitors for the past few years. Here, the high mountains plunge suddenly into the sea, forming sumptuous fjords and harbouring incredible creeks. One of the most spectacular fjords is Khor al Sham.

With its drop-offs and sheltered bays, the Musandam is a famous spot, especially for travelling dive cruises. The sites of the region are intact and numerous and reserve important rock formations, lined with soft corals and beautiful tables of acropora (hard corals). The varied fauna includes dolphins, whales, seahorses, nudibranchs, blacktip sharks, parrotfish, angelfish, and clownfish.

This small enclave has long been ignored by tourism, but some dive centres have settled in Dibba.

AL MARSA TRAVEL AND TOURISM

We offer scuba diving and dhow cruises on fully equipped and air-conditioned boats. Day cruises in the vicinity of Dibba on the Zighy Bay side, with two 1-3 day cruise dives (up to 7) with 2/3 dives per day. Dive Safari cruises of 7 nights/6 days with at least 3 dives a day.

The road leads from Dibba to the northern tip of Musandam and back. Strong currents can occur (not recommended for beginners) and visibility is 12 metres on average. Loan of equipment such as masks and snorkels, kayaks, fishing rods, and equipment for divers are available. Drinks and meals are served on board.

AL MARSA HAS 4 SAFARI BOATS:

- Red Dhow
- Brown Dhow
- Yellow Dhow
- Blue Dhow

INCLUDED ON BOARD:

- An air-conditioned lounge.
- A comfortable front deck and a partially covered sun deck.

THE LOWER DECK

The cabins are all air-conditioned and located on the lower deck.

- **Red Dhow:**
  5 double cabins with shared showers/WCs
  1 single cabin with shared showers/WCs
  2 double cabins with private showers/WCs

- **Brown and Yellow Dhow:**
  6 double cabins with private showers/WCs

- **BLUE DHOW:**
  1 double cabin with shared showers/WCs
  2 triple cabins with shared showers/WCs
  1 master cabin with 4 beds and a private bathroom.

DIVE AGAINST DEBRIS WITH DIVERS DOWN DUBAI

In celebration of our ocean AWARE week organised by Project AWARE, we are focusing our attention on tackling ocean pollution, creating awareness for vulnerable shark and ray species and empowering local communities to take positive actions for the protection of fragile aquatic species. The global issue with plastic pollution has been widely documented around the world. Every year tens of thousands of marine animals and seabirds die from eating or getting tangled up in marine debris. As divers, we have the power to help remove this debris from the ocean. What we lift may be small in size, but by working together locally, nationally and internationally, we can make the ocean safer for marine life.

EVENTS
Date: Saturday, 15th September 2018
Location: Sunset Beach, Jumeirah, Dubai
Contact: nicola.l@diversdownuae.com

Date: Saturday, 22nd September
Event: Project AWARE Shark Conservation Course
Contact: michela.c@diversdownuae.com

AN INTRODUCTION TO UNDERWATER PHOTOGRAPHY WITH DIVERS DOWN

As divers, we marvel at the wonders of the underwater world – from the largest whale sharks to the smallest nudibranch. But have you ever felt frustrated that you were unable to capture a moment on camera and then share it with other divers, family and friends, and social media?

Help is now available for people interested in trying underwater photography. Divers Down Fujairah is hosting an Underwater Photography workshop and everyone is welcome. The day will include a classroom workshop in macro and fish photography, a photography dive and an introductory session in basic editing.

EVENT DETAILS
Date: Saturday, 29th September 2018
Meeting Time: 9:30 am
Location: Divers Down UAE – Miramar Hotel, Fujairah
Contact: info@diversdownuae.com
www.diversdownuae.com

AT THE DOCTORS

STORY BY PATRICK VAN HOESERLANDE ILLUSTRATION PETER BOSTEELS

"Youth divers?" It sounded like music to their ears.

The doctor looked at his papers and said, "Oh yes, there is only one diver", and asked who of the two was learning to dive. Skubba raised his hand. He was speechless.

Skubba had to stand up and the doctor came up to him with a weird kind of magnifying glass with a light attached to it. He looked into both of Skubba's ears.

"An otoscope!" Fred suddenly shouted.

"An auto scoop?" Skubba repeated, amazed.

"No, an otoscope," the doctor corrected him. "With this thing, I can look into your eardrum to make sure it is not damaged. And these are caps with a funnel attached to it. This allows me to see if your Eustachian tube is working properly so that I can know that you can clear your ears," explained the doctor.

"Yes, because that tube has to work well if you don't want to have any pain while you're diving," Fred added.

"Right!" The doctor confirmed while a strange drawing showed up on his screen. He looked at it and mumbled, "Good."

"Now we're going to examine your lungs," the doctor continued. "We're going to test your lungs with this, a spirometer."

Skubba and Fred looked at a handle with a large hole at the top end of it. The doctor inserted a short tube into the hole and asked Skubba to blow through the tube as hard as he possibly could. What a weird test!

As soon as Skubba blew into it, a little ball drew a circle on the doctor's computer screen. He asked Skubba to blow through it again. Another circle appeared on the screen. "Also good," said the doctor.

Skubba had to undergo other tests too. Listening to peeping sounds and tell which side he could hear them from, and then the doctor measured his heartbeat.

The doctor also asked why he wanted to learn to dive. Both boys then burst into chatter and began to tell their adventures in full detail. The doctor enjoyed it.

When he asked why Fred did not want to go diving, Fred answered that he did not feel at ease in the water. The doctor understood that and said you should only learn to dive if you really want to. Not because someone else expects that from you. Fred found that to be wise advice.

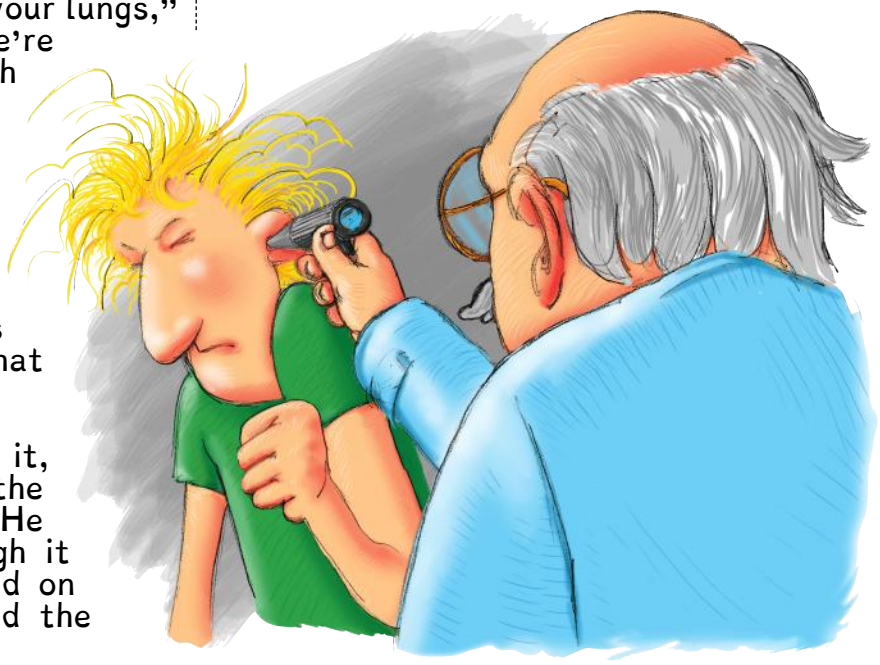
When all the tests were done, the doctor reviewed the results.

"That looks good. Skubba, you may dive! I will see you again next year."

Skubba and Fred jumped up into the air. It felt as if they had won a competition.

They both gave the doctor a handshake and promised to visit him again. After all, it had been a fun and interesting visit, and they were no longer afraid to go to the doctors.

They loudly left to go home in all their excitement. Now the diving could really begin!



SOUND

STORY BY PATRICK VAN HOESERLANDE ILLUSTRATION PETER BOSTEELS

Nella had asked our friends to stay a little longer after training. Somebody needed help with an underwater experiment. Skubba could help underwater and Fred would certainly be able to assist with setting up the test. However, she had not told them what the experiment would be. The two boys stood in the entrance hall of the swimming pool and let their imagination run free.

"Are you Skubba and Fred?" they suddenly heard behind them.
They both turned in the direction of where the voice had come from.
"My name is Lloyd[1]. How are you?"
"Good," our friends said almost in unison.
"What are we going to do?" asked Fred. He could no longer suppress his curiosity.

"We are going to measure the speed of sound underwater. I have to do this for a school science project and your instructor said you wanted to help."
"Should we be in the pool for that? Can't you do that experiment in a glass of water?" Skubba asked.
"You could indeed do that in a glass of water, but that would be much more difficult and the results would not be good."
"Why not?" Skubba asked.

"If you want to know how fast you walk, you can't do that with just one step. You go for a walk and measure how long it takes. When you have the distance and time, you can calculate how fast you move," Fred said.
"Ah yes", Skubba did not know for sure if he had understood it, but Fred certainly had.

"Okay, guys, let's get started," Lloyd suggested. "The first thing we have to do is take a water sample."
"A sample?" Skubba did not know the meaning of that word.
"We just put a little water into this bottle. We call that a sample. While Fred fills the bottle, Skubba, you can use this thermometer to measure the water temperature."

While both boys performed their work meticulously, Lloyd prepared all the material. Two metal rods to provide the

sound, an underwater camera to serve as a microphone and a long cord to measure the distance. With the camera they could register the moment the sound was produced by hitting the rods against each other, and the microphone would tell them when the sound wave returns. Measuring the time between the start and arrival, Lloyd could calculate how fast 'sound' travels in water.

Lloyd explained how to line up the camera and two metal rods to Skubba. Together they measured the correct distance underwater so they knew where to put everything. Then they measured everything again, because the camera and the metal bars had to be at the right distance before the test.

Skubba turned the camera on and Lloyd knocked the metal rods together several times. The experiment went well and the boys enjoyed themselves. Lloyd had to check a few things at home, but he was satisfied with the result.

When everything was put away, Lloyd asked them if they wanted to help him with his next experiment: measuring the speed of sound in sea water.

"Does a pool filled with seawater exist?" Skubba asked very interested.

([1] This story is based on an experiment conducted by Lloyd van Doorn.)

THE CONSERVATION EFFORTS OF A 10 YEAR OLD

FEATURE **ALLY LANDES** PHOTOGRAPHY **FELICIA WONG** ILLUSTRATIONS **ZOE TAN**

Zoe Tan joins forces with Wild Aid activists, above and below, demonstrating against the shark fin trade outside a Maxim's restaurant in Central, Hong Kong.

When a 10 year old wants to get involved in marine conservation, who's to stop them! Zoe is no ordinary 10 year old, she's got a thing for dumbo octopuses (*Grimpoteuthis*) and she's going to be a marine biologist when she grows up – a Cephalopodiatrist to be precise!

Zoe was one of the dozens of activists dressed as a shark who took part in the demonstration led by Wild Aid in Hong Kong back in April this year to get the restaurants owned by Maxim's Caterers Limited to stop serving shark fin dishes at their outlets. It was the latest effort by the group to end the "cruel and unsustainable" trade in the expensive Chinese delicacy demand for which there is a major factor threatening the future of many shark species.

A letter was sent to the chain signed by 276 NGOs, conservation groups and scientific researchers calling for it to dump shark fins.

In Hong Kong, the hub of the global trade, there is still one speculation they won't drop: "we only trade in abundant blue shark fins," merchants and caterers say, "not endangered species."

Maxim's claim to "sustainably sourced" shark fin dishes of blue sharks is actually listed as near-threatened by the International Union for Conservation of Nature (IUCN). Experts in marine biology, fisheries and green groups are saying that they will enter the endangered list if fishermen don't stop targeting them. They are the most frequently caught species amongst the 100 million sharks killed worldwide each year which was discovered through research conducted by a Dalhousie University study.

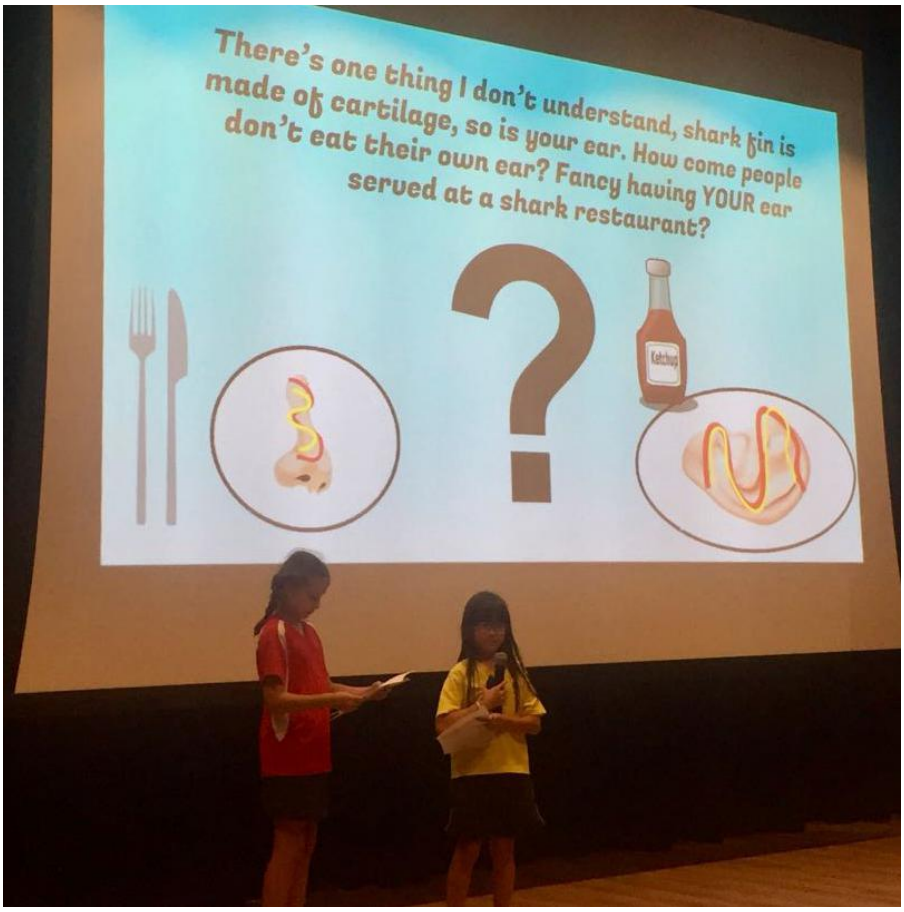
There is a lot of ongoing research being done in Hong Kong's role as a gateway for unregulated and illegal fishing within the international food trade. Recent research shows that blue shark numbers have more than halved in areas of the Pacific and Atlantic oceans between the 1980s and 2000s, with declines having reached 6% globally and they are the most heavily traded of all species in the Hong Kong fin trade. It has to stop!

BLOODIED FINS
ZOE TAN, AGED 9

A shark.
Gracefully gliding through the unknown
depths of the ocean.
Its silver body shimmering
in the sunlight beaming down on the sea.
Wonders flood our minds
as this majestic creature approaches.

One day,
The sound of noisy motors
draws nearer and nearer.
Silently screaming in agony,
I realise my fins are gone.
The calm blue water
suddenly turns red
as I get tossed into crimson water.
I keep bleeding
as I drift down to the sea bed.
Sound of motors fades away.
I am left to slowly die in pain.

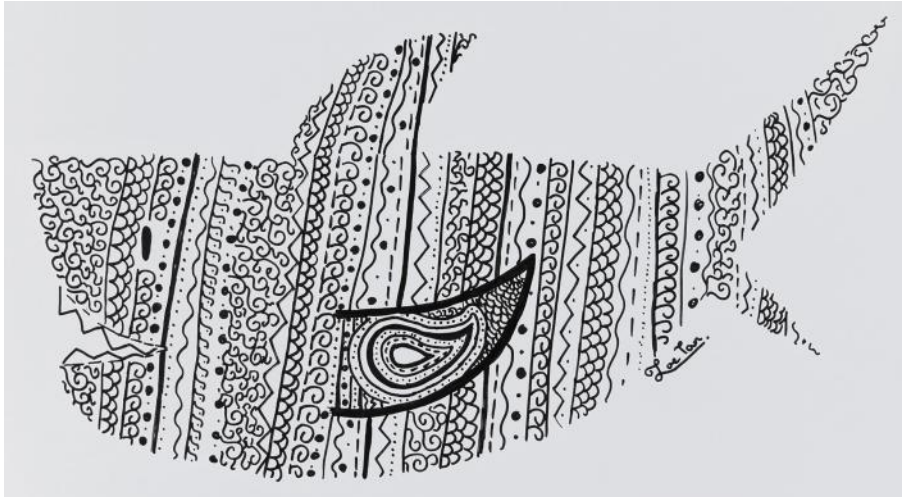
Next time you drink that tasty soup,
Think about where it came from.



ABOVE: Zoe (right) and her friend Michaela Riedel (left), created a presentation to share with their school assembly to bring awareness and a call for action. How come people don't eat their own ear? **BELOW:** Saying no to shark feasting made it to the front page of the Star World newspaper.


Star world

Saying no to shark feasting



ZOE TAN

Zoe just turned 10 and lives in Hong Kong with her family and dog, and attends Glenealy School. An ocean lover, she knew she wanted to be a marine biologist since the age of 5, currently leaning towards being a cephalopod-ologist.

She dreams of one day diving with dumbo octopuses.

REEF CHECK WELL-REPRESENTED AT 2018 ASIA PACIFIC CORAL REEF SYMPOSIUM

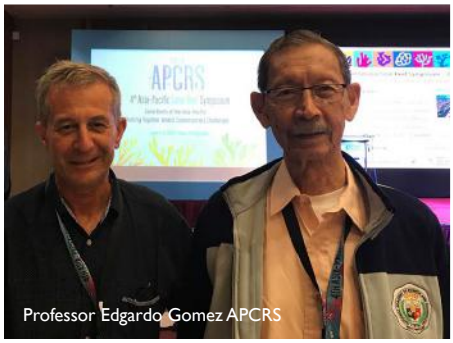
BY **JULIAN HYDE, REEF CHECK MALAYSIA**

The 4th Asia Pacific Coral Reef Symposium was recently held in Cebu, Philippines, with a theme of "Working together amidst contemporary challenges", and there are certainly plenty of challenges for coral reefs to contend with – not to mention linked ecosystems such as mangroves and sea grass meadows, all of which provide important habitat for a huge proportion of marine life. The event saw presentations ranging from *Cnidarian phylogeny*, through comparisons of reef monitoring methodologies, to barriers to raising funds for coral reef conservation – a real meeting of the minds, of scientists and managers.

Reef Check (RC) in the Asian region was well represented at the event. Two of the Philippines' most distinguished marine scientists, Dr. Al Licuanan and Dr. Perry Alino, are part of the RC Philippines network; some consider them to be the founding fathers of marine conservation in the Philippines. We were also introduced to the new coordinator in the Philippines, Vanessa Vergara, who is already making significant strides in fundraising for training and surveying programmes. Also represented were Taiwan, Japan, China, Hong Kong, Vietnam, Thailand, Malaysia, Singapore and Indonesia.

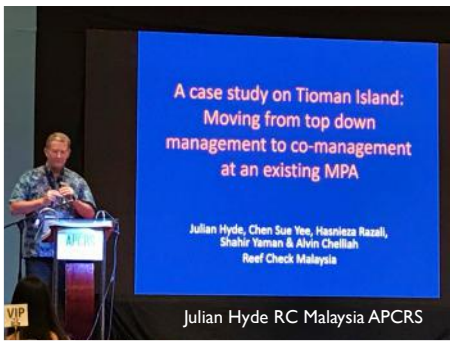
A meeting of RC coordinators was held on the third day of the symposium. A number of ideas emerged about how the diving market is changing and what opportunities and challenges lie before us. Included in the discussion were the need to update training materials; demand for online provisions of some training-related services; and an opportunity to promote the Discover Reef Check experience.

Professor Perry Alino APRCS



Professor Edgardo Gomez APCRS

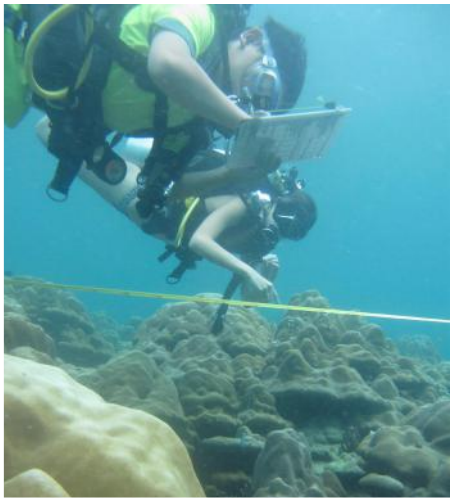
Vani Vergara RC Philippines APRCRS

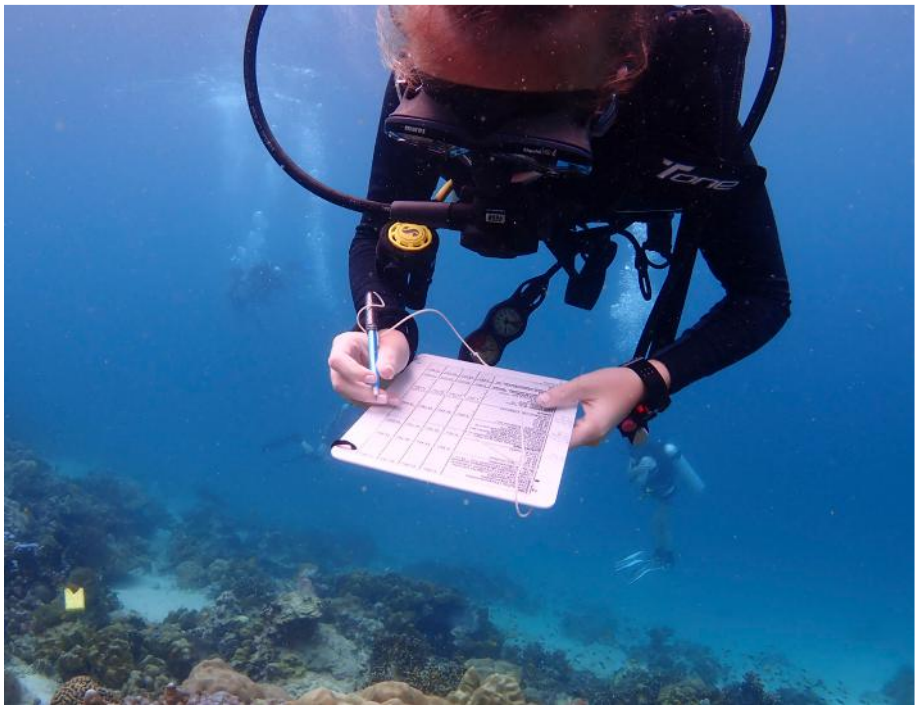


Julian Hyde RC Malaysia APCRS

CONCORDIA INTERNATIONAL SCHOOL CELEBRATES 10 YEARS WITH LAUNCH OF 3RD PROJECT IN THAILAND

BY **TERRY UMPHENOUR** PHOTOS BY **CONCORDIA INTERNATIONAL SCHOOL**





"Maximum depth will be eighteen metres and dive time will be fifty minutes. Gear up." The dive briefing command sent 25 enthusiastic young divers from Concordia International Schools in Shanghai and Hanoi down to the dive platform on Manta Queen III's dive deck. The students and their seven adult leaders had prepared all year to collect data for Reef Check to monitor the health of the oceans' reefs.

This year was quite special to the programme. It began Concordia's third, five-year Marine Research Project data collection programme in the Andaman Sea. The project goals are to provide Reef Check with longitudinal data from reefs off Thailand's coast, develop students into active global citizens, and guide them to become ecologically responsible adults. This year's study was conducted near Koh Lipe. The previous two studies were conducted near Racha Yai Island (2008–2012) and Phi Phi Island (2013–2017) in the Andaman Sea.

Concordia students sign onto the programme in the fall of each school year. They come for many reasons: to help the reefs, to learn to scuba dive, to have fun, and to gain new experiences. They range in age from 12–19, and many students participate for more than one year.

Collecting data requires participants to be PADI certified Open Water and Advanced Open Water divers, so new students begin in the classroom. In June of each year, students travel to Thailand and board ship to finish PADI certifications and complete the necessary twenty-five dives needed to collect data. During these dives, students learn to identify and record fish, invertebrates, and substrate data to send to Reef Check. Students must successfully pass three tests: one on indicator fish species, a second on invertebrates, and a third on substrate.

The Marine Research Project concludes each year with two days dedicated to collecting Reef Check data. Students work in teams of six to collect data during the last two days at sea. As students step back onto dry land, each has grown in knowledge about the health of the ocean's reefs and shares some small satisfaction at being part of an effort to ensure that reefs are available for future generations. Many will return the following year and it is hoped that other schools and organisations join their efforts to support Reef Check. If you know of a school or organisation interested in setting up a similar programme, please contact Terry Umphenour for more information.

ENVIRONMENTAL DNA (EDNA) IS PROMISING NEW TOOL FOR MARINE ECOSYSTEM MONITORING

BY **ZACK GOLD, REEF CHECK CALIFORNIA VOLUNTEER DIVER**

Monitoring marine biodiversity is critical for understanding the health of marine ecosystems. Current monitoring relies heavily on visual SCUBA surveys like the wonderful work done by Reef Check California every year. Unfortunately, traditional visual SCUBA surveys are expensive, logistically challenging and limited by taxonomic expertise and the amount of time divers can spend in the water. Any Reef Check volunteer knows this well, and that is why the work of Reef Check volunteers plays such a vital role in providing desperately needed data to keep track of our local marine ecosystems and the health of our Marine Protected Areas. Unfortunately, these limitations make it difficult to survey all marine ecosystems frequently enough to provide the best information on ecosystem health and impact of management policies.

Novel molecular techniques offer promising tools to monitoring marine ecosystems in real time. These techniques rely on the fact that all organisms leave trace amounts of their DNA in the environment. Just like we all leave traces of ourselves behind wherever we go – strands of hair or fingerprints, for example, fish, sharks, and invertebrates leave little pieces of themselves behind, too – things like scales and feces, which are filled with DNA. Recent technological advances allow us to isolate and sequence this environmental DNA (eDNA) from just a litre of seawater, enabling rapid and accurate identification of organisms present in a community. As such, eDNA approaches are ideally suited to intensive marine biodiversity monitoring programmes like Reef Check's.

In order to investigate the applicability of eDNA for monitoring Southern California's marine ecosystems, Zack Gold, a Ph.D. candidate in Professor Paul Barber's lab at UCLA, is comparing eDNA methods to Reef Check SCUBA surveys. Last summer, Zack collected eDNA samples at 50 sites around Southern California while joining Reef Check's summer surveys. By simultaneously collecting eDNA and traditional SCUBA survey data, Zack hopes to determine the advantages and limitations of each monitoring method. By demonstrating the effectiveness of eDNA in assessing marine ecosystem health inexpensively across broad spatial scales, his research has the capacity to revolutionise marine biodiversity monitoring, providing critical insights into the variables shaping marine protected area effectiveness in urban coastal environments.

So far, Zack has been able to detect over 400 species of fish and invertebrates from blue whales to giant black sea bass to thick-horned nudibranchs to purple urchins! The eDNA results were also able to tease apart unique marine communities seen at different sites, which is critical for being able to compare communities inside and outside MPAs. Although the first round of results are promising, more work needs to be done to complete reference sequences for all of the species of Southern California and to finish all the lab work from the 400 samples collected last summer. Zack is looking forward to sharing more of his results with Reef Check and coastal marine managers as the science is completed. Ultimately, Zack is planning to provide the results of the eDNA study to a wide array of marine managers and policy makers to demonstrate the effectiveness of eDNA in quantifying marine ecosystem health and the capacity of eDNA to provide cost added benefits to current ecosystem assessment.

Given how easy it is to collect and filter seawater samples, Zack believes it will be easy to imagine a future where eDNA samples are collected up and down the California coast to keep better track of our vital marine ecosystems all with just a scoop of water. With the combination of Reef Check's ongoing monitoring and eDNA tools being developed by Zack, more information can be gained to help assess and protect our reefs for generations to come.

HEALTHY KELP FORESTS SEEN ON BIG SUR EXPEDITION

BY **REEF CHECK CALIFORNIA**

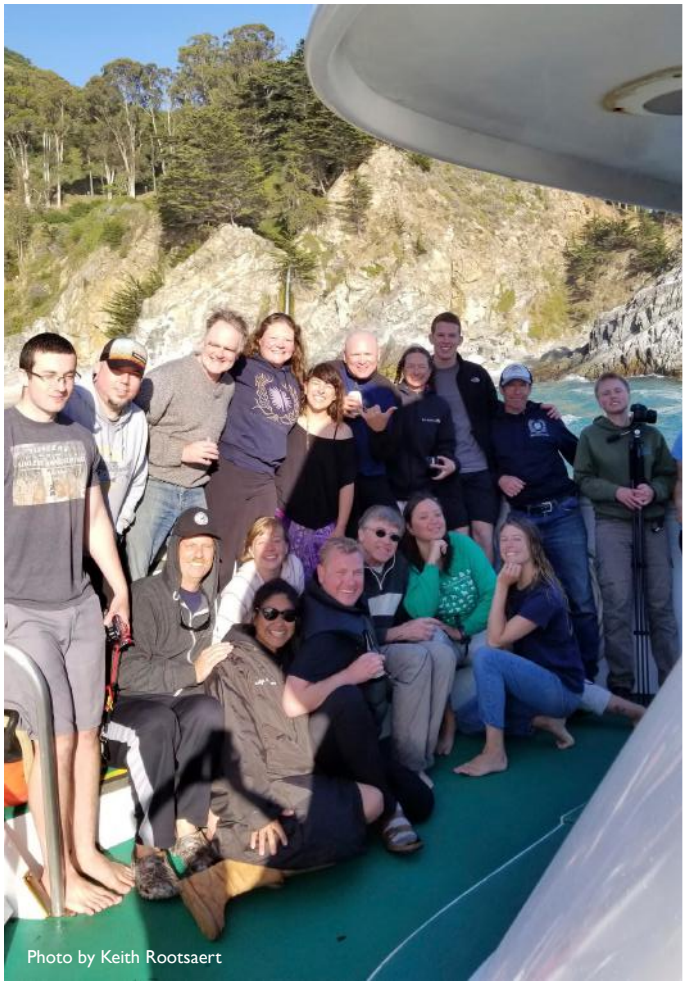


Photo by Keith Rootsaert

Photo by Jessica Bray

Last week, 20 divers were able to complete surveys for all 10 sites attempted along the Big Sur coast of California! Over the course of four days, we completed three sites near Big Creek reserve, four sites near Point Sur and three sites near Cambria. As always, Big Sur treated all on board with a magical experience. We had fantastic weather with beautiful sunsets. We spotted humpback whales, dolphins and an albatross along the way. Under the water, we spotted huge lingcod and vermillion rockfish and saw large stands of kelp, including *Pterygophora*, *Laminaria setchellii*, giant kelp and bull kelp.

This was our fourth year of surveying these sites along the Big Sur coast and we are happy to report that these kelp forests appear healthy with abundant kelp and appropriate populations of sea urchins, unlike some other areas of the state that have become urchin barrens in the past few years following the outbreak of sea-star wasting disease and warm water events. We even saw a sunflower star, a species that was once common but today is rarely seen.

The crew on the Truth Aquatics boat, the Vision, were amazing as always and helped to ensure that all of our important work was completed. Thanks to all who worked so hard to make this trip happen. Without the dedication of our supporters and volunteers, this important data could not have been collected.

L-R: Photos by Justin Gill

RARE SPECIES SIGHTED IN CALIFORNIA, NEW SPECIES ADDED TO RCCA SURVEY PROTOCOL

BY **JAN FREIWALD, SELENA MCMILLAN** AND **DAN ABBOTT**

Photo by Selena McMillan – Feather Boa

Photo by Patrick Webster – Finescale Triggerfish

Photo by Selena McMillan – Large Mouth Blenny

Photo by Selena McMillan – Female Rock Wrasse

Reef Check California's (RCCA) 2018 survey season is just about to start, but we have already made some interesting observations during recent dives. RCCA staff have observed several species outside of their normal range, suggesting that certain species are expanding their historically southerly ranges northward. These sightings are likely the result of the recent warm water and El Niño events that have occurred in recent years. In 2016, RCCA reported the first sighting of a crowned sea urchin (*Centrostephanus coronatus*) in central California (Freiwald et al. 2016). This species of sea urchin was previously only found as far north as the Northern Channel Islands and has a historical distribution ranging from the Galapagos Islands in the south to Southern California in the north. In March of this year, during a dive in Point Lobos State Marine Reserve, our Southern California Regional Manager, Dr. Selena McMillan, documented a crowned urchin for the second time in central California. On a reef in Whalers Cove, a common dive destination, she observed a crowned urchin among purple and red sea urchins, which are typically found in the region.

This is not the only observation of typically southern species on the central coast in recent months. During a recent training dive for students from California State University Monterey Bay, Dan Abbott, RCCA's Central California Regional Manager, and others saw a female rock wrasse (*Halichoeres semicinctus*) at the breakwater in Monterey. This fish species is not commonly found north of Point Conception, which marks the northern range boundary of many species found in southern California. While southern species have been observed in central California from time to time, in recent years these observations seem to have become much more common in the Monterey/Carmel Bay region.

During a recent dive, Kate Vylet, RCCA's Climate Change Monitoring Coordinator, and Dan Abbott saw an even less common fish species in central California. They found a Finescale Triggerfish (*Balistes polylepis*) sleeping in the sand near a reef along the Monterey Peninsula. Though triggerfish are primarily found on coral reefs, the finescale triggerfish has a wide geographic range, including the entire North American west coast, but it is rarely seen in central California. This fish has become more common in southern California recently, where similar increases in its abundance have been observed after previous El Niño events. This is why RCCA has added this species to its species list and is teaching volunteers now to look for it anywhere during their survey dives.

Another species that has become increasingly common in southern California is the Largemouth Blenny (*Labrisomus xanti*). This species' historical range expanded northward into central Baja California, Mexico and was first reported in California in 2015, near La Jolla (Love et al. 2016). Now they are fairly common at Santa Catalina Island and are being seen throughout southern California. Evidence of their reproduction has also been observed in larval collections off the coast of Palos Verdes (Milton Love, personal communication). RCCA has added Largemouth Blennies to its species list and is now documenting their densities and potential range expansion in southern California and statewide should they start showing up even further north.

RCCA has also added a new kelp species to its surveys this year. We have observed changes in the composition of kelp in many of our southern sites in recent years, noticeably the emergence of feather boa kelp (*Egresia mensiesii*) in place of or among giant kelp (*Macrocystis pyrifera*). The feather boa kelp is native but is usually found at very shallow depths and in the intertidal. With the warm water events that have occurred, we have observed this species' expansion into deeper, subtidal waters. We will now be counting individuals and stipes of individuals to estimate densities of this alga within the kelp forests that we survey.

SANTA MARTA REEF CHECK 2018 EXPEDITION BRINGS TOGETHER COLOMBIAN DIVERS

BY **ANGELA ALEGRÍA ORTEGA, CORALES DE PAZ**

For a second consecutive year, Corales de Paz organised a participatory monitoring of Colombia's coral reefs. The Santa Marta Reef Check 2018 expedition brought together 30 recreational divers from all over the country to evaluate the ecology of the reefs in the Santa Marta Bay and the National Natural Tayrona Park (NNTP). Held again at the El Rodadero Hotel, the event presented the Reef Check EcoDiver programme to 20 recreational divers, including an official from the NNTP, a technician from the Rodadero Aquarium, a volunteer diver from the Calipso Foundation and two professional divers from El Rodadero Diving Center. In doing so, Corales de Paz continues to build capacity to complement local and national programmes that track coral reef health in Santa Marta. The event was made possible thanks to the collaboration and participation of the national research biologists from the NNTP, the SeaFlower Foundation, the environmental bureau of San Andrés Island (Coralina), the Rodadero Aquarium, the Calipso Foundation, and Corales de Paz as Scientific Leaders of the Reef Check survey teams. Their commitment to teaching survey skills and their expertise in reef ecology made it possible to collect information on coral health from five dive sites, three of which had already been monitored during the 2017 expedition. The immediate result is updated information on the reef dynamics occurring in this region.

In addition to the training of recreational divers in the Reef Check protocol, the atypical presence of Sargasso (Sargassum spp) forests could also be assessed. This is a temporary condition that has been reported elsewhere in the western Atlantic, normal in Santa Marta in the first months of the year, but in 2018 has had a prolonged presence atypical for the southern Caribbean. This seaweed is transported by marine currents that come from South America to the Caribbean Sea and the Gulf of Mexico, but since 2015 a change in its season has been reported. According to researchers at the University of Galveston (Texas), a change in marine currents due to an increase in sea temperatures in 2015-2016 affected the distribution of Sargassum by sending it in large quantities to the Caribbean coasts.

Another preliminary result of this citizen science expedition is the recording of a low prevalence (<10% of the population surveyed) of white plague in the evaluated sites. This coral disease is causing great coral mortality in the reefs of Florida and the most recent records suggest that it is spreading south, raising alarm in Caribbean countries. The data collected on coral diseases as part of this Reef Check serves as an updated reference point for reef managers and scientists following the progress of white plague in the Caribbean and Colombia.

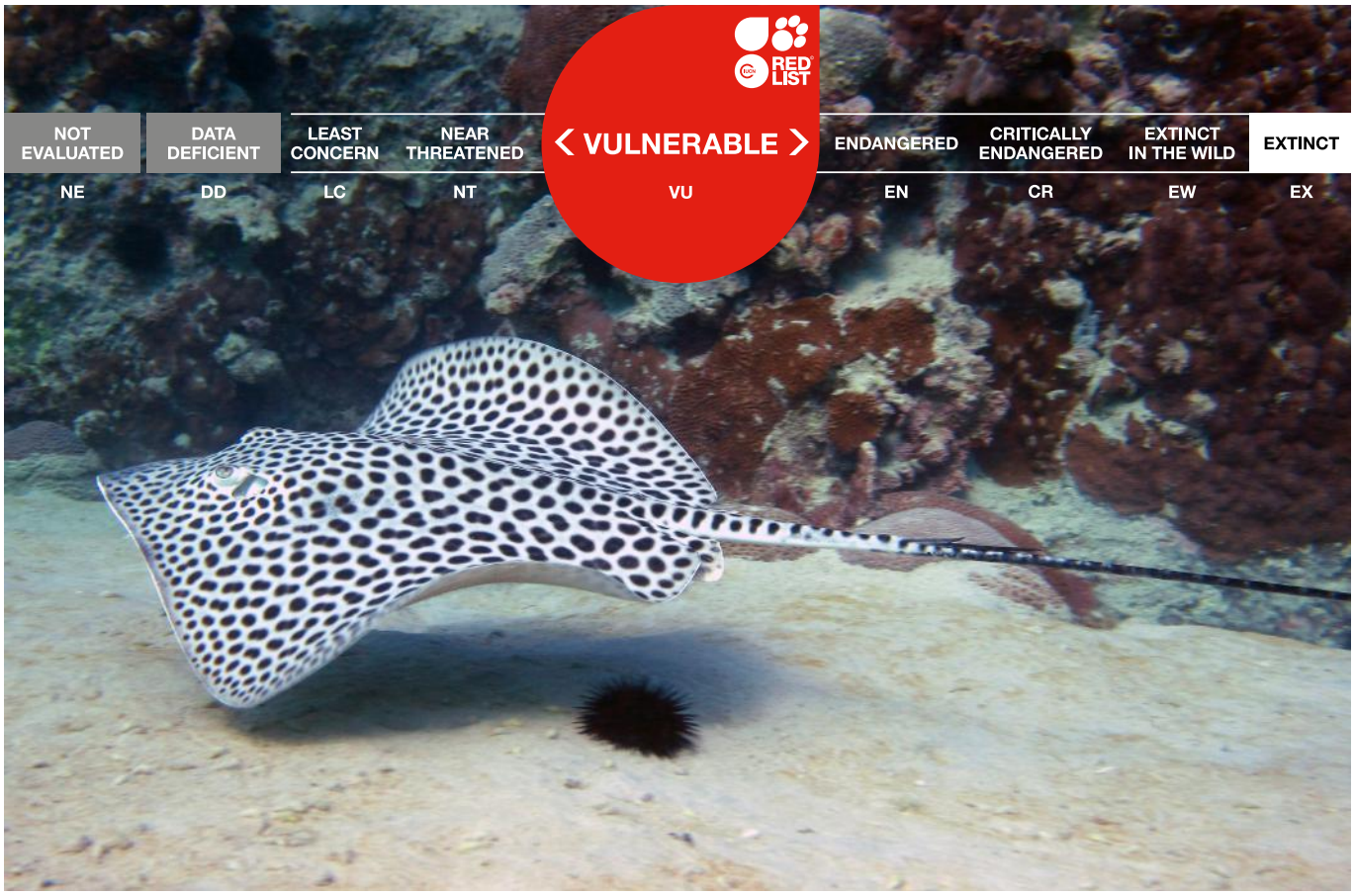
For this expedition we were able to receive support from the National Learning Service (SENA in Spanish) who was evaluating the quality of the programme and certifying the participants with a certificate in technical competencies in participatory reef health evaluation. We also received the endorsement of other entities such as Biozean, Colombina, El Rodadero Hotel, Rodadero Dive Center, Rodadero Aquarium, SeaFlower Foundation, NNTP, Conservation International, The Colombian Federation of Underwater Activities (FEDECAS), the Global Confederation of Underwater Activities (CMAS), among others, whose support were pivotal to achieve the objectives of the event.

The goal of Corales de Paz for its participatory coral reef monitoring programme is to serve as an early warning system for the health condition of Colombia's Caribbean coral reefs. We hope that recreational divers, who frequent the coral reefs, help in providing information to the environmental authorities so that when needed, they can implement actions to control possible threats to our coral reefs. The confirmation of the atypical presence of Sargassum and the estimation of a low prevalence of white plague are two examples that demonstrate the contribution that the Reef Check programme and its EcoDivers can make to the study of coral reef dynamics. The event held in Santa Marta was very well received and the participants expressed great interest in continuing in the near future supporting coral reef monitoring, which encourages us to continue with this work in favour of the conservation and rehabilitation of coral reefs in Colombia.

FEATURE CREATURE

RETICULATE WHIPRAY (*HIMANTURA UARNAK*)

FEATURE **IUCN RED LIST 2016** PHOTOGRAPHY **PHILIPPE LECOMTE**



RED LIST CATEGORY & CRITERIA: VULNERABLE

Scientific Name: *Himantura uarnak* (Gmelin, 1789)

Common Name(s):

English – Reticulate Whipray, Honeycomb Stingray, Leopard Stingray, Marbled Stingray

French – Pastenague Léopard

Taxonomic Notes: *Himantura uarnak* possibly forms a species complex (B.M. Manjaji pers. obs. 2007). It is often confused with *H. undulata* and *H. fava*. Colour pattern in *H. uarnak* varies throughout its range; fine spots and reticulated forms need to be compared in detail (W. White pers. obs. 2007).

Justification: The Reticulate Whipray (*Himantura uarnak*) is a large-bodied stingray (160 cm disc width) that has a wide distribution in the Indian and Western Pacific Oceans. This species has also entered the Mediterranean Sea from the Red Sea through the Suez Canal.

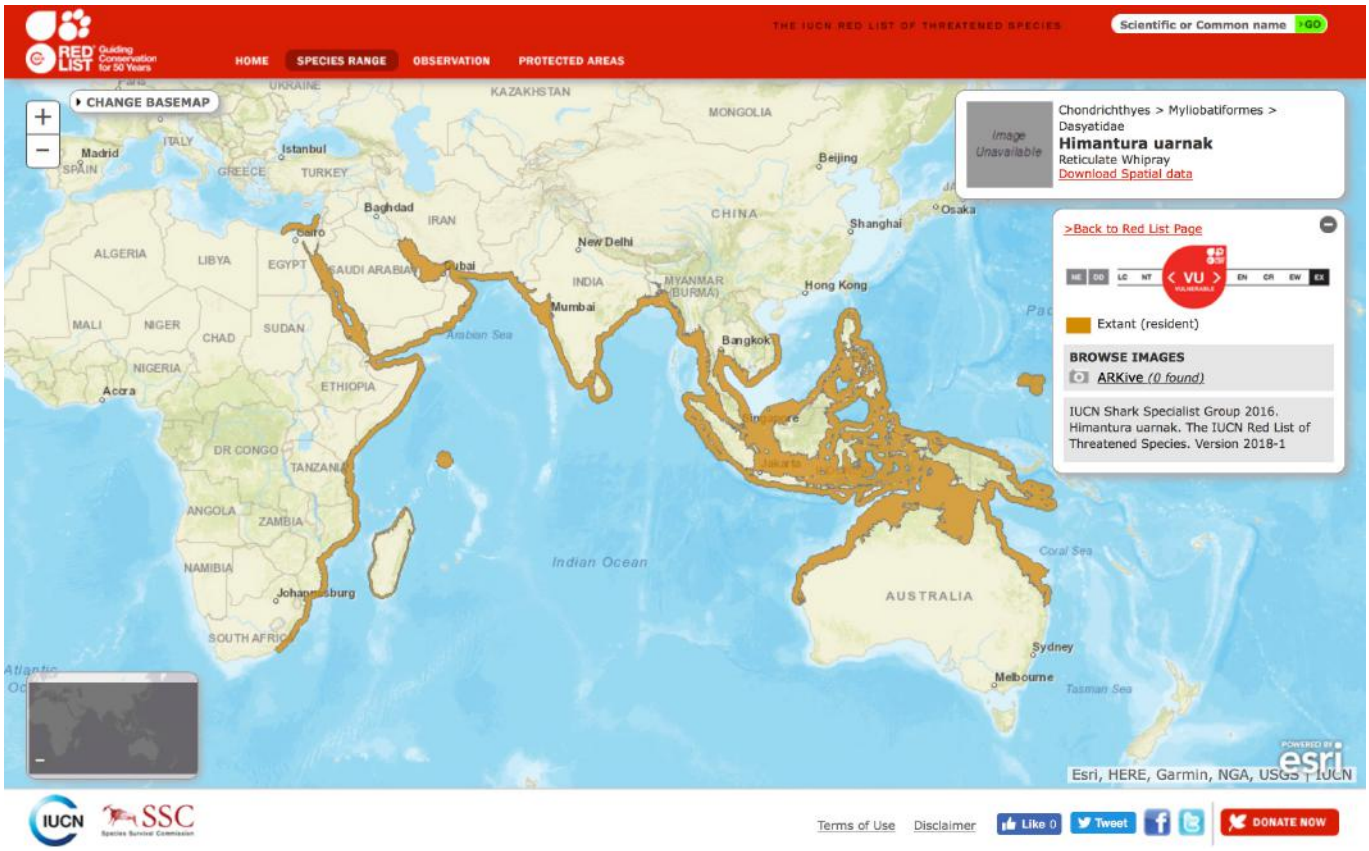
It is taken as a utilised bycatch of tangle/gill net, trawl net, and dropline fisheries throughout Southeast Asia and parts of the Indian Ocean where inshore fishing pressure is intense. The Reticulate Whipray faces many of the same threats as other Himantura species within its range, however, its large size at maturity and maximum size, low fecundity and preference for shallow waters (which are being heavily utilised and degraded in many parts of its range), suggest that it may be more vulnerable than some of its congeners. It is caught in particularly high numbers in the target fishery for rhynchobatids operating in the Arafura Sea.

Although no species-specific data are available, overall catches of stingrays are reported to be declining, with fishermen having to travel further and further to sustain catch levels. Aggregated time series data for rays also shows a steady decline from 1973-1994 in the Gulf of Thailand. This species' preference for inshore coastal waters means it is also threatened by extensive habitat degradation and destructive fishing practices throughout a large part of its range. Given the species' high levels of exploitation, extensive habitat degradation and its large size, significant population declines are inferred to have occurred and are likely to be ongoing in Southeast Asia and more widely in the Indian Ocean. Conversely, this species has refuge from fishing pressure in northern Australia, where fishing pressure is light, bycatch mitigation measures are in place and it is not commercially utilised and consequently is considered at low risk.

Given the continuation of high levels of exploitation throughout most its range where the species is caught in multiple types of fisheries, along with evidence for declines in catches of rays, the level of decline (>30% over the last three generations) and exploitation can be inferred from overall declines in fish catches in the region, as well as from habitat loss. The Leopard Whipray is assessed as Vulnerable globally based on inferred levels of decline and exploitation across a large part of its range, but is considered to be Least Concern in Australia.

Previously published Red List assessments: 2009 – Vulnerable (VU)

Range Description: The Reticulate Whipray is widespread in the Indo-West Pacific, from South Africa to northern Australia, including



the Red Sea, the Persian/Arabian Gulf, India, and Southeast Asia (north to at least the Philippines) (White et al. 2006; W. White and B.M. Manjaji-Matsumoto, pers. obs. 2007; Last and Stevens 2009). The species is thought to be a Lessepsian immigrant, having entered the Mediterranean Sea from the Red Sea through the Suez Canal (Serena 2005). In northern Australia, it occurs widely from Shark Bay in Western Australia to Brisbane in Queensland (Last and Stevens 2009).

Countries occurrence: Native: Australia (Northern Territory, Queensland, Western Australia); Bangladesh; Brunei Darussalam; Cambodia; Egypt; Eritrea; India; Indonesia; Iran, Islamic Republic of; Israel; Japan (Nansei-shoto); Kenya; Kuwait; Lebanon; Madagascar; Malaysia; Mozambique; Myanmar; Oman; Pakistan; Papua New Guinea (Papua New Guinea (main island group)); Philippines; Saudi Arabia; Somalia; South Africa; Sri Lanka; Sudan; Taiwan, Province of China; Tanzania, United Republic of; Thailand; United Arab Emirates; Yemen.

FAO Marine Fishing Areas: Introduced:
Indian Ocean – eastern; Indian Ocean – western; Mediterranean and Black Sea; Pacific – western central; Pacific – northwest.

Lower depth limit (metres): 45

Population: The Reticulate Whipray is uncommon throughout much of its range (B.M. Manjaji-Matsumoto, pers. obs. 2007), but appears to be common in parts of northern Australia (W. White., pers. obs. 2007).

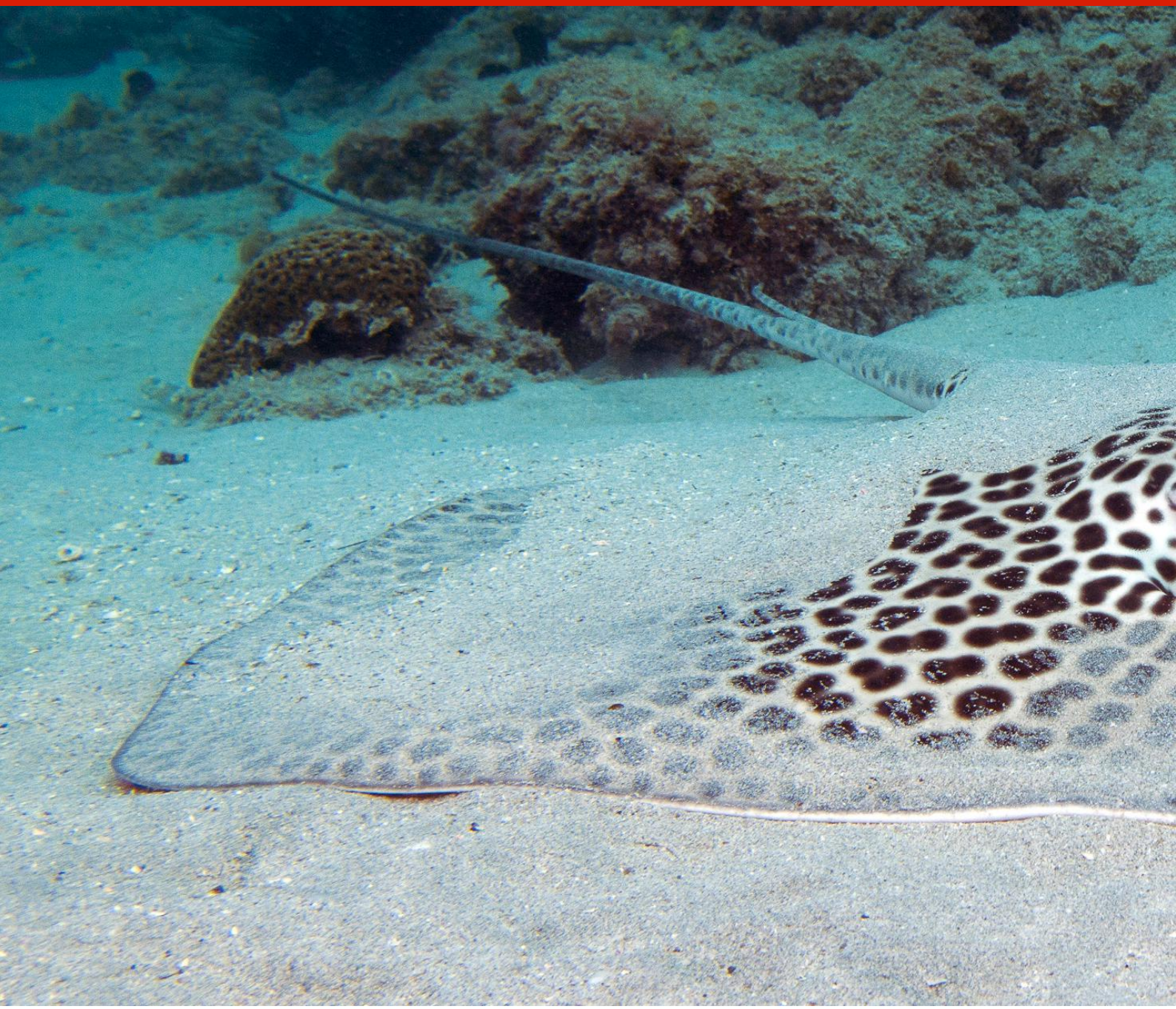
Globally, shark and ray landings have declined by at least 20% since 2003, but the Indo-Pacific is amongst the regions where this decline has been more severe (Dulvy et al. 2014). Catches of sharks and rays in Southeast Asia are very high but are declining and fishers are travelling much further from port in order to increase catches (Chen 1996). Net and trawl fisheries in Indonesia (especially the Java Sea) and elsewhere are very extensive and as a result, many shark and ray species are highly exploited and stocks of most species have declined by at least an order of magnitude (Blaber et al. 2009). Batoids are heavily exploited (White and Dharmadi 2007) and data sets from as early as 1963–1972 show the considerable decline in batoids in the Gulf of Thailand (Pauly 1979).

Trawl and gill net fisheries are also moving further afield. For example, in Jakarta the gillnet fishery at Muara Baru travels to waters around Kalimantan due to the decline in local populations (W.T. White, unpubl. data). While species-specific data on long-term declines in elasmobranchs in the Southeast Asian region are lacking, declines of the Reticulate Whipray in Southeast Asia and elsewhere in the Indo-West Pacific (including East Africa, Middle East, India) are inferred given the widespread historical and continuing declines of demersal fisheries in this region (Stobutzki et al. 2006). Furthermore, the extensive loss and degradation of habitats such as coastal mangroves are another key threat to coastal and inshore species; Southeast Asia has seen an estimated 30% reduction in mangrove area since 1980 (FAO 2007, Polidoro et al. 2010).

Current Population Trend: Decreasing

Habitat and Ecology: The Reticulate Whipray is often found off sandy beaches, in sandy areas of coral reefs, in shallow estuaries and lagoons, and may even enter freshwater (Vaudo and Heithaus 2009, Gutteridge 2012). This species also occurs offshore to depths of at least 50m (White et al. 2006). Tracking data for the Reticulate Whipray suggests that within sandy, shallow water areas, the species is a highly resident mesopredator, though the home range for individuals can be relatively restricted (Vaudo and Heithaus 2012). Reproduction is viviparous, with histotrophy. This species reaches 160 cm disc width (DW) (Last and Stevens 2009) (up to 450 cm total length in Compagno and Last 1998). Males mature at 82-84 cm DW and size at birth is 21-28 cm DW (Manjaji 2004, White et al. 2006, White and Dharmadi 2007). Fecundity is assumed to be low as a single pregnant female observed possessed two embryos (B.M. Manjaji-Matsumoto, pers. obs.).

As there is no information on this species' maximum age and age at maturity, generation length was inferred as 20 years based on data for the congener, the Blackspotted Whipray (*Himantura astra*). Female Blackspotted Whiprays are reported to have a maximum age of 29 years and an age at maturity of nine years (Jacobsen and Bennett 2011). These were used to calculate a generation length of 19 years based on the equation: generation length = (((29-9)/2)+9). The maximum size of the Reticulate Whipray is considerably larger (~160 cm DW) than that of the Blackspotted



Whipray (80 cm DW) so it is possible the generation length of the Leopard Whipray could be greater than 20 years.

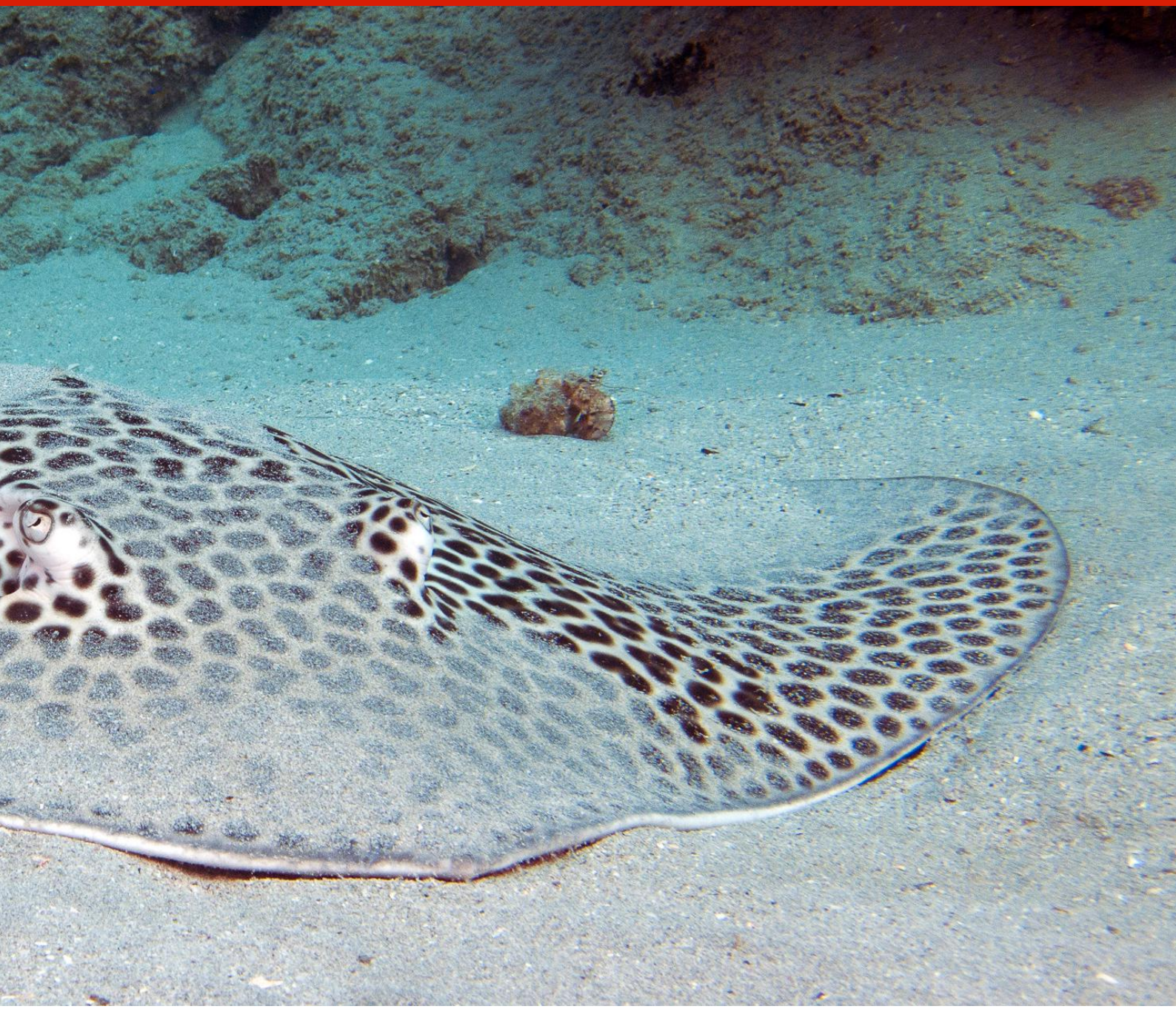
Systems: Marine

Generation Length (years): 20

Use and Trade: The flesh of the Reticulate Whipray is used fresh or salted and dried for human consumption (Last et al. 2010). In some areas, vertebrae are dried and exported, and the skin is dried and used for wallets, belts, shoes, handbags (high value) etc. most of which are exported (White et al. 2006).

Major Threat(s): The Reticulate Whipray faces many of the same threats as other Himantura species within its range, however, its large size at maturity, maximum size, and preference for shallow waters (which are being heavily utilised and degraded in many parts of its range), suggest that it may be more sensitive than some of its congeners (B.M. Manjaji-Matsumoto, Fahmi, W. White, pers. obs. 2007).

The inshore fishing pressure for the Reticulate Whipray is high throughout much of its range in Southeast Asia, and in this area, most bycatch by commercial fisheries (especially trawlers) are landed and sold as food fish (White et al. 2006, Last et al. 2010, Krajangdara 2014). In Indonesia, and probably throughout other areas of its range, this species is captured by demersal tangle net, bottom trawl, commercial gillnet and, to a lesser extent, longline fisheries (White et al. 2006). The Reticulate Whipray and other stingrays are an important retained bycatch of the commercial gillnet fishery in Indonesia that targets rhynchobatid rays in the Arafura Sea (Last and Compagno 1999; W. White, pers. obs. 2007). Catches in inshore waters have declined and these vessels are having to travel farther to sustain catches; the rhynchobatid fisheries are very intensive in this region, thus the level of exploitation is extremely high. Within Borneo, the species is an occasional capture in the demersal tangle net and bottom trawl fisheries (Last et al. 2010), and it has been observed from fish market surveys within Thailand (Krajangdara 2014). Its inshore distribution also overlaps with coastal artisanal and commercial fisheries throughout large areas of the Indian and western Pacific oceans. There is also evidence that fishermen in these regions increasingly illegally fish in Australian waters (Chen 1996, W. White, unpubl. data). In Sabah (Malaysia) and Indonesia, Himantura species are often caught and landed in the inshore fisheries (trawls and longlines) and are also taken by Danish seine fishing gear (M. Manjaji-Matsumoto and Fahmi, pers. obs. 2007). Within the artisanal gillnet fishery of the Daru region within Papua New Guinea, the Reticulate Whipray forms a component of the non-target catch within a fishery that predominantly targets barramundi (L. Baje, National Fisheries Authority PNG. pers. comm. 2015).



Demersal fishing pressure has increased in both effort and capacity in many areas of this species' inshore range during recent decades. For example, demersal resources in the Gulf of Thailand went from being lightly exploited to severely overexploited between 1973 and 1994 (Pauly et al. 2005). Available time series data for grouped biomass of 'rays' for this area and period applied to an ecosystem model for the area, suggested that this group was one of the most severely affected by the initial increase in fishing pressure, showing a steady declining trend (Pauly et al. 2005). Species-specific catch data are not collected, but aggregated landings data for 'Rays, stingrays, mantas, nei' are reported to FAO by some countries. Indonesian landings increased from ~10,000 t in 1975 to almost 60,000 t in 2003. Data are not available for India, but data for Pakistan show that landings increased to a peak of 53,000 t as early as 1982, after which landings dropped to ~10,000 t in 1983 and have not risen above 21,000 t since (FAO 2008).

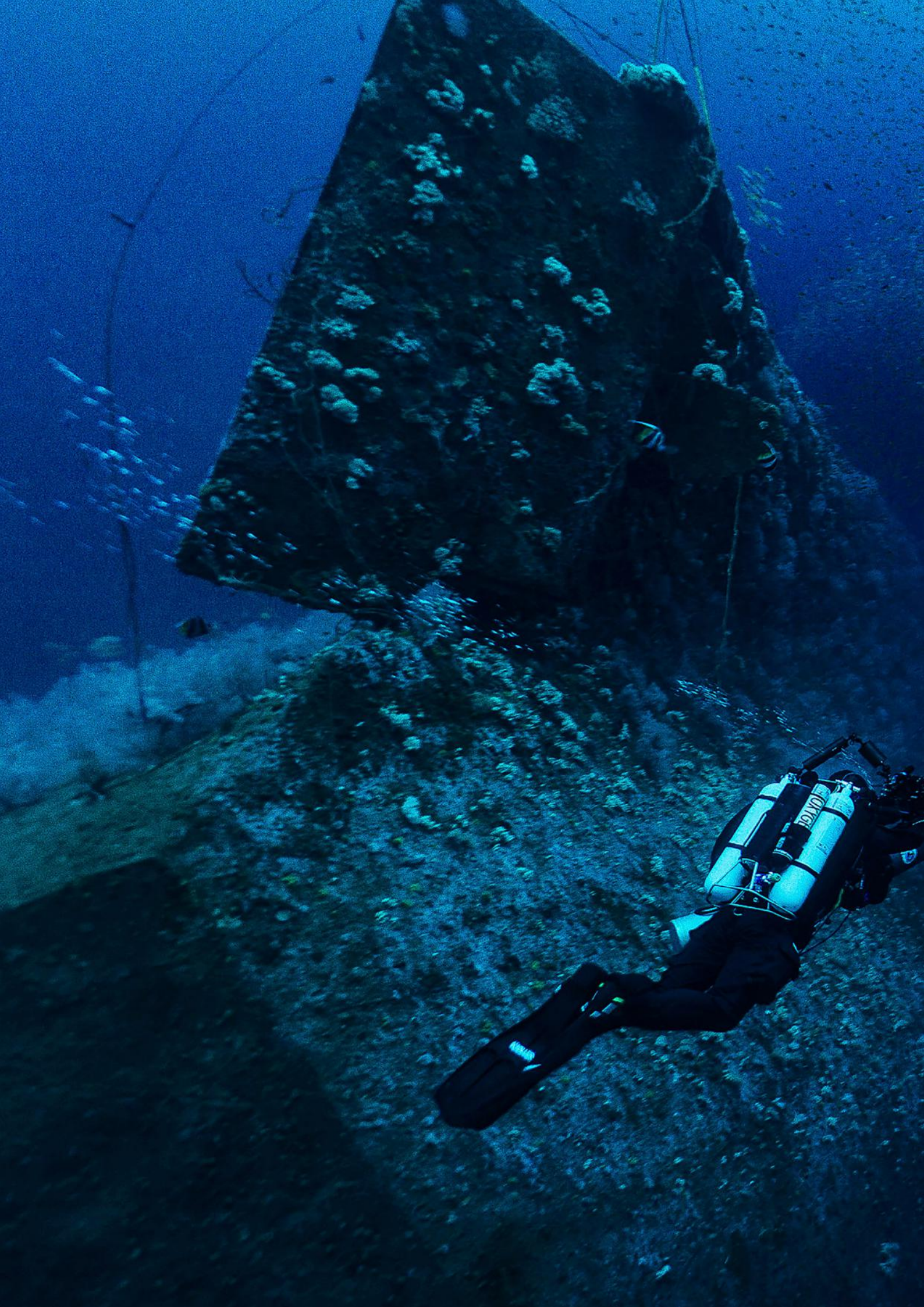
This species' preference for inshore waters, shallow estuaries and lagoons means it is also susceptible due to habitat degradation and loss of mangrove forest and seagrass areas. It may also be affected by destructive fishing practices and pollution. Extensive areas of mangrove forest have been lost in Indonesia and Malaysia through conversion of land for shrimp farms, excessive logging, urban development and, to a lesser extent, conversion of land to agriculture or salt pans (FAO 2007). Between 1980 and 2005 combined overall mangrove area in Indonesia and Malaysia was reduced by >30% (FAO 2007).

Within Australia, catch data for this species is relatively limited, though it is taken as bycatch in the Australian Northern Prawn Fishery. However, with the introduction of turtle exclusion devices (TEDs) and other exclusion devices in the fishery, the ray bycatch has declined by 36.6% and there has been significant reductions in the catch and associated mortality of large rays (Brewer et al. 2006).

Conservation Actions: There is no species-specific conservation measures in place. Further research is required on the species biology, as is assessment of catches throughout its range.

In Australia, the use of turtle exclusion devices (TEDs) in the Northern Prawn Fishery (NPF) has been compulsory since 2000 (Day 2000) and following their introduction, ray bycatch has reduced by 36.3% (Brewer et al. 2006). The presence of marine protected areas within Australian waters, such as Great Barrier Reef Marine Park and Shark Bay Marine Reserve, has reduced the potential for this species to be captured.

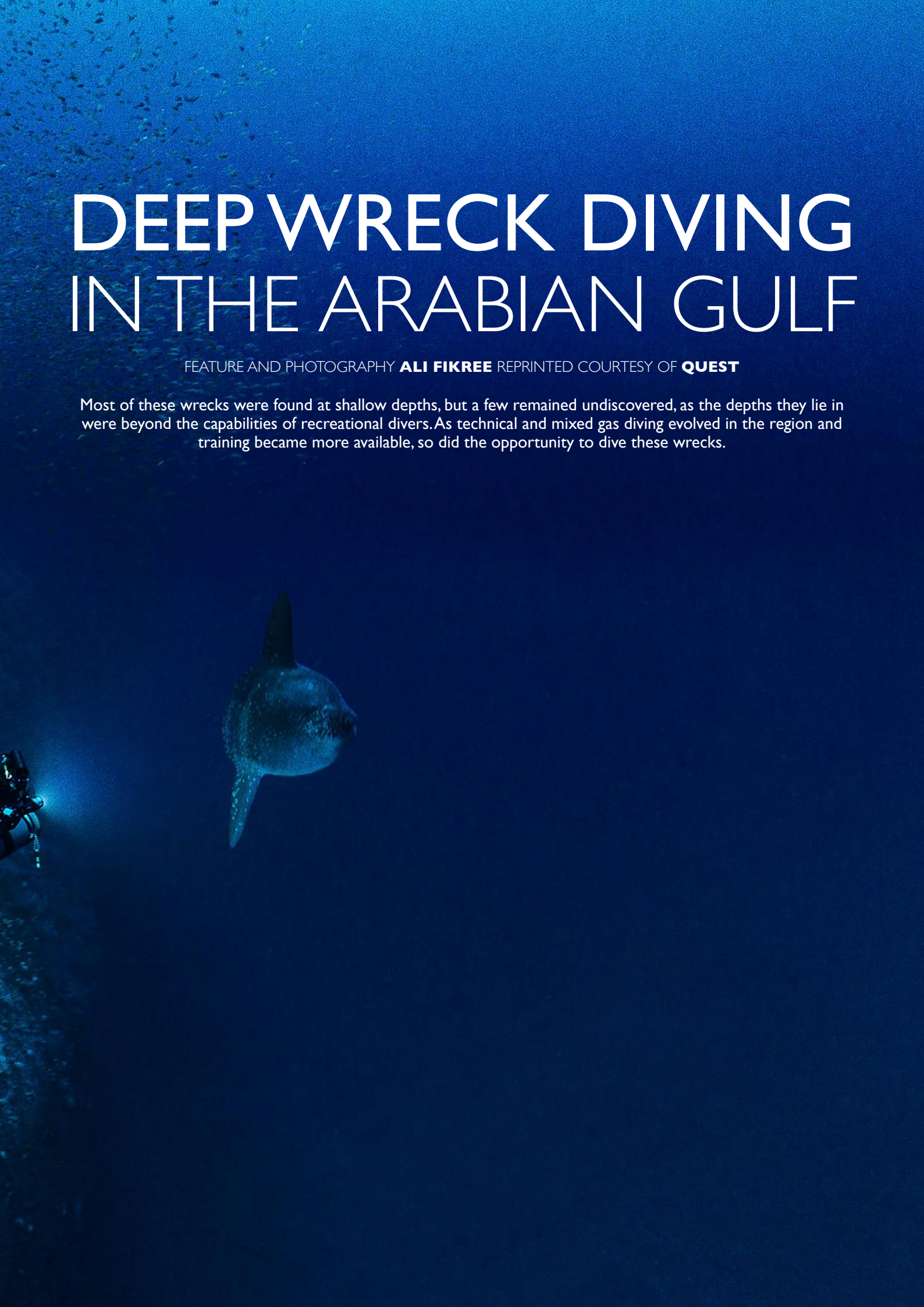
Citation: Manjaji Matsumoto, B.M., White, W.T. & Gutteridge, A.N. 2016. Himantura uarnak. The IUCN Red List of Threatened Species 2016. **www.iucnredlist.org**



DEEP WRECK DIVING IN THE ARABIAN GULF

FEATURE AND PHOTOGRAPHY **ALI FIKREE** REPRINTED COURTESY OF **QUEST**

Most of these wrecks were found at shallow depths, but a few remained undiscovered, as the depths they lie in were beyond the capabilities of recreational divers. As technical and mixed gas diving evolved in the region and training became more available, so did the opportunity to dive these wrecks.



Diving has always been a part of life in the Arabian Gulf, from freediving for pearls in antiquity to mixed gas deep wreck exploration in present day. A plethora of wrecks can be found in the region, ranging from ships from World War II (1938–1945) and the Iran-Iraq War (1990–1998) to modern day oil smuggling tankers.

Most of these wrecks were found at shallow depths, but a few remained undiscovered, as the depths they lie in were beyond the capabilities of recreational divers. As technical and mixed gas diving evolved in the region and training became more available, so did the opportunity to dive these wrecks. Locally available specialised gases, equipment, and training has enabled divers to safely explore deeper wrecks. Putting together a suitable exploration team and establishing a reliable base with proper boats and gas blending facilities took a while to set up. Even though a handful of trimix-capable divers were in the region, only a small number were skilled at working as an exploration dive team. With the formation of a proficient team, results soon followed.

THE INES

In 2000, members of the Desert Sports Diving Club discovered the wreck of the Ines. The tanker was completed in April 1967 by Brodogradilište "Jozo Lozovina-Mosor" in Trogir, Croatia. Her overall length was 112m, her beam extreme measured 15.8m, her moulded depth was 15.8m, and her draught measured 6.98m. She was owned by Imia Corp. Ltd and managed by Fairdeal Marine Services.

According to casualty records, the Ines sank on August 9, 1999, after suffering an explosion and catching fire while anchored 8 miles off Fujairah. Five crew were reported missing, two were injured, 22 rescued, and one confirmed dead. The vessel sank in 71m of water.

The Ines rests upside down with her propeller lying at 57m. She is remarkably intact except for where the explosion took place. When scootering around the vessel, much of the superstructure and other points of interest are visible. The Ines has several points of entry, but entering a wreck at such depths requires a lot of skill and patience. Every now and then, part of the wreck collapses and another door opens, offering more entry ways and exploration points.

The maximum achievable depth on this wreck is 73m, and most dives and decompression can be carried out within Tech 2 limits. Most of the wreck can be dived at 60m, but it is vital that divers are aware of the time spent at these depths; meticulous dive planning is required. During decompression, divers are usually greeted by red snapper, tuna, the occasional remora, and jellyfish. On the wreck itself, there is an abundance of marine life such as guitar sharks, rays, and groupers.

THE ANITA

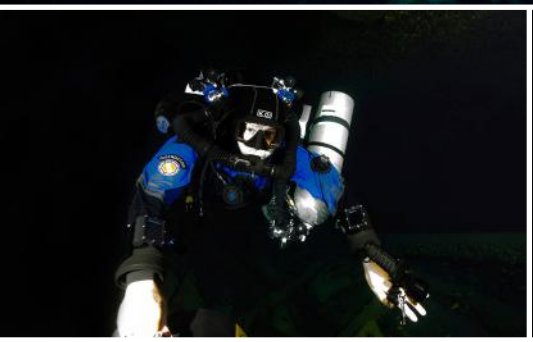
Another wreck, the Anita, rests a few miles off of Khorfakkan. The supply ship, completed in 1966 by Mangone Shipbuilding Co, Houston, experienced several name changes and owners. Constructed in the United States, she was originally named Midnight Star before becoming Tropical Service, Sheikh Sultan, and finally, the Anita.

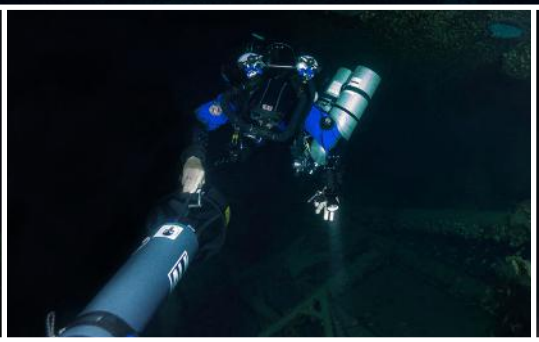
Anita's length was 47.71m, her beam molded measured 10.98m, her molded depth was 4.58m, and she had a draught of 3.85m. Her registered owner at the time of her sinking was the International Shipping Agency in Kuwait. She sailed under the UAE flag and was registered in Sharjah.

According to casualty records, as she was en route to Fujairah Anchorage, the Anita struck a mine and sank in the Gulf of Oman at 0900 hours on August 15, 1987. One crew member was reported dead and five sailors were deemed missing. Additional information such as deck plans and schematics have proven to be difficult to locate.

The Anita sits upright. Her shallowest part rests at 81m while her deepest portion lies on the seabed at 92m. Given the depth, this wreck requires divers to be very experienced with mixed gas diving and decompression. The wreck itself is not big and can be swum around easily, but using a scooter enables divers to see a lot more of the wreck, including some of the damage caused when she hit a mine. Most of the superstructure is intact, but there are signs of deterioration.

A large portion of the deck has yet to be explored, and there is always something new





to be found. Given the depth, exploration and penetration require a lot of skill, planning, and patience. Having a good support crew and support divers are crucial for a dive like this.

While diving the wreck, it's common to encounter a surprised look from its local inhabitants, mostly bat fish and the rare grouper and tuna. Closer to winter, lionfish can usually be found, as can rays and barracuda.

It is worth noting the urban legend circulating within the dive community that claims there is a mine a few metres in front of the bow that was subsequently covered by a stainless-steel cage. Commercial divers allegedly installed the protective cage after she sank. The cage and mine have yet to be discovered.

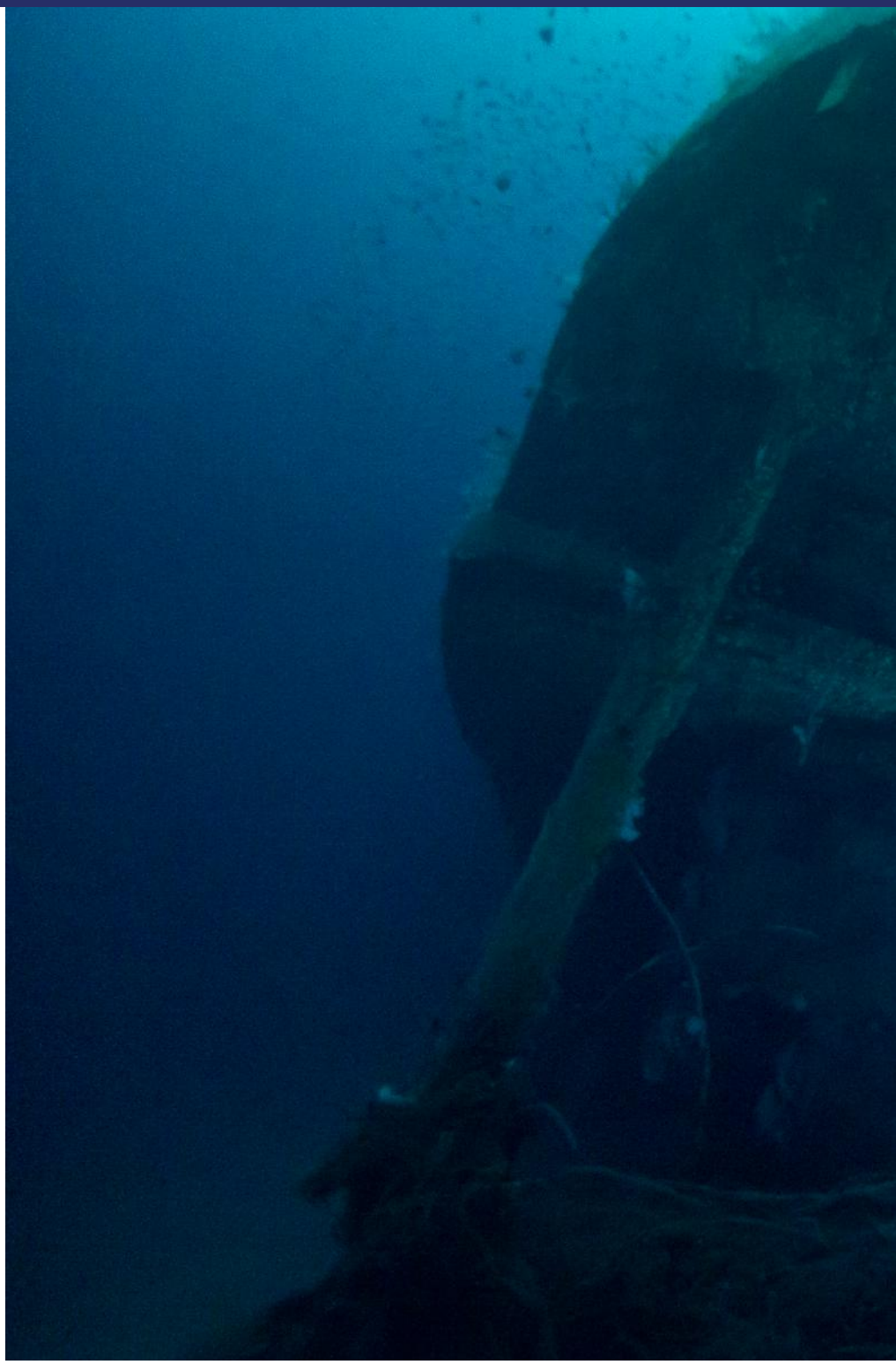
THE ENERGY DETERMINATION

Very few wrecks have been awarded the title of "The Mount Everest of Shipwrecks," but the Energy Determination is one of them; her wreck has successfully held that title since she was first discovered and dived in the 1990s. The Energy Determination was a ULCC (Ultra Large Crude Carrier) and measured 351m long and 55m wide. She had a gross tonnage of 153,479 tons, and her last known flag was Liberian. With dimensions like these, it is difficult to imagine a chunk of steel that size sitting on the seabed. Her construction and fit out was completed in 1976 by Germany's most prestigious ship building company, Bremer Vulcan (1893-1997) in Bremen.

On November 5, 1979, the Energy Determination left Bonaire (Netherlands Antilles) in ballast for Das Island in the Arabian Gulf. While steaming through the Straits of Hormuz on December 13, she suffered a violent explosion that engulfed most of the deck in flames and caused her to start listing. As she posed a great risk to other vessels in an active shipping lane, attempts were made to tow her out, but while under tow, she began to list even more, and the main superstructure began to collapse.

Unfortunately, the damage was too severe for the ship and on December 15, she broke in two. The stern section that held the accommodations and the engine room sank. The forward section was towed to Dubai where it remained anchored in Jebel Ali Port (now known as Jebel Ali Free Zone Authority) for about two years before being sold sometime around March 1982 to a ship scrapyard in South Korea. At the time of sinking, the Energy Determination cost the insurers, Lloyds of London, a staggering £28 million (British Sterling Pounds), which during that era, was the largest ever insurance undertaking for a ship.

These are only three examples of wrecks that lay in the waters of the Arabian Gulf. But with a rich maritime history, this region is an opportune locale for wreck explorers.



ALI FIKREE

Ali first started diving back in 1995 and underwent his GUE Fundamentals training in 2005.

He is the first UAE National to train under GUE and become a GUE Fundamentals Instructor.

Having trained all the way through to Tech 2, Cave 2, RB80, and JJCCR, Ali is an active wreck explorer and cave diver, and currently working on developing GUE UAE with training and wreck exploration projects.

MY BUDDY
THE 3D VIDEOGRAPHER

FEATURE **PATRICK VAN HOESERLANDE**

Diving is a hobby with various possibilities. There are plenty of good incentives to take your gear and get underwater. In this new series titled 'My buddy', I'm in search of diving enthusiasts who spend their limited time underwater for a special and specific reason.

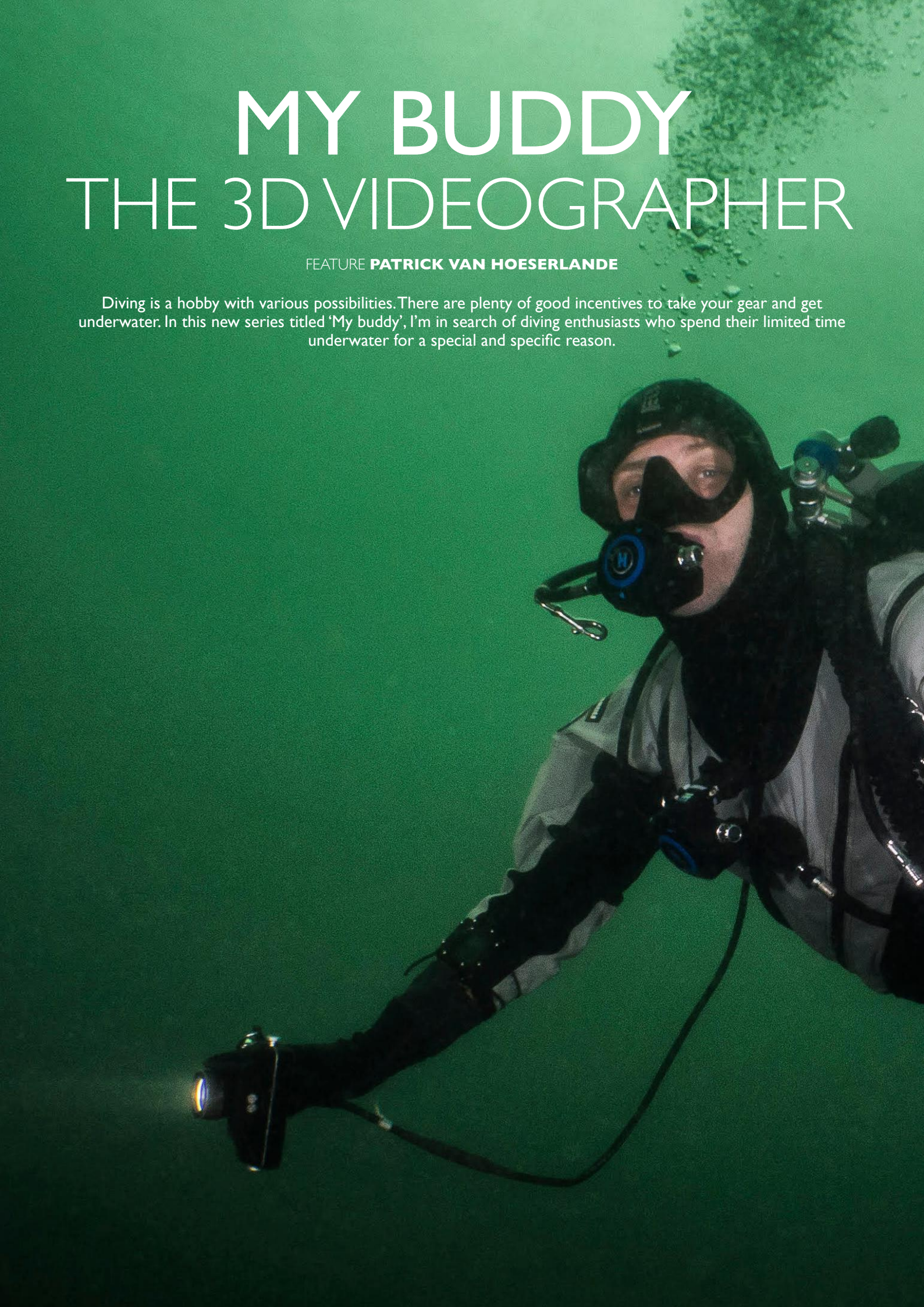


Photo by Laurent Miroult

Photo by Filip Staes – The Buddies

"My buddy" for today, Ben van Asselt, combines underwater filming with his passion for wreck diving. One would expect that we would meet somewhere near a slipway. I thought perhaps a rendezvous in a small harbour with a sea view, but instead we met on the almost empty parking lot of the Put van Ekeren (see June's issue for the first 'My Buddy' article of the series with more information about this lake). Together we were to look for the underwater statue, 'The Buddies' to make a short 3D film of it. So, what is the connection between our dive in fresh water and Ben's dives in the North Sea?

I'm the first one to arrive at our meeting point. This was not a lucky shot because I had planned to arrive early to get the chance to prepare my material before Ben showed up. It is much easier to interview someone and take photos when you don't have to prepare your diving equipment. After he arrived, I took advantage of my extra time to take a closer look into his dive box. In this neatly arranged box I discovered a big camera, a heavy video light and all sorts of items that come in handy for wreck diving in the rough North Sea. The size of his fins indicated a slow diver, which for me is great!!

Why are we going to film 'The Buddies' in 3D? I have to admit that the name of the artwork fits perfectly with the title of this series of articles, but that is not the reason. Modelling objects by creating a three-dimensional video makes research without being underwater possible. By means of 3D video, maritime archaeologists can investigate wrecks without worrying about air consumption and decompression stops. They don't even have to know how to dive. For diver-scientists this approach is nothing to get excited about, but for the less water loving people, it's a welcome alternative. An additional advantage is that the wreck itself will be not touched, nor damaged.

Such a model can be viewed from all sides and everything can be neatly measured in the dry and safe environment of an office. The better the cameraman masters the technique of 3D filming, the more efficient a video team can work at depth. My buddy Ben, has had the idea to make cinematographic 3D models of all the statues in the lake. Filming the statues serves as practice for the bigger task to later model wrecks in the sea.

This kind of underwater filming differs a bit from normal procedures. Of course you have to film the object from all sides, but unlike other video work, you have to expose the object to light abundantly. After all, the aim is not to record the perfect shot but make sharp images of all the details.

The real work obviously follows after the underwater session. Even more so than when producing a film, the biggest part of the work is done behind a computer screen in a dry environment. Specialised software takes many frames from the raw film footage and combines these with pure calculating power to an initial coarse 3D model. The videographer manually corrects the virtual representation, after which the computer refines the model in a second calculation session. Again, manual correction and automated refining. This cycle continues until the levels of detail are sufficient for the purpose of the model.

I'm not interested in the dry stuff however, because we were dressed up for the wet part of the job. While Ben handled the camera, I was to take care of illuminating the statue for him. After a quick buddy check, we started our slow but progressive search for the statue while checking our video equipment was properly sealed.

We collided with the three-headed statue on our first attempt – the statue is a group of three heads looking up symbolising a disabled diver with two buddies.

The visibility was ideal. Carefully circling around the artwork, we stripped the pedestal of moss and other vegetation. This flora, unlike the life fixed on the statue, was a figurant that would only get in the way. We kept our movements short and slow as to not stir up any silt. The bright video light would light up dust particles like snowflakes in head lights. Silt would add a long break to our dive and we needed to avoid that.

Photo by Filip Staes

After the cleaning job, we swam away from the statue to manoeuvre ourselves in our starting position. From there we carefully approached the statue side by side. The camera rolled while Ben circled the heads in a very controlled manner, and I mirrored his movements from 20 centimetres at his side. I know from my previous dives that my feet are slightly positively buoyant and so it turned out to be a very concentrated 6 minute session of underwater ballet, constantly fighting against my fins.

After the first take, we went back to our starting point for the second round of the statue. This time I had to illuminate from the top so that the shadows would become smaller and the details more visible. It was a 'quicker tour' of just 3 minutes.

Having successfully completed our assignment, we got to spend the rest of our air on enjoying the underwater life around us. The dive was just as I like them: at ease. A little more than an hour after our initial immersion, we surfaced.

While we put our equipment away, we debriefed and talked about old and new projects. Ben informed me of a new project in the pipeline, but of which he could not yet disclose anything. There are definitely some exciting times ahead.

Thank you Ben for getting me acquainted with three-dimensional underwater filming. This was just one of the many facets of our hobby that I had planned to discover.

To see the 3D result from our dive, go to: **www.sketchfab.com/benvanasselt**

Do you know anyone who has a unique dive mission and wants to be my buddy on one of these dives? Or are you such a diver?

Then please get in touch with me by email: **patrick.vanhoeserlande@nelos.be.**

Diver: Ben van Asselt
First Dive: 2008
Total Dives: 760
Club: Amphora
Certification: 3 Star Diver
Specialities:

- GUE Tech I
- GUE DPV
- GUE 3D

Equipment: Light and Motion Stingray camera housing and video lights.
Favourite Dive Site Local Waters: 'Westhinder' wreck in the North Sea.
Favourite Dive Site Abroad: Rosarol, Croatia
Most Spectacular Dive: A dive on a wreck with lots of fish in Croatia. We recuperated all kinds of diving equipment (stages/regulators) and re-oriented the entire wreck. A German diver had tried it a year ago, but had not succeed.

SHARK DIVING IN THE GRAND BAHAMAS

MEET CRISTINA – DIVING WITH SHARKS FOR THE LAST 22 YEARS

FEATURE **NICO DE CORATO** AND **CINZIA VERZERI**
PHOTOGRAPHY **CINZIA VERZERI** AND **CRISTINA ZENATO**

Cristina Zenato has been diving with sharks for the last twenty-two years. Her field knowledge about sharks has been utilised by scientists, filmmakers and people interested in learning about sharks, the world they live in and how to protect them.


NEPTUNIC

Shark dives are becoming more and more popular in the scuba diving world. It has always been a dream of mine to dive with sharks, and the dream started to come true when I took the PADI Shark Dive course at the Dubai Aquarium in the Dubai Mall. I wrote an article about that for this magazine some years ago. I did the same in Melbourne as well as some other places, but I only saw my first shark in open water just a few months ago: a reef shark in Khorfakkan; can you imagine my emotion?

The dream has not yet become a 100% reality though, because I'm still dreaming about "real sharks". I mean – not a single shark, spotted metres away from me just for a second – I want to get some time for myself to travel wherever I can have a full on experience with sharks in open water. In the meantime, I never miss a chance to watch documentaries on TV and YouTube; that's how I virtually met Cristina Zenato and "her children".

Just a few days after watching a documentary on Cristina, I got a phone call from Cinzia, a dear friend and colleague of mine at the Bergamo Scuba Angels (the heli rescue divers organisation I belong to). Cinzia was so excited to tell me she was about to leave for a short holiday to the Bahamas and that she had booked a 3-day course with Cristina. What an incredible coincidence! I immediately remembered another incredible coincidence, when I had watched Joel Lambert's documentary about the great white shark during an Emirates flight coming back to Dubai. I had contacted him, and he replied back within a few hours telling me he had a stopover in Dubai the day after before heading to Africa, so we managed to arrange an interview.

I tried to organise my agenda to join Cinzia with unfortunately no such luck, but I was in touch with her everyday during this beautiful experience, looking forward to her daily feedback. I anticipated her photos at the end of each day and to learn of her experiences and the emotions she encountered. She was always full of esteem and so grateful for Cristina and her job.

'It was an unforgettable dive… she helped me with the steel sharksuit, how to get it on and take it off… everything is so different over there… I have no words to describe what I experienced today…'

These are just a few of the phrases Cinzia sent me during those days. My favourite is:

'Today I learned a new verb I did not know about before – To SHARK!'

In life you need to collect moments and not "things". I'm sure Cinzia will never forget those really special ones, and I can't wait to meet Cristina and her sharks in person myself one day.

DIVING WITH CRISTINA AND WITH THE SHARKS OF COURSE!

Cristina Zenato has been diving with sharks for the last twenty-two years. Her field knowledge about sharks has been utilised by scientists, filmmakers and people interested in learning about sharks, the world they live in and how to protect them.

Her day to day work is with the Caribbean Reef Sharks in the Bahamas, but she has travelled the world, worked with and experienced twelve different species of sharks.

As a professional shark diver, Cristina can perform as a safety diver for talent and in water crew during video and image productions. Her knowledge of shark behaviour will allow production to obtain the best results in the sharks' presence and reduce risk factors, delivering consistency and highly increasing the chances of success.

THE SHARK HANDLING COURSE

A pioneer in the shark-handling course, Cristina offers a three-day, one on one training course for those divers interested in experiencing how it feels to feed, pet and be surrounded by Caribbean Reef Sharks.

DAY 1: Cristina will start her course on the first day with a morning session about shark biology, behaviour, and reaction to food; together you will discuss shark handling, procedures and learn about shark conservation.

Following the morning classroom, you will complete an observation dive during which you will watch Cristina interact with the sharks and apply the information discussed during the morning. This dive is open to certified friends and family as it is an observation dive. Ask Cristina how to book the additional divers.

DAY DURATION: 8:30am through 4:30pm.

DAY 2 AND 3: You will complete two training dives per day while wearing the chainmail suit under Cristina's direct supervision. The basics of feeding, handling and petting will be presented during the dives.

A videographer will collect all the special moments and deliver a final DVD product of your experience. No observers are allowed during the training dives for safety reasons.

DAY DURATION: 8:30am-2:00pm.

NOTE: This course is shark and location specific. It is built as a personal experience and does not constitute a training course for people interested in becoming a professional shark feeder or in creating a shark dive for guests.

EXPLORATION, EDUCATION, CONSERVATION

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Facebook: @czunderwater
Twitter: @CristinaZenato
Instagram: cristinazenato
Vimeo: Cristina Zenato

Cristina Zenato and Cinzia before a dive.

ABOUT NICO DE CORATO

A blogger, marathon runner, triathlete, divemaster and heli rescue swimmer with Bergamo Scuba Angels.

You can visit my website at **www.dubaiblognetwork.com**, contact me on social networks, or email me at **admin@dubaiblognetwork.com** for information about my articles or just to say hello.

RESTORATION. EDUCATION. SCIENCE.
THE CORAL RESTORATION FOUNDATION

FEATURE **DOUG SIMPSON** PHOTOGRAPHY **CORAL RESTORATION FOUNDATION™**

There is a great need for CRF and agencies like them throughout all regions of the globe. It is my hope that local communities of divers and non-divers together will volunteer their time, talents, and funds to ensure their coral reefs are restored and renewed for generations to come.

Photo by Zach Ransom Coral Restoration Foundation™. Divers at work in the CRF Coral Tree Nursery.


Lydia giving a demonstration.

Coral reefs are in trouble, and the Coral Restoration Foundation (CRF) is working hard to save them. Across the globe more than 25% of our coral reefs have died in the last several decades. The Florida Reef tract alone has lost 90% of its staghorn and elkhorn coral in that time. If current trends continue, in 30 years, more than 75% of all surviving reefs globally will perish.

The Coral Restoration Foundation is a non-profit marine conservation organisation headquartered in Key Largo, Florida, USA. They are world-renowned leaders in cultivating, growing, and replenishing ("outplanting" is the term they use) coral in Florida and globally. They manage the world's largest ark and database of coral genotypes. Restoration. Education. Science. These are at the core of the Coral Restoration Foundation mission. It is an important and critical mission.

WHY ARE CORAL REEFS IMPORTANT?

"Coral ecosystems are a source of food for millions; they protect coastlines from storms and erosion; they provide habitat, spawning and nursery grounds for economically important fish species; they provide jobs and income to local economies from fishing, recreation, and tourism; they are a source of new medicines, and are hotspots of marine biodiversity." – The US National Oceanic and Atmospheric Administration (NOAA)

WHY ARE OUR REEFS DYING?

A combination of factors are contributing to this. Warmer ocean temperatures for prolonged periods, acidification, desalinisation plants, overfishing, pollution (including agricultural run-off that causes high algae growth), and poorly managed coastal development.

Clearly our reefs need help. Through scientific research collaborations with governments, non-governmental organisations (NGOs), and international researchers, universities, and scientists, developing education and volunteer programmes, and large coral growth and outplanting efforts, CRF and groups like it across the world are rising to the challenge. There is hope.

As divers we are also part of that hope. We don't have to sit back and just observe coral destruction, but we can take an active part in its regrowth and restoration, and have fun while doing so!

For those seeking to make an immediate positive change, the most accessible and successful volunteer opportunities the Coral Restoration Foundation offers are its coral growth nurseries and outplanting programmes. This success did not happen by chance. CRF was founded in 2007 and has since planted over 66,000 endangered staghorn and elkhorn corals, which are now spawning every year. Their research "tracks how different coral genotypes (and their associated microbes and symbionts) correlate with growth and condition, and the success of different outplant methodologies". There is no doubt CRF research and operations teams have achieved a world class level of quality, expertise, and success in coral growth and restoration.

CRF staff members carefully select coral samples from existing healthy reefs in the ocean, build specialised Coral Trees for optimum coral arrangement, and attach these trees to the ocean floor in such a way that when combined with the method used to affix the coral to the tree, photosynthesis is greatly increased and the growth rate can be up to 500% higher than the coral could otherwise do on its own. CRF teams monitor growth and health throughout the entire process, including the rare (one night a year only) and difficult-to-observe coral spawning. At every stage CRF meticulously captures and logs data such as the location where the sample is taken, the temperature and depth of water, and date and time. The same is done months later when CRF removes the coral from the trees and relocates it to a designated area for outplanting and continued monitoring for growth and health. The end result is a robust and reliable restoration programme that makes possible a fun and rewarding opportunity for the volunteers!

So, I decide to "dive in". After contacting CRF to set up a time to volunteer, my children (aged 19 and 21) and I make the 2.5 hour drive from our home for the week in Boca Raton, Florida to Key Largo. We are in the classroom at 0900 for an awareness and educational session that includes videos, before and after

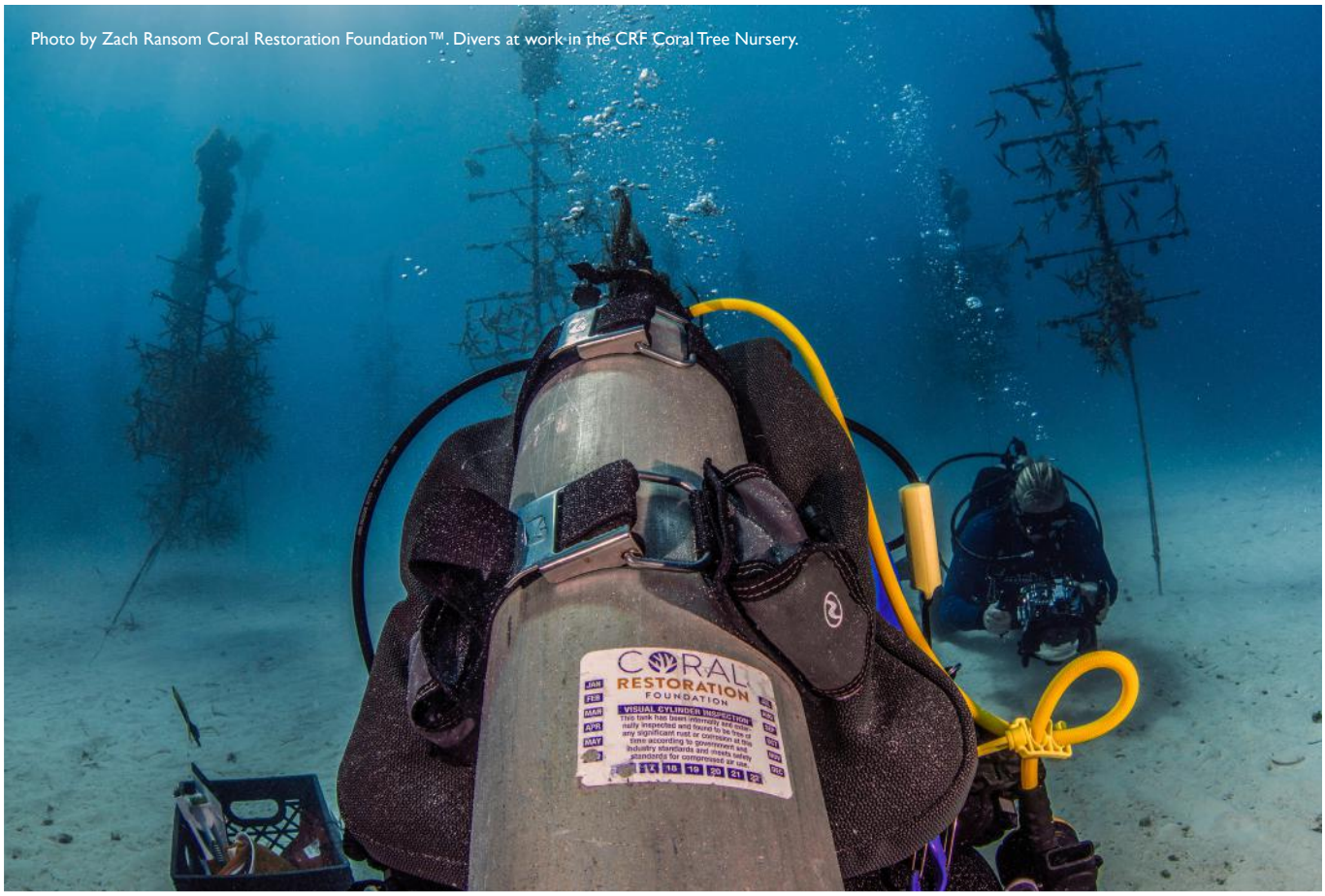

Photo by Zach Ransom Coral Restoration Foundation™. Divers at work in the CRF Coral Tree Nursery.

Photo by Zach Ransom Coral Restoration Foundation™. Staghorn Thicket.

Photos below by Alex Neufled. A healthy elkhorn thicket.

pictures, statistics, questions and answers, and hands-on training simulation using the tools and techniques required to clean the Coral Trees and outplant the coral samples. After completing the classroom session we have a clear understanding that our coral reefs are in trouble and need our help.

After a five-minute trip to the boat dock, we check-in with the dive operator, setup our gear, and receive a boat safety briefing. The boat reaches the nursery in about 20 minutes.

We are assigned buddy teams, given a detailed dive briefing, including a quick recap of the tools (brushes and chisels) and techniques for the tasks we will perform, and then we are in the water with the other teams in the group ready to descend.

The first of our two dives is to remove the algae and fire coral from the Coral Trees that rest just 6-8m below the surface. We learned from our classroom session that the height of these trees is adjusted seasonally to obtain the range of temperature and sunlight for optimal coral growth. The volume and scale of the nursery is impressive. The visibility was great and we could see about 50 trees. This was just one of the seven nurseries containing a total of 500 Coral Trees with nearly 20,000 pieces of coral.

CRF staff distribute a cleaning tool to each team member and assign each team to a different tree. It takes about 30 minutes for a team of two to three to clean one tree depending on the amount of algae and fire coral present.

The excellent classroom training enables each of us to perform our tasks effectively and efficiently. Proper buoyancy control is critical to this process, as are gloves and a long sleeve rash guard (to avoid contact with the fire coral!).

My daughter had just obtained her OW certification the previous day, so I am pleasantly surprised (and relieved!) with her ability to maintain neutral buoyancy while task loading.

As the teams are working, CRF staff identify and collect the coral samples that we will outplant on our next dive. Throughout the dive a divemaster moves from team to team constantly monitoring each person's air consumption. It seems like we've only been down for a few minutes when CRF staff signal to each group to stop work and then collect our tools.

After our surface interval we are back in the water for the second dive. The captain hands the crate of coral to a CRF staff member and we make our way to one of the eight designated outplant reef sites along the Florida Reef Tract. You immediately notice the lack of coral in this area. It is all dead. But then you come upon small groups of thriving coral. These have identification tags and are recent outplanting efforts. There is new growth! I catch myself thinking, 'This actually works… with enough volunteers, communities can quickly achieve massive scale and volume to restore dying or dead coral reefs.'

We then arrive at our outplanting site. It's a barren section of sandstone that once hosted large coral populations. One CRF staff member positions each team at a specific area while another lays out six palm-sized pieces of staghorn coral in front of each team. Each team is also provided with a hammer chisel. This tool is used to create a surface area on the sandstone that is free of algae and contains rough edges that ensure a strong bond between the sandstone and the marine

epoxy that is used to permanently attach the coral to its base.

After I clear a few areas, a CRF staff member comes by to mix and activate the marine epoxy (yes, underwater) and hands my son what looks like a big piece of pink bubble gum. Again, as previously practiced in the classroom, my son applies the epoxy to the rock, pushes a piece of coral into the epoxy, and then applies the "current" test where you wave your hand vigorously through the water near the coral, creating a strong surge, to ensure the coral will not be pulled out of the epoxy before it is able to harden. It takes about an hour for the epoxy to set. Over the next year the coral will grow over the epoxy to create a much larger attachment area.

Seeing that piece of coral permanently set proved to be more profound and emotional than I could have imagined. In addition to a great feeling of hope, I also feel an overwhelming sense of family legacy and tradition. For years on end, long after I am gone, my son can always come back to this location with his children and grandchildren and show them what we did together. And if the world can learn to take better care of our oceans, just maybe their children and grandchildren can come back to that same place and see an endless array of coral and be reminded that this is a result of their grandfather and great grandfather volunteering just a few hours of their time just a few weekends a month.

There is a great need for CRF and agencies like them throughout all regions of the globe. It is my hope that local communities of divers and non-divers together will volunteer their time, talents, and funds to ensure their coral reefs are restored and renewed for generations to come.

There are opportunities both below and above the water. It can be as simple as divers achieving speciality certifications such as Peak Performance Buoyancy and Coral Restoration. Snorkellers and non-divers can avoid touching or taking pieces of coral for souvenirs. Everyone can stop using sunscreen that contains Oxybenzone (kills coral larva). If you don't have a restoration programme like CRF in your area, contact your local university or diving association and start the conversation. Reach out to the Coral Restoration Foundation for guidance and recommendations. Also, please consider making a donation to CRF or your local restoration agency.

CORAL RESTORATION FOUNDATION™

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THE MARINE SANCTUARY OF CAGAYANCILLO, PHILIPPINES

FEATURE AND PHOTOGRAPHY **GONZALO ARAUJO**

The municipality of Cagayancillo, and its waters, was recently declared the largest MPA in the Philippines, spanning approximately one million hectares, and it comprises various multiple-use zones, with strict no-take zones in place, whilst other areas are being studied for regulated resource use (e.g. gear restrictions to hook and line only or closure during spawning events of certain species). Finding a balance for sustainable fishing is essential to ensure the future of the islands, its marine ecosystem and its inhabitants.

L-R: Navorca vessel in Cagayancillo, photo by Sally Snow and Arena, photo by Gonzalo Araujo.

Cagayancillo: the Philippines largest Marine Protected Area has opened its waters for divers, but what do we know about this million-hectare park and the secrets that lie beneath the surface?

I didn't know what to expect in Cagayancillo, as we left Puerto Princesa City in Palawan, Philippines. I remember looking at a map of the Sulu Sea years ago and wondering what could one possibly expect in those remote islands in the middle? I knew that Tubbataha Reefs Natural Park was a great place to encounter tiger and other sharks, as well as abundant sea life, but what about those neighbouring islands? Surely they must hold similar underwater treasures. I wasn't far off.

We left Puerto Princesa on board the M/Y Navorca, a research vessel from WWF-Philippines, en route to the remote archipelagic municipality of Cagayancillo, on a shark and ray expedition, and to assess the area for tourism, with Large Marine Vertebrates Research Institute Philippines (LAMAVE) and WWF-Philippines. We (LAMAVE) had conducted some preliminary work around the islands using remote-underwater video surveys in 2016, so I knew that megafauna was around, but would we be able to see any? What would the reefs be like? The visibility? What about the locals that inhabit the islands? I was both excited and a little worried as the anticlimax of high expectations can be brutal. So I decided to forget all about what I knew of this newly established, 1 million-hectare marine protected area (MPA), and see what it brought to us instead, a technique I discovered works well when interacting with wildlife. After all, the unpredictable encounters are the best ones.

SO, WHERE IS CAGAYANCILLO EXACTLY?

Cagayancillo is an archipelagic municipality in the northeastern Sulu Sea, 270 km east of Puerto Princesa City, Palawan, and about 130 km west of Sipalay, Negros Occidental. The municipality is made up of 31 islands and covers a land area of a mere 26.4 km^2. The main island of Cagayancillo extends about 12 km southwest to northeast covering seagrass, mangrove, shallow and deep reef habitats. The island is within close proximity to deep-water, exceeding 4,000 m and reaching temperatures of < 10°C relatively close to shore. These unique geographical characteristics make Cagayancillo a unique place where little levels of exploitation have been observed, and where reef-associated species have flourished. It is also a passing point for migratory species such as whale sharks and manta rays that use the broader Sulu Sea and adjacent areas.

THE PEOPLE OF THE ISLANDS

Over 6,000 people live on these islands, whose main source of livelihood is fishing and seaweed farming. Sustainable livelihood practices have been encouraged, and the ongoing work by NGOs and a proactive local government is yielding benefits for the local communities. The municipality of Cagayancillo, and its waters, was recently declared the largest MPA in the Philippines, spanning approximately one million hectares, and it comprises various multiple-use zones, with strict no-take zones in place, whilst other areas are being studied for regulated resource use (e.g. gear restrictions to hook and line only or closure during spawning events of certain species). Finding a balance for sustainable fishing is essential to ensure the future of the islands, its marine ecosystem and its inhabitants.

DIVING

As we approached the outermost island, Arena, I couldn't contain my excitement. We'd been travelling for over 12 hours and now, as the sun rose to the East, we could see the shape of a reef breaking the water's surface, and beyond a watch tower.

Are people there? As we moved closer I could see the extent of the seaweed farm lines in the lagoon of the atoll, and the currents going wild along the edges of the reef. Arena hosts seasonal settlements during the summer months that primarily farm seaweed in the lagoon and also opportunistically fish around the atoll.

Our preliminary work with LAMAVE in collaboration with WWF-Philippines, the municipality of Cagayancillo and the Palawan Council for Sustainable Development (PCSD), highlighted an incredible amount of elasmobranch biodiversity within the Cagayancillo islands using remote underwater video cameras including tiger and thresher sharks, reef sharks, white-spotted eagle rays, manta rays, and whale sharks. Porcupine rays, pink whiptail and blue-spotted mask rays can also be spotted in the shallow lagoons of the islands, although the former two are rare. Trying not to let any of this knowledge raise my expectations, we got ready and jumped in for the first dive at around 6:30am. Immediately I knew we were somewhere special: +30m visibility, walls stretching out to the blue, and fan corals decorating what felt like every inch of the wall. Also, fish. We drifted along the wall and it was dark that early in the morning along a wall at 30m. A spotted eagle ray passes by as my dive buddies stick their heads into big cavern-like openings on the wall. Beautiful dive. We go back on M/Y Navorca and approach the island of Cawili.

Cawili is an inhabited island. The locals now make a living out of seaweed farming, deep-sea fishing and octopus fishing (some reef

L-R: Barracudas, photo by Gonzalo Araujo. Octopus drying out in the sun, and seaweed farmer drying and sorting out his stock, photos by Sally Snow.

species as well). Here, a part of the reef had been pre-established as a no-take zone MPA, with an access fee for divers. We jumped in and the difference was evident: similar walls and soft coral gardens as we'd seen in Arena, but a lot more fish. The shallow reef was a continuous acropora hard coral structure, as far as I could see, right up to the reef's drop-off. I've only seen that in the Philippines, in Tubbataha Reefs Natural Park. I spotted a couple of green turtles on that dive, rather skittish individuals. I would later find out that the turtles were a reliable food source until not too long ago. Now, some conflict exists with the green turtles coming in to forage on the seaweed that's being farmed, but the locals keep one line of seaweed for the green turtles.

We did some consecutive dives along Cawili and another one in Arena (it's a small stretch between the two). The eagle rays seemed to be everywhere as we encountered at least one on every dive. We transitioned to the main island of Cagayancillo where we were able to moor the boat inside the lagoon. The lagoon is shallow with a sandy substrate. From the boat we saw blacktip reef sharks, blue-spotted mask rays and giant trevally on the hunt. These are good indicator species that food is aplenty. It's too shallow for a day dive, but ideal for a night dive as it is a fairly protected environment.

We arrived in the afternoon and dove the 'airport strip' on the southwestern tip of the island. Essentially that's where the airport strip ends. We drifted along the wall towards the tip of the island, and alas, a giant ray cruises above me at about 12m. I was at 30m so it was hard to tell what species it was, but definitely an eagle ray. But it was way bigger than your average white spotted eagle ray. This beast was a good 2m from wing tip to wing tip, and with a very long tail that was about 4m long all in all. My dive buddies were close-up and managed to get some incredible footage of what turned out to be an ornate eagle ray, and indeed, the first live report with this species in the Philippines. This was only the tip of the iceberg, as we also saw reef sharks, a small group (20 to 30 individuals) of bumphead parrotfish, and the walls with overhangs, gorgonians as far as the eye could see, and believe it or not, as I came up from the deep towards my safety stop, a whale shark cruised by at about 20m. Again, my dive buddies were lucky and got the perfect identification photo (whale sharks can be distinguished by their unique spot pattern). What a dive! To date, the airport strip dive site is in my top 5 of the Philippines, toppling some of Tubbataha Reefs incredible sites. So much so, we did another 3 dives at the same site, and it was still full of life and wonders.

CHALLENGES, CONSERVATION AND THE FUTURE

Although the uniqueness of Cagayancillo is its remoteness and rich biodiversity, the challenge at hand lies with balancing the need of the local communities and stakeholders, with the urgency to preserve marine ecosystems in times of great anthropogenic threats. Having declared the area a marine protected area means that some parts of Cagayancillo will be no-take zones, other parts will be kept for tourism, and other parts will be open to small-scale fisheries.

Divers wanting to visit Cagayancillo will play an important role in the local economy. Sanctuaries will bear fees for diving and snorkelling that can directly benefit the local communities of Cagayancillo by direct economic incentives to preserve these rich marine resources. The positive incentive of economic revenue not from fishing, or by using more sustainable fishing practices, can have long-lasting benefits for all. Your role as a diver, supporting such initiatives, can have significant positive repercussions for the local community and the marine environment. Currently only a handful of operators offer trips to Cagayancillo, mainly from Sipalay in Negros Occidental or some liveaboards offer it during their transition trip to or from the Visayas. I hope you get to experience these magnificent reefs and remember we are privileged we get to plunge into this incredible ecosystem many call home.

LARGE MARINE VERTEBRATES RESEARCH INSTITUTE PHILIPPINES

GONZALO ARAUJO

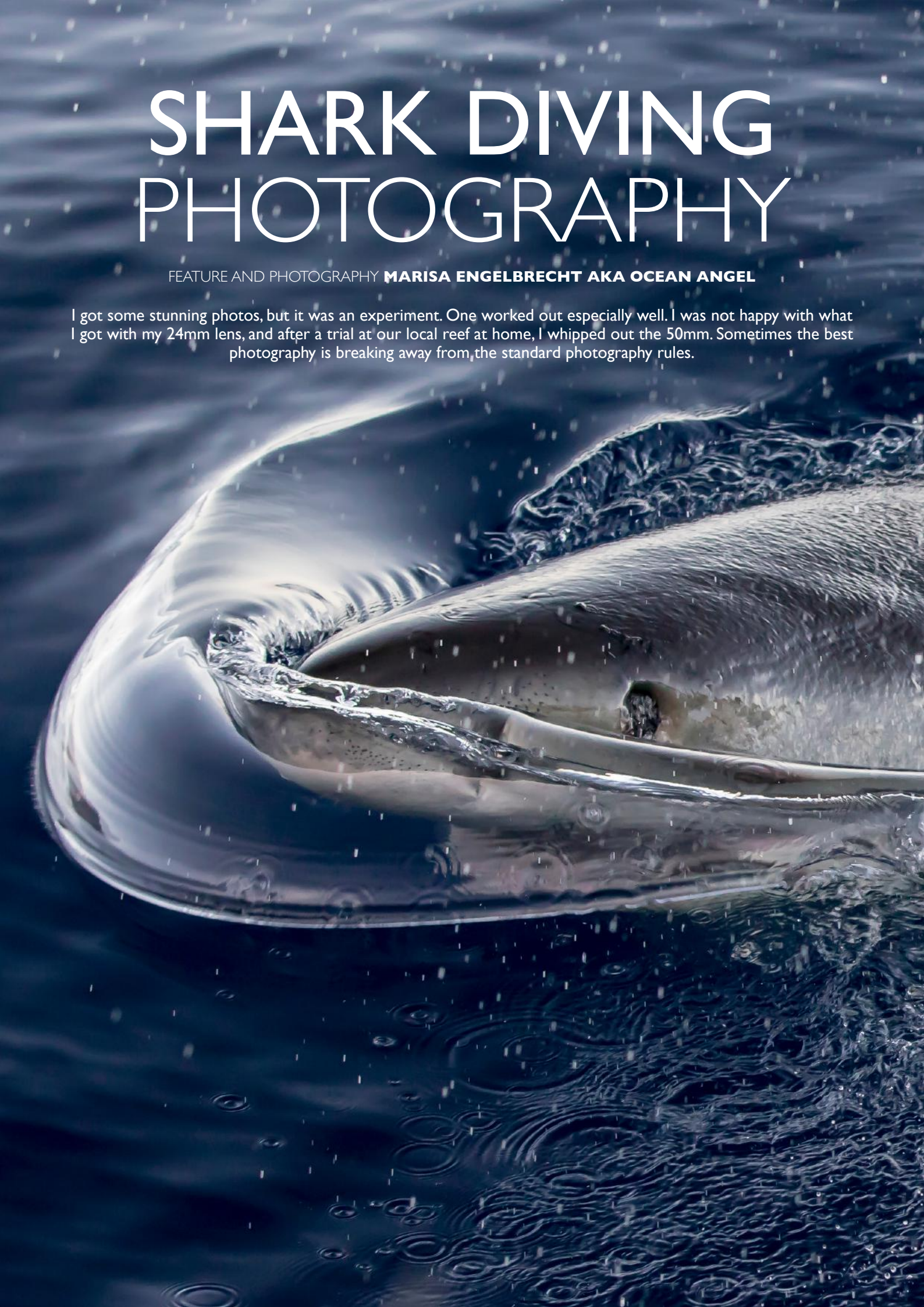
Gonzalo is the Executive Director of the Large Marine Vertebrates Research Institute Philippines, the largest independent non-profit non-governmental organisation dedicated to the conservation of marine megafauna and their habitats in the Philippines.

Gonzalo is a marine conservation ecologist and has been studying sharks, marine turtles and cetaceans for seven years with the ultimate goal of protecting them and their environment. You can follow him on social media at: **@gonzo_araujo** or through **@lamaveproject**

SHARK DIVING PHOTOGRAPHY

FEATURE AND PHOTOGRAPHY **MARISA ENGELBRECHT AKA OCEAN ANGEL**

I got some stunning photos, but it was an experiment. One worked out especially well. I was not happy with what I got with my 24mm lens, and after a trial at our local reef at home, I whipped out the 50mm. Sometimes the best photography is breaking away from the standard photography rules.



Great White Shark taken with 50mm lens.

In 1975, Universal Studios and Steven Spielberg brought a stunning predator into our homes. It came with the familiar theme music created by composer John Williams which makes hair stand up on the back of your neck still to this day. A man eating monster was created forever in a mere two hours on our screens, and all of a sudden, we all needed bigger boats. Know what creature I am talking about yet?

"But aren't you scared of them?", is the first question I get asked with big eyes and astonishment. It is the unthinkable for many people, something so terrifying that very few ever investigate further.

I am talking about the beautiful, magnificent and fascinating predator of the ocean, the shark, and our constant pursuit to dive with and capture them on camera.

What do we do? We plan our holidays and random trips during time off work and in-between work to be in the ocean or on it to see as many sharks, whales, dolphins, rays, turtles and numerous other sea creatures as we can. Our jobs have amazing benefits which allows us to set sail – or rather wings, all over the world.

I will be honest, my first great white cage dive in 2004 was a scary experience, in bad visibility, rough seas and in a very flimsy one person cage. I swore I would never do it again The sharks however always remained fascinating to me, alongside my great passion for cetaceans and the ocean. Watching more and more documentaries on TV and watching fellow South African, Chris Fallows talk passionately about his beloved flying Great White Sharks, resulted in an almost overnight decision to head down to South Africa and try for a better experience with Apex Shark Expeditions in False Bay, Cape Town. Unfortunately the Cape winter weather did not play along and we had to head off to Gansbaai for some luck to see sharks. It was right out magical and resulted in plans being made right away to head back as soon as we could. At the same time, my photography interest got bigger and it was somehow the sharks of Gansbaai and the whales of Walker Bay that triggered it.

Several trips to Cape Town followed over time. Some lucky, some not so much, and some with no luck at all. More equipment started to accumulate on every shark trip as we invested more and more to get images and video. Anyone who has attempted underwater photography, has been through bad weather and rough seas and would tell you that it's incredibly difficult on a good day. Water and salt is not good for any type of camera, so you do your best to secure and protect it with all kinds of gadgets. All of this, to get that "once in a lifetime moment". And that is only if the wildlife shows up and plays along. To date, we have been out to sea with Apex Shark Expeditions well over fifty times and the amount of extraordinary photos I have, will give you an idea of how difficult it is. There has been moments of severe cursing and frustration because of missed opportunities and sheer joy and celebration when you manage to get that incredible shot or video footage, and then there are also times when you just sit back, relax and take it all in. That seldom happens for photographers though as our eyes are always scanning for a set up or

Great White Shark in False Bay.

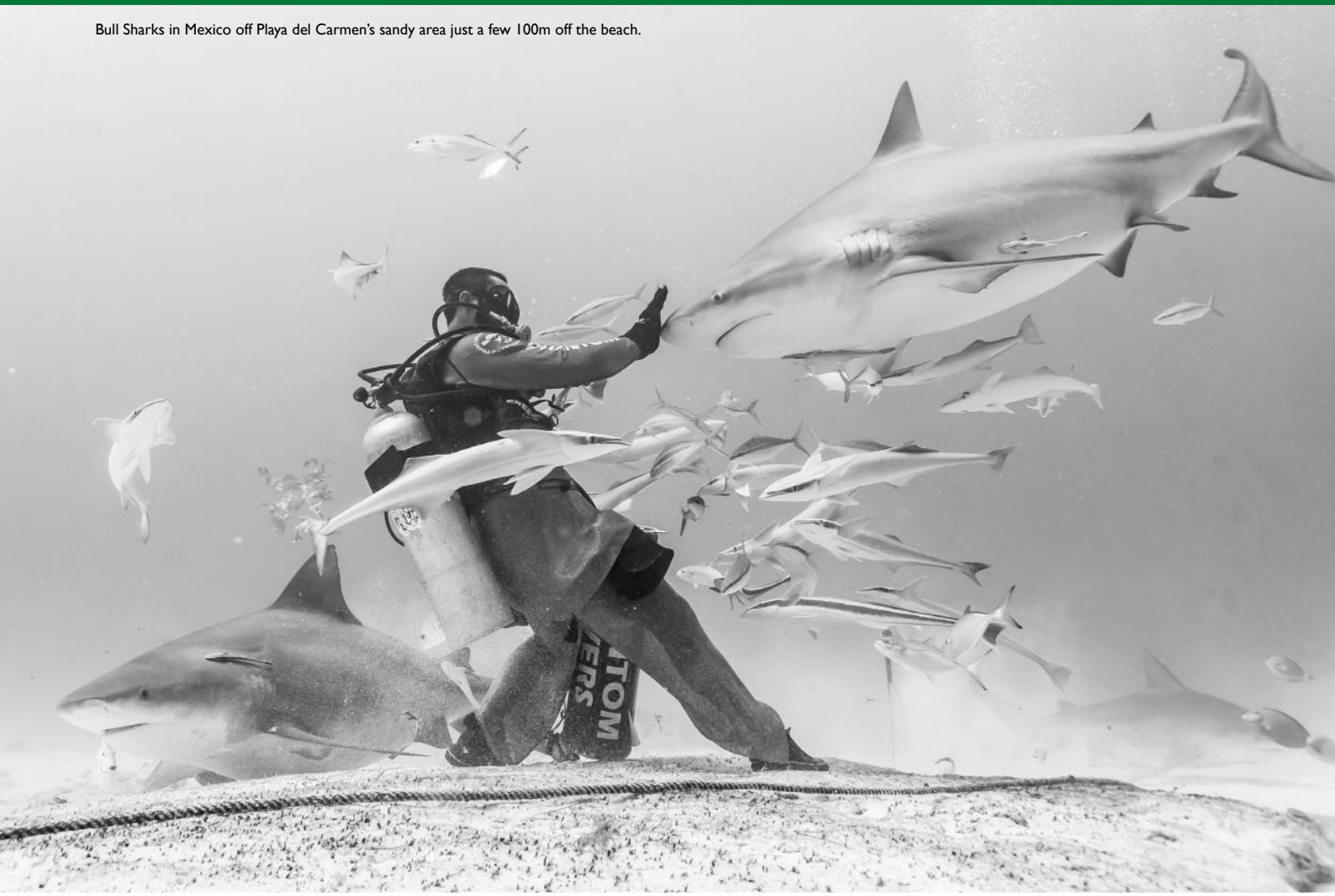
image. Most of our trips to False Bay has been spent on the boat, as the water is cold, the visibility underwater is seldom good and great moments occur on the surface here, due to the unique ecological system.

Trips to the Maldives followed during which we encountered a lot of reef sharks and managed a brief glimpse of a manta ray. I found a resort offering dives with Hammerhead Sharks, but sadly we did not have the privilege of encountering them. This still remains one of the sharks on the list as a must see for us.

Back to Cape Town and Chris took us out on a pelagic trip, far off Cape Point, to a canyon which drops 3,000m into the ocean depths. Here we got into the water with Blue Sharks and a Mako Shark for the first time. The Blue Sharks I can only describe as puppies. They are curious, have these huge big eyes that look right at you as they swim past, and their bodies have shades of blue which moves and changes hue and tone with the sunlight. Blues are truly beautiful sharks. The colour of the water is mesmerising too and you just do not want to get out, light creates patterns shooting deep into the blue that is magical. Never in my wildest dreams would I have ever thought I would be floating around in the middle of the ocean, in water so deep, your mind cannot grasp the depth of the canyon below you. Years before I would have said there is no way, that is scary. The sharks are the magnet though and you forget about everything else while you are in the water with them – add to that any other amazing creature, such as a sperm or false killer whale that could show up, you just won't want to get out of the water.

We met Jimi Partington who was at the time working on the White Pointer II of the Apex trip we were on, and he lured us to Mexican waters to go see the submarine sized Great White ladies of Guadalupe. We made our first trip out to the remote island in November 2015 which is towards the end of the shark season there. The excitement was real and incredible, however nobody shares the gruesome details with you about the trip to Isla Guadalupe. These are open waters of the Pacific ocean and the small island is 36 hours of travel from San Diego. Add to that a hurricane that had just wiped out towns in Mexico a few days before, and we headed off on a very wild ocean after being held back in port in Ensenada for 12 hours, waiting for swells to subside. I was convinced I was not going to return in one piece from this boat trip, admittedly, completely petrified, holding on for dear life most of the way, to anything and anyone possible. Amazingly I do not get seasick and I thank my job as airline crew for that. We finally dropped anchor in the calm waters of the bay, sheltered by large rock formations on the island and jumped into the cages shortly after. All was forgotten when the big ladies swooped in and stunned everyone with their size and elegance. When you first enter the cage, you are cautious, especially after the safety briefing. You are heavily weighed down as you only have the regulator line and wetsuit on, not the usual scuba kit, and you have to be "grounded" in the cage. The gaps between the bars are big enough for a human to get through comfortably if you turn sideways. And should a shark get into the cage or something goes wrong with the cage, the first thing you need to do is remember to get rid of this weight or

Bull Sharks in Mexico off Playa del Carmen's sandy area just a few 100m off the beach.



you may well sink like a rock all the way to the bottom 200m down. That thought scared me way more than the sharks ever could. It wasn't long however before we started elbowing each other out of the way to get halfway out of the cage to get those perfect photos and videos. When these giants swim towards you at eye level, they appear to be almost smiling and it makes gorgeous photos which is a far cry from the vicious teeth, blood and guts surface shots so many try to convey, keeping in line with all those scary movies. It is a peaceful, graceful creature. A lady of over 5m in length, with a girth that was pretty much the width of our cage, graced us with her presence on the last dive of the day and I was blown away. I could not get enough of how unbelievably big and graceful she was, gliding past several times. We were left with sheer respect and quiet admiration.

Mexican Great White Shark expert, Dr Mauricio Hoyos graced us with his company one night with a wonderful presentation, and low and behold, famous cinematographer, Andy Casagrande joined in. I have met some celebrities in my line of work and normally am not at all phased, however meeting Andy left me a stumbling, mumbling mess and my biggest regret was that I did not have the courage to ask him for a photo that night before he jumped back onto the research boat and disappeared into the night. The journey back to mainland was a lot smoother than going out thank goodness, otherwise I possibly would never have signed up for another trip again.

We next set sail to Australia, to join up with Rodney Fox Expeditions, operating out of Port Lincoln. A trip nowhere near as long and wild as crossing the Pacific Ocean thank goodness. We made a quick stop to have a great dive with the endangered Australian Sea Lions, a totally fun and unique experience, and then carried onto Neptune Island to drop anchor in the late afternoon. This liveaboard is extremely comfortable and was a great experience with the facilities on board. However, this time the water was freezing cold in comparison to the warm blue comforts of Guadalupe. I was in two wetsuits sitting out on some of the submerged cage dives as my body just did not cope with the extreme cold of 12˚C water at 25m below the surface. Being at the bottom was not the issue – the sharks distracted you from external factors, along with the cheeky fish that tried to steal the bits of fish guts in the box next to our feet, sometimes even having a go at exposed fingers, leaving bloody knuckles – but it was the safety stop that had me a shivering mess. The sharks are not nearly as massive as the ones in Guadalupe, yet always a great experience. And again, we met someone who introduced us to another location, with different sharks this time. The shark community is actually incredibly small and well connected. Carlos Estrabeau has a huge passion for Bull Sharks, also know as Zambezi Sharks in Africa. A whole new ball game, or rather shark game for us. This shark has a reputation, and not a good one at all. They scavenge and actually swim up rivers, capable of travelling quite far into fresh water – the murkier, the better apparently. So we had our preconceived ideas ironically, and Carlos had to work serious magic to convince us to join him whenever we could in Playa del Carmen, in Mexico to experience this highly feared shark. Low and behold, some openings at work allowed us to send him a message much sooner than any of us ever thought, and off we went. I was nervous, I admit it. We sat through some more extensive safety briefings and I again thought, what on earth am I getting myself into now? But after the first dive we were hooked and ended up booking even more dives than we originally planned. The sandy area off the beach at Playa Del Carmen hosts heavily pregnant Bull Sharks for roughly two to three months before they head off somewhere unknown to give birth to their young. They line up and cruise centimetres off the sandy bottom towards us and Carlos, only adjusting their cruise level to either take bait from Carlos or cruise so closely over our heads, instinctly making us duck down. And just like that, they disappear again. What is astonishing is how close all this is to the famous beaches of Playa, bathers blissfully unaware of these bulky ladies hanging around just a few 100m away.

Great White close-up with 50mm lens.

Great White.

Bull Shark.

Great White coming up to the surface.

In the mean time, our local reefs in the United Arab Emirates have miraculously regained health after years of over fishing and gorgeous black tip sharks can now be seen on most dives on the East Coast on the local reefs. This keeps us occupied in-between our big trips – cameras in action and our shark-fix fixed.

We headed back to Guadalupe in September 2017, this time a lot earlier in the season, when the predominant Great White shark presence is males. They are much smaller than the females, but still big and with lots of action as they are more active than the females. I cannot get my head around feet, I was raised on metrics so I have to convert the sizes mentioned once back on the boat, and only then do I go, "oh wow", that's still pretty damn big! This is a bucket list trip and if you are not a good sea traveller, do it like most on the trip did, sleeping tablets all the way until you get there. On this trip I got some stunning photos, but it was an experiment. One worked out especially well. I was not happy with what I got with my 24mm lens, and after a trial at our local reef at home, I whipped out the 50mm, 1.8F knowing I was taking a massive risk. Please know I tried the 1.4F and it does not work underwater. I was astonished at what I'd captured and many people questioned me, not believing that the 50mm worked that well. Sometimes the best photography is breaking away from the standard photography rules.

I managed to squeeze some diving in recently, on a work trip to Fort Lauderdale off West Palm Beach and Jupiter, and saw Lemon Sharks for the first time. They are really lovely sharks to be in the water with, very curious and they do come right up close to have a look back at you. Some Bull Sharks came up too, and a Hammerhead circled the bait box way below us, barely visible, never coming up to the surface. So again, Hammerheads are still on the must see list. Although the diving is spectacular, I am not a fan of the US way of running dive operations, pricing and taxing every single thing.

The latest trip has been to Sodwana in South Africa. It's a place that captured me as a child, when the only way to reach it was by 4x4, with all your food and drinks packed and brought along, including drinking and cooking water. The possibility of seeing Ragged-tooth sharks, Blacktips, Grey Reef sharks, whales, mantas, etc are good here, but we only encountered Grey Reef Sharks on two occasions. It is a superb place for both macro and wide-angle photography and videography, and is the first tropical water to dive in as you head up the Kwazulu Natal coast towards Mozambique.

Our next holiday is finally booked and ready. After numerous inquiries to dives centres and operators in the US, Florida – specifically to see Lemon Sharks, Hammerheads, possibly Tigers and Bulls, and the Giant Goliath Groupers – with either no or terrible responses, we decided back to South Africa it was, financially also better value for money. Aliwal Shoal is lined up with three baited dives and three regular dives where we hope to experience Ragged-tooth Sharks and Oceanic Blacktips, with a break in the bush in the middle, before we head to Sodwana again. This time it will be whale season on the north coast, which makes me even happier and more excited. So much to look forward to with a whole new photographic and video set up for both of us too as we took the plunge to upgrade our gear, which is super exciting.

Until we get back with more great ocean experiences to share with you all, save our seas, save our oceans and save our sharks.

www.oceanangelphotography.com

Nurse Shark in Cozumel, Mexico.

NIBBLING SEA LIONS OF THE PACIFIC NORTHWEST

FEATURE AND PHOTOGRAPHY **STEVE WOODS**

I deflated and dropped under the surface to see nothing but fur and teeth nibbling and playing with my fins, camera housing, dry suit, hoses etc. You name it and it was being nibbled. This can be quite intimidating as they are absolutely huge animals. A 3m, one ton sea lion has powerful jaws and could easily tear you to pieces if it wanted to, so to be playing with it like a puppy, is a surreal thing.

The Pacific Northwest is a magical place for wildlife and outdoor enthusiasts alike. From Alaska down to Northern California 'Cascadia' is a region that is dense in biodiversity on land and in the huge variety of marine habitats, as well as having a strong social theme of green living and lower carbon footprints. British Columbia is unique, comprising temperate rainforests, coastal mountain ranges and hundreds of islands that create perfect sheltered breeding grounds of herring and salmon amongst other fish. This, in turn attracts an array of predators such as marine mammals, land mammals and birds that feed on the congregations of easy prey. Any time of year is a good time to visit British Columbia as there will always be the natural beauty of the landscape as well as many exciting animals to see, though we were keen to go and spend some time photographing the incredibly charismatic sea lions that congregate there in large numbers early in the year, waiting for the herring to spawn, and a free lunch.

There are two types of sea lions, the Stellar's Sea Lion (*Eumetopias jubatus*) and the Californian Sea Lion (*Zalophus californianus*). Stellar's Sea Lions have a much larger range from Japan, China and Russia all the way down the pacific coast to California. Whereas Californian Sea Lions are only found in the Pacific Northwest. Stellar's Sea Lions are slightly larger growing, up to 3m on average and the larger males can weigh in at 1,100 kg. Both species start to congregate on the small rocky outcrops of Vancouver Island in late December and early January which, luckily for divers, coincides with great visibility in the water. We were based on Hornby Island which is a short ride away from a famous colony of sea lions that haul out of the water in an area called Norris Rocks.

January in Canada is cold and the water temperature is around 4-8°C so it is important to use a dry suit, as well as good undergarments in order to stay warm. Dry gloves are also a real bonus to be able to keep the feeling in your fingers if you are operating cameras.

Before we even got near the colony, you could hear and smell them. There were around 400 individuals, either vying for space on the rocks or frolicking in the water. As we got closer, we were greeted by a party of around 10-15 animals, obviously interested in us and seemingly waiting for us to get in the water and play. The amazing thing about sea lions is that they are exactly like dogs on land. They are obviously very intelligent and have a very inquisitive mind.

After gearing up and checking all of our equipment, we were slowly overheating in our cumbersome dry suits, so it was definitely time to get in the water to cool down. The moment we jumped off the boat, I thought my partner was trying to get my attention by grabbing me and tugging at my hoses and my suit. Once the bubbles subsided I realised that she was still on the boat and that I was being mauled by a pack of playful sea lions who needed attention, just like a pack of puppies (albeit one ton puppies!). I deflated and dropped under the surface to see nothing but fur and teeth nibbling and playing with my fins, camera housing, dry suit, hoses etc. You name it and it was being nibbled. This can be quite intimidating as they are absolutely huge animals. A 3m, one ton sea


AQUATICA
A300

lion has powerful jaws and could easily tear you to pieces if it wanted to, so to be playing with it like a puppy, is a surreal thing.

Normally, from a photographic perspective, the problem is getting close to your subject, especially underwater. It is the opposite when working with sea lions. They are so keen to play with you that they mob you and the only thing your camera sees is fur and teeth – meaning that good images can be few and far between. For minutes at a time, you will be the favourite play thing to 15-20 animals, completely covering your view, only letting up when they find another diver they want to play with. If and when it gets too much, you can simply swim away from them and let them play with other divers. On numerous occasions, I would be photographing a mob of sea lions, only to realise that one of my buddies was in the middle of them being nibbled and hounded by the boisterous lot.

After an hour and a half in the water, fingers start to get numb, no matter how much adrenaline, so we got back on the boat to take a break. For the entire time we were on the boat, the sea lions barked at us and were obviously trying to get us to get back in and play with them. I don't think there is a dive as interactive as with sea lions, it really is an amazing experience.

On successive days, we dove in other dive sites away from colonies, which was great as the sea lions would come in threes or fours to spend time with the divers instead of 20 at a time. This was great for being able to take images with fewer animals.

Our surface time was also incredible as we counted over 30 Bald Eagles sat on the rocks with the sea lions, and there are Orca, Minke, Fin and Humpback whales in the area, though we weren't lucky enough to see them. We were quite happy with the sea lions that we came for. Definitely a must for the more adventurous diver out there.

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A LONG WEEKEND IN ANILAO'S MACRO PARADISE

FEATURE AND PHOTOGRAPHY **SIMONE CAPRODOSSI**

They call Anilao the nudi capital of the world and Manit Corner is the most popular neighbourhood in the capital. Nudibranchs are everywhere, big, small and tiny, from several different species. Many were mating and even promiscuously between other species. I literally did not stop seeing and photographing nudibranchs for the full 90 minute dive. What an incredible place.

The Philippines are known for their great diving and have a top reputation as a macro destination, and Anilao is definitely among the top macro diving destinations in the Philippines, and in the world. So when I was told I had to go on a business trip to Manila, I could not resist planning a long weekend of macro diving in Anilao that is just a short driving distance from the capital.

Despite only giving a couple of weeks notice, Tourism Philippines contacted the local dive centres and Martin Nussbaumer kindly agreed to host me for 3 days of intense diving and photography to document the experience with them.

Reaching Buceo Anilao from Dubai turned out to be a really easy journey – very different from the very long multi plane journeys needed to reach other macro heavens such as Lembeh in Indonesia.

With a comfortable sleep on my 7 hour flight with Emirates, I woke up in Manila around 6 in the morning. Airport formalities were very fast at that time and I was already sat in the arranged pick up car before 7am. Driving swiftly through a sleepy Manila, we made it to the lush coastline of Batangas in record time despite heavy rains. As we reached the beach, a traditional boat was waiting to load my gear and take me across on a 10 minute ride to the resort. It was lovely to turn the corner over what I would learn to be a Nudi metropolis and unveil the Buceo Anilao Resort stretched uphill over the cape side, all rooms facing the beautiful bay.

Less than 12 hours from leaving home in Dubai, I was sipping coffee with a view over the Philippines sea and Dave was briefing me about their very organised operation. Everyday guests can enjoy up to 4 dives, typically 8am, 11am, 3pm and then a dusk or night dive around 5 or 6pm.

Given my speedy arrival, Dave offered me to catch the upcoming 11am dive and get started on my underwater experience. He quickly introduced me to the dive centre and the beautiful camera room where I could safely leave all my photo gear, and brought me up to my room to change and get ready. The resort is built on a hill and keeps you in shape with all the steep stairs to climb. My room was proudly located high up in the middle of the resort, right above the beautiful infinity pool. This meant more stairs, but the effort was rewarded with an unobstructed stunning view of the bay from the very comfortable superior room.

Buceo Anilao is a relatively new resort, only 4 years old, and this reflects in the great conditions of the rooms, the common spaces and the diving and photography areas. But the fresh paint of the resort hides a huge wealth of experience and knowledge of the area. Dave Santos the founding partner and in charge of the daily running of operations, is an Anilao veteran, having dived these waters for over 40 years earlier as an instructor, bringing other divers from Manila over and then setting up some of the other more well known diving operations.

Dave introduced me to John Lloyd a young guide with very sharp eyes who would be my private guide and buddy for the next 3 days. I like having a private guide to be able to focus on photography without any worry of a group having to wait for me. In any case, the standard here is a maximum of 4 divers per guide, so it is a very tight group.

The first dive was on the house reef that is a muck and rubble site just off the shore of the resort. I was excited to be fully kitted with my

super macro setup and John Lloyd immediately started feeding me exciting subjects, including some practically invisible, really tiny nudis that I could only really make out on my computer screen after having blindly focused my lens on the indicated dot.

After a nice lunch and a bit of rest, I was in the water again for a first dive in Secret Bay, probably the most famous Anilao dive site that is just around the corner by boat from the resort. Secret Bay is a muck paradise and did not disappoint. In 70 minutes of non stop action, John found me several very small frogfish, a thorny seahorse, innumerable nudis and to close the session, a pair of tiger shrimps.

I managed to hit the tail end of an early typhoon so we came out of the water to find the guys on the boat freezing in the wind and pouring rain. The storm continued to get bigger so we decided to cancel the night dive as it would have been unsafe to go out to sea.

I was then forced to relax and after an early dinner, I hit the hay as I had just spent the previous night on a plane after all.

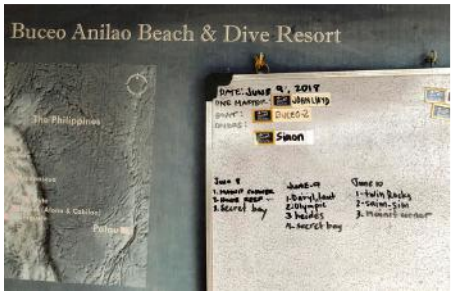
The first dive on the Saturday was very different as we sailed about a half hour across the bay to Daryl Laut. This site is a coral reef with many nudis and the main objective was to find a lovely duo of Harlequin Shrimp that John eventually managed to spot after a long search.

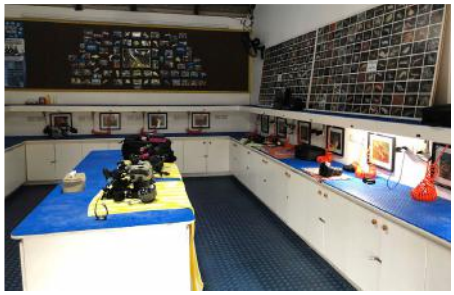
From there we hit a very different site, a small sunken platform covered in soft corals. There are electric clams in the rocks on the way down and once you reach the platform you can easily spend the hour photographing the variety of nudis that live there. I was however on a different mission as the platform is home to a group of Cardinal fish and some of them had eggs, so I set myself the mission to capture the mouth breeding behaviour. The Cardinal fish males hold the fertilised eggs in their mouths for a couple of weeks during which they do not eat. Every few minutes they open their mouths to aerate the eggs and you have to catch that precise moment. John managed to find me one with eggs in his mouth and I locked myself on him, trying to keep in focus. After a couple of frustrating attempts, I caught him with his mouth half open and his eggs visible on the third attempt. This meant a good 20 minutes at over 25 metres, so I then ascended to roam the shallows until the end of the dive. The shallow part is also lovely with many beautiful anemones with a variety of clownfish species, and the very pretty pink eyed gobies.

We got back tired and excited after the 2 dives and the weather just kept getting worse. In the afternoon I was the only one still committed to going out. Luckily the sea was not too rough despite the heavy rain so we decided to stay out for the afternoon dive and an early night/dusk dive as the forecast was not promising for the evening.

We went back to the muck of the Secret Bay area which is probably my favourite part. Again, the action was non stop with a series of amazing critters. In a thrilling dive that seemed to end far too quickly, John managed to show me several frogfish, a bottle that had become home to a cute pair of Yellow Gobies, then on to an octopus, a beautiful pair of Robust Ghost Pipefish, and finally, a Flamboyant Cuttlefish parading in all its glory. He then had to pull me away from the friendly cuttlefish so that I would not miss a pair of very cool Ambon Scorpionfish just a few metres away.

The last day was dedicated to a couple of wishes I had expressed. One of them was





photographing Shaun the Sheep (technically *Costasiella Sp.*) possibly the cutest nudibranch there is, which looks very much like a cartoon sheep. When you see other photographers' images of them, you do not realise just how tiny these creatures are. They actually live on a unique green sea grass that stands out of the muck bottom like a mini cactus the size of a thumb. The little cute nudi is literally a dot on the green to the naked eye. With the help of a super macro diopter he takes some shape but it still takes a lot of effort to even understand what part is the front and where the cute little eyes are. John found me a few and they practically took up my entire photography dive. They are the cutest things once you get to see them on a larger scale on your computer screen.

The next dive also required a lot of patience and commitment as I wanted to photograph a Hairy Goby. Another very cute little yellow fish with a rather spiky face that I had never seen before. It is not hard to spot the coral where they live, but they actually live between the tight branches of the small coral, and getting one in view and most of all facing you, is hard work. There is then the mission of focusing on it between articulated coral branches. They are very small, but you can never really get close enough for supermacro… a rather challenging subject to say the least. I have some reasonable shots, but I will need another go at them at another time.

To close my amazing series of dives, John took me to Manit Corner which is literally right on the side of the resort. This is actually a stunning reef that deserves a wide-angle shoot to capture the health and variety of corals there, but it is again the macro that reigns. They call Anilao the nudi capital of the world and this is the most popular neighbourhood in the capital. Nudibranchs are everywhere, big, small and tiny, from several different species. Many were mating and even promiscuously between other species. I literally did not stop seeing and photographing nudibranchs for the full 90 minute dive. What an incredible place.

From the thrill of the last dive, I had to sadly pack up my gear and head back to Manila but it felt like I had spent a full week's holiday in Anilao thinking of the variety of subjects I had managed to capture. Going back for a proper holiday is obviously now top of my list, and I want to especially thank Dave and Martin for the kind hospitality, and John Lloyd for his sharp eye action, giving me a great taste of this incredible destination.

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DIVING IN ANILAO

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A MUST DIVE!
PUERTO GALERA, PHILIPPINES

FEATURE AND PHOTOGRAPHY **PHILIPPE LECOMTE** TRANSLATED FROM FRENCH **ALLY LANDES**

It's very difficult to describe the daytime dives in words,
but they just become more beautiful and varied from one dive to the next.

In May 2017, I had the fortune of winning first place in the macro category of EDA's Underwater Photography and Film competition – Digital Online. My prize was a destination package of 6 days/5 nights at the Marco Vincent Dive Resort in Puerto Galera in the Philippines.

Having not yet taken the time to dive in Philippines waters, I was very eager to get to Puerto Galera. I got in touch with the dive centre at the Marco Vincent Dive Resort via Marianne and booked my weeks stay in March. The best diving season in the Philippines is from January to June and the rainy season, starts from June to October.

Many of my fellow divers and photographers had already told me about the fantastic encounters to be had underwater in the Philippines. "You'll see Philippe, you'll easily encounter all the different species that we rarely see elsewhere, and most of all, during the same dive!"

I had already gathered up all my dive equipment and foremost my photography equipment needed for the trip, and now all I had to do was wait for the big day.

My departure to Puerto Galera was from Abu Dhabi where there are 2 to 3 daily flights to Manila. An employee from Marco Vincent Dive Resort meets you at the Ninoy Aquino International Airport with a driver to take you to the port of Batangas, south of Manila. The drive takes between 1h 30 mins and 2h via the highway to reach the port, and then another person will have booked you a place to board one of the many shuttle boats to reach the port of Puerto Galera on the island of Mindoro. The boat journey is a comfortable 1h 15 mins, even in rough sea conditions, and you get to see all the island landscapes en route covered with forests and mountains.

When you finally arrive at the small port of Puerto Galera, you will be surprised by the atmosphere that emanates from this island. Once again, an employee from Marco Vincent welcomes you at the dock and takes you over to the hotel where you are greeted with a very warm and almost family like welcome from all the staff. Before they introduce themselves to you, they already know your name and address you by your first name.

The hotel is located in a quiet side street and a small road leads to the beach known as 'White Beach', just 2 minutes away. The hotel






has a large swimming pool, a bar/restaurant on the top floor and a breakfast room with pool side terrace. The dive centre is just two minutes away from the hotel and has all the necessary space to store your equipment as well as classrooms and a room where you can comfortably work on your photos.

In addition, the hotel also offers a complimentary massage session.

After the arrival briefing, it was time to prepare and assemble my camera equipment so as not to forget anything once aboard the boat.

The first day's dive began with a hearty breakfast at 7am in the hotel dining room by the pool, during which I got to meet my group of fellow divers. We were 6 divers in total, including myself, with 4 American retirees and an organiser. After breakfast, we made our way to the small port via a very short 5 minute bus ride to where the boat and crew awaited our arrival.

There, we discovered our boat that would serve us over the course of the 6 days of diving to follow. The boat is actually a large canoe and you are able see everything around you. This one is able to accommodate more than 12 divers for 3 dives per day. There is a large room in the centre of the boat where you can eat and a large work bench for photographers, with a separate desk to charge the camera batteries and strobes.

The stern of the boat has a large shaded platform from where we jump in and out of the water. There is also a sun deck semi covered by the boat's helm. There are 3 guides on board – Marlon, Sherwin and Warren – as well as 2 cooks, the captain and 2 other crew members.

The majority of dives are done around the small peninsula of Sabang beach which is only 20-25 minutes away by boat. For muck dives, we have a large playground: the bay of Puerto Galera. This bay is one of the most beautiful in the Philippines and one of the richest in the world because of its diversity in marine life.

For those who are interested in doing some night dives, they can be organised close to the hotel as they can be done directly from White Beach. At night, the sandy bottom of this beach turns into a real hunting ground for all sorts of marine life. Crabs of all kinds can be seen, and shrimps surface from the sand in search of food while trying to escape predators.










These will surprise you, like the octopuses and cuttlefish with their very different swimming techniques or how they rapidly disappear into the sand.

It's very difficult to describe the daytime dives in words, but they just become more beautiful and varied from one dive to the next.

For those who will discover the Philippines for the first time, you will want to return back as quickly as possible as the underwater life is so rich and diverse. Dives generally last an hour but they will seem so much faster as there are so many things to see, you will forget all about time. Feel free to chat with the guides who will be delighted to point out the species on your wish list. They know the area like the back of their hand and despite the weather conditions, they will take you to some of the best dive sites to work with those conditions.

For all divers, but especially the macro fans out there, Sabang Bay is a unique place where you can see some incredible marine life. I was able to witness several species that I had never seen before. Between frogfish of various sizes and colours, the Blue-ringed Octopus (*Hapalochlaena*), the Yellow Pygmy Seahorse (*Hippocampus denise*), not to mention the other species of seahorses I saw; the diversity in these waters is simply amazing.

You must especially pay attention to where you place your hands as these bottoms are also very rich in all kinds of scorpionfish. These are so well camouflaged that even when the guide points them out, it sometimes takes several seconds to distinguish the shape of these fish.

The most incredible creature I got to see during my stay was the Flamboyant Cuttlefish (*Metasepia pfefferi*). This cuttlefish is constantly on the move and gives off the impression it's walking rather than swimming, but the most amazing thing about it is its animated colours which are in permanent motion. It gives the illusion of fire running over its body.

To break up the rhythm of the reef dives during your stay, the dive centre will have you discover Verde Island over one or two days. This island is located between the islands of Luzon and Mindoro, along the Verde Island Passage which is described as "the centre of marine biodiversity in the world". It takes about an hour to reach the reef and from there, and depending on the current, you can dive either on the drop side or the reef side.

Once in the water, you will admire the immense diversity of marine life with all its different colours and shapes. Dispersed amongst the tranquillity, giant barrel sponges grow all around the reef. These sponges are of various shapes and sizes and can exceed one and a half metres high. Because of its geographical location, the reef is always subject to currents. This gives a constant food source to the marine life of the reef, including both fish and corals.

The staff members on the boat will help you with everything and make sure you relax. Hot towels and ginger tea will be waiting for you after each dive. On top of all of that, you will be given a summarised list of all the dives you will have done, with their respective descriptions at the end of your stay.

As you can see, there is an endless array of diving discoveries to be made. The service, the good moods and the Filipino hospitality will make your stay an unforgettable experience which will remain in your memory, and some will very much have the desire to return. The Philippines is definitely a must dive destination!

MARCO VINCENT PHILIPPINES DIVE RESORT

MARCO VINCENT DIVE RESORT
DIVING IN PUERTO GALERA

Marco Vincent Dive Resort is located in White Beach, a serene and beautiful cove found in Puerto Galera. It is approximately 100 metres from the shore, an exclusive retreat where you can explore the numerous natural attractions and a myriad of both land based and aqua sports activities.

Come and experience the irresistible rhythm of an island's drum beat. See the untamed charm of Puerto Galera. The Marco Vincent Resort offers enjoyable, comfortable and a worry-free stay because of its premier quality, service and entertainment.

Enjoy happy hour cocktails, night life, fire dancers along the beach and fresh sea-breezes from our beach-front Aqua Restaurant but retire to a quiet oasis of a Mediterranean inspired property at night.

There are three restaurants (two on site and one beach front), a conference/ function room, an indoor pool, massage bubbles and 38 spacious and tastefully decorated rooms to complete this one of a kind vacation destination.

Marco Vincent Dive Resort
White Beach, Puerto Galera
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Tel: (+632) 514 5224
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Email: mvresort@marcovincent.com

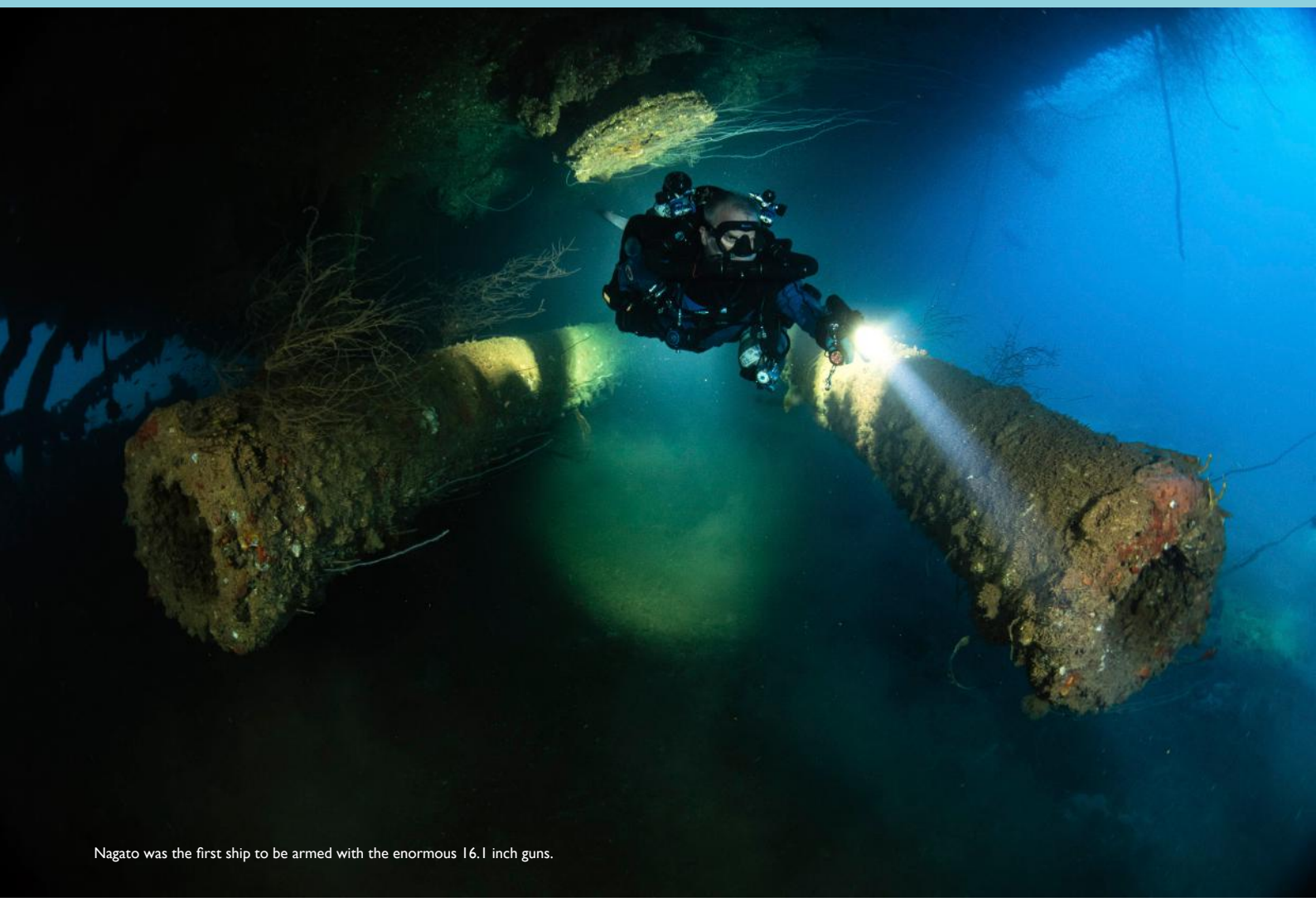
www.marcovincent.com

BOMBS AT BIKINI

OPERATION CROSSROADS – FOR THE GOOD OF MANKIND AND TO END ALL WORLD WARS

FEATURE AND PHOTOGRAPHY **JESPER KJØLLER**

I've been fortunate enough to dive some of the most iconic shipwrecks in the world such as Umbria, Thistlegorm and Britannic and the wrecks of Truk Lagoon. But the Bikini Experience has been something else.



Nagato was the first ship to be armed with the enormous 16.1 inch guns.

Shortly after WWII, the Americans selected one of the most remote and inaccessible areas of the world to conduct nuclear tests. They wanted to evaluate the A-bomb's impact on warships, but the experiments necessitated an inhumane repatriation of the inhabitants of the small island paradise in the Marshall Islands. Today, the remote Bikini Atoll offers an unrivalled historic collection of gigantic aircraft carriers, battleships, destroyers and cruisers and it must be every serious wreck diver's wet dream destination.

Imagine a knock on the door. A friendly man on your doorstep tries to convince you to pack everything up and leave your home. Not just you and your family, but your entire community. It is for the good of mankind and it will end all worlds wars, he claims. Would you agree? Would you accept the offer to be moved far from the place you grew up, the only place you ever knew? And would you be happy when you discover that the relocation is far from temporary, but will last several generations? And that you would probably die a gruesome and slow death if you ever returned to your home?

Today, this approach seems brutal and extremely ruthless, but nonetheless, it was exactly what happened in February 1946, when the American military governor Ben H. Wyatt persuaded the local chief King Juda to convince his people to evacuate their small island in the Bikini Atoll. The population of 167 natives was moved to cramped barracks on a remote island and the preparations for the nuclear testing programme were set in motion. Operation Crossroads was go!

ON THE DATELINE

The remoteness of the Bikini Atoll was the prime reason it was chosen as a nuclear test area back in the day. As a consequence, you have to endure long and sometimes challenging travel routes to get there today. After being on the move for almost three days, we definitely feel like we've journeyed to the opposite side of the globe when we finally arrive. And we kind of have. We are almost on the dateline – 12 time zones from the Greenwich Meridian.

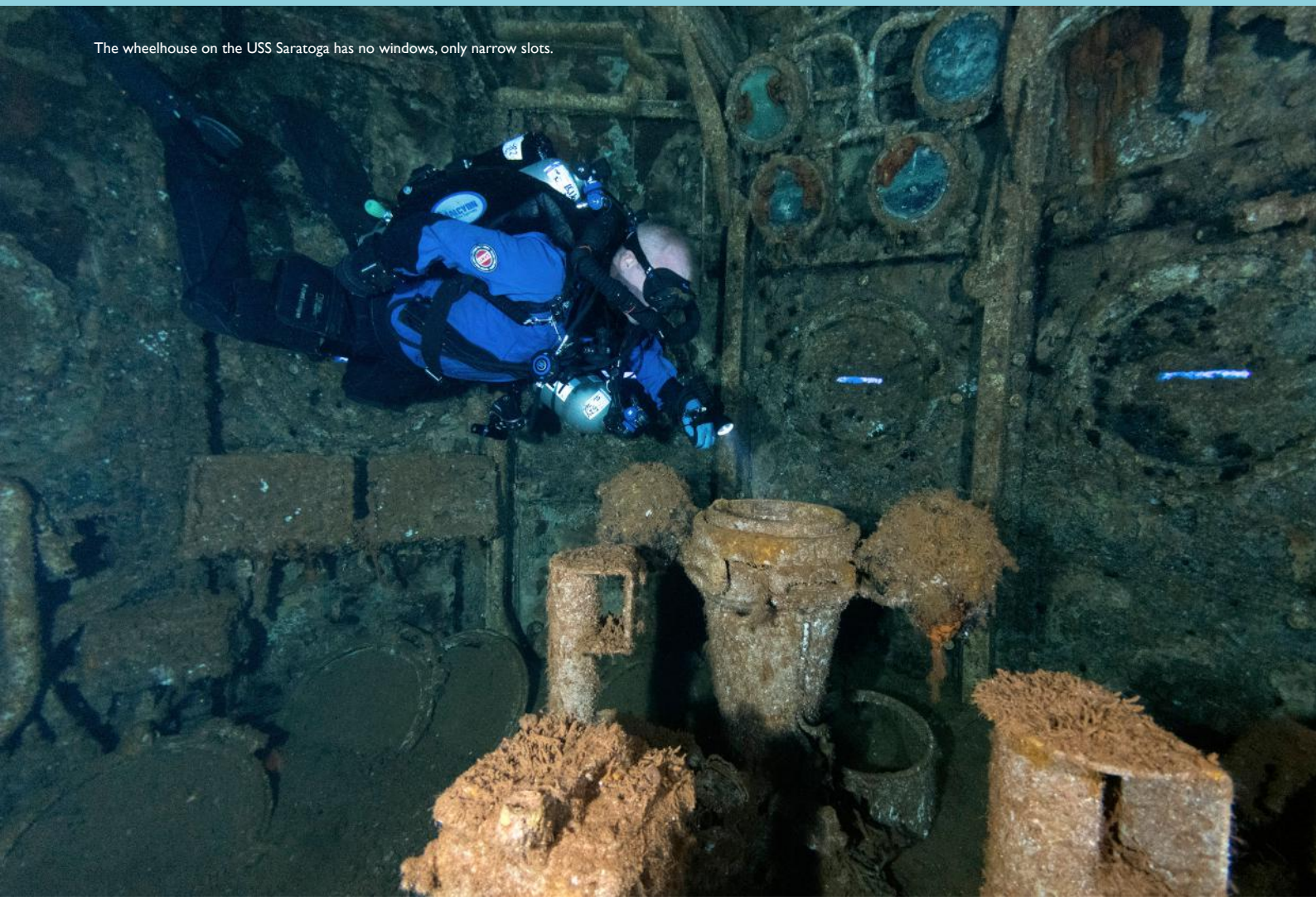
After stopping on three other islands on the way, The United Airlines Island Hopper from Guam finally drops us off at the American army base at Kwajalein Atoll – think Area 51 in a tropical setting. The journey continues with a short and free ferry-ride to the neighbouring small and densely populated civilian island of Ebeye. Here, we relax and nurse our jet lag for a day at the charming Hotel Ebeye, the only one in town, until we embark the Truk Master to kick off our adventure.

Before beginning the 24 hour cruise due north towards the Bikini Atoll, we have time for a dive on the heavy cruiser Prinz Eugen. The German vessel was impounded by allied forces after WWII and it was decided to include German and Japanese target ships in the nuclear tests to investigate any meaningful differences in the enemy's ship-building methods compared to American in respect to damage from atomic weapons. Prinz Eugen survived both Operation Crossroads blasts with only minor structural damage, but it received a large dose of radioactive fallout. Later that year Prinz Eugen was towed to the Kwajalein Atoll for decontamination and offloading of ammunition. However, the ship was leaking and it could not be repaired because of the radioactivity, so eventually the Prinz Eugen capsized in shallow waters in Kwajalein Atoll Lagoon in December 1946.

As it is the case with most heavily armoured military vessels, Prinz Eugen is lying upside down. But it is still an epic dive and the sheer size of the wreck primes us for what is waiting in further north in Bikini. The main photographic attraction is the three gigantic propellers, of which one of them partly sticks out of the water.

THE MIGHTY SARA

Bikini Atoll appears in the horizon late in the



The wheelhouse on the USS Saratoga has no windows, only narrow slots.

afternoon the following day. We have been making good time on the unusual calm Pacific Ocean and we arrive a few hours earlier than expected, so we have an opportunity to do a quick orientation dive on the aircraft carrier USS Saratoga to get acquainted with her. That way we can explore here more confidently the following days.

The famed USS Saratoga is probably the largest diveable shipwreck in the world and among the very few aircraft carriers accessible to divers.

As I swim along the surface towards the descent line in the bow of the Truk Master, I look down and suddenly it dawns on me: What I see below is not the bottom. It's the flight deck of the 270m long aircraft carrier! We descend to the deck at around 30 metres to get our bearings. The entire flight deck is covered by teak planks. They were solid and easy to repair, so that was the chosen material for an aircraft landing surface. Even if the deck is covered by a layer of seaweed, it is still possible to make out the individual teak planks here and there.

TIGER ON THE SARATOGA

To give the pilots as much possible space for take-offs and landings, aircraft carriers have a narrow and tall bridge-structure pushed to one side. Saratoga had four sets of 55-calibre MK9 eight-inch double barrel guns, two pointing forward and two pointing aft but only one of the four gun turrets were not removed before the blast, and the smokestack has since collapsed, but the superstructure is surprisingly intact. Here we find map rooms, radar rooms, coding rooms and radio rooms, but they are all very small and cramped. Space was limited on such a narrow bridge.

We swim into the wheelhouse. It has no windows, only narrow slits. I assume it was to protect officers in the high and exposed position. The whole idea with the design of the command bridge on an aircraft carrier was to present as small a target as possible. In front of the wheelhouse is an outside navigating bridge, from where the commanding officers had a better view of the ship and its surroundings when docking or performing complicated manoeuvres.

We leave the bridge and swim towards the line to begin our decompression. On this dive we stayed relatively shallow, so we didn't rack up more than 30 minutes of decompression. Suddenly my buddy points to something behind me and I turn around. A tiger shark is checking us out and stays with us for a while. We later hear that he is a common sight on the Sara. As if the dive was not already fantastic, the tiger shark is the icing on the cake.

FLOATING CITY

We have a nice selection of blueprints and schematics of the wreck and we study them closely between dives to plan our routes and to make sure we go to the interesting places in the most efficient manner.

An aircraft carrier is an entire floating city. When fully operational USS Saratoga was the home of some 2,800 crew, so there were a lot of practicalities to be considered. On the drawings, the different compartments are marked with functions such as bakery, barber shop, dentist, laundry, sickbay, blacksmith, potato peeling room, butcher and dive locker. Exciting stuff, to say the least!

With so many penetration possibilities and an abundance of details inside and outside, you could easily go to Bikini and only dive USS Saratoga for a week. In fact, if the aircraft carrier was the only wreck here, it would still be worth the long journey. We did five long dives on the enormous vessel and still felt that we had only scratched the surface.

NO BUBBLES

While USS Saratoga theoretically has several kilometres of passageways to explore, not all levels are accessible or safe to penetrate. But from the huge forward aircraft elevator, it is possible to enter a few different routes. We

The impressive bow on the USS Saratoga – the largest diveable shipwreck in the world.

look into a promising doorway but beyond it looks very silty and hazy, so we deploy a safety spool and make a tie off, so we can find our way back to the exit if we experience a silt-out. After swimming past the first couple of rooms, the visibility opens up and we can now clearly see the permanently attached penetration line that leads further into the wreck. Apparently, the line was laid by staff from the now defunct land-based dive centre at Bikini Island.

We attach our safety line to the mainline and start exploring. Everything is very rusty and the floor is covered with a thick layer of extremely fine sediment. One careless hand-movement or a misplaced fin kick will destroy the visibility. Percolation is also an issue. Open circuit exhaust bubbles would dislodge a shower of rusty particles from the roof. But on our JJ-CCR rebreathers, we don't let out a lot of bubbles. Still, it's necessary to adjust buoyancy once in a while and even a small stream of bubbles from our mask provokes percolation. The trick is to move very slowly and deliberately. I'm hindered by my big camera system and for every doorway or bulkhead we pass, I have to fold the strobe arms and cautiously push the camera in front of me while taking extra care not to scratch the dome.

After only a few minutes of swimming, we find the first Easter egg. On the floor sits a US Navy Mark V diving helmet – a perfect specimen in very good condition. The original design was from 1916, but the 30kg helmet was still in use in the mid 1980s. It's presence here speaks volumes of the limited number of divers that have visited Bikini. In most other places it would have been long gone. A diving helmet from USS Saratoga would be a very valuable collector's item. We take a few shots of the nugget and continue our quest.

A TRIP TO THE DENTIST

From studying the maps, we know that after swimming down a flight of stairs, we need to make a sharp turn to the right to get to our final destination. My buddy on all the dives in Bikini, the famed wreck explorer Richard Lundgren, swims in front of me in the narrow passageway and suddenly he disappears into a doorway to the left. Is this it? Did he find it? I peek in and I'm met by a fantastic scene. We found what we were looking for: the dental operation room on the USS Saratoga! Inside everything is intact. Three dentist chairs arranged with all the bells and whistles of a dentist workstation such as drills, washbowls, hoses, and lights. We move around very slowly and carefully inside the small compartment to avoid destroying the delicate instruments or stirring up any silt. On the way back, we spot more hidden gems such as telephones on the walls, fire extinguishers and signs saying

"Sickbay". Old school Coca-Cola bottles are scattered all over the place. In lots of rooms and corridors, we see filing cabinets. Apparently, in the pre-digital age, the Navy had a lot of paperwork to store.

On a later dive, we also find the dive locker complete with umbilical-hoses and dry suits hanging on the wall and we explore crew lounges with sofas and coffee tables.

Allegedly no one has explored the engine room of the USS Saratoga yet. Towards the end of our last dive on her, we find a possible way in, but we do not have time to survey it further, so we leave Sara with a sense of unfinished business. I guess we just have to come back…

TORA! TORA! TORA!

All the warships in the lagoon played important roles in WWII history all over the world, before they ended on the sea floor in a nuclear blast. But the one with the most impressive historic pedigree has to be the battleship HIJMS Nagato. It was from this floating fortress that Admiral Isoroku Yamamoto directed the attack on Pearl Harbor on December 7, 1941. Nagato was impounded by the Americans after the Japanese surrendered and just as the German Schwerer Kreuzer Prinz Eugen, Nagato was included in Operation Crossroads to gather information on enemy shipbuilding techniques in an atomic explosion. But I suspect that the opportunity to revenge Pearl Harbor also played a role.

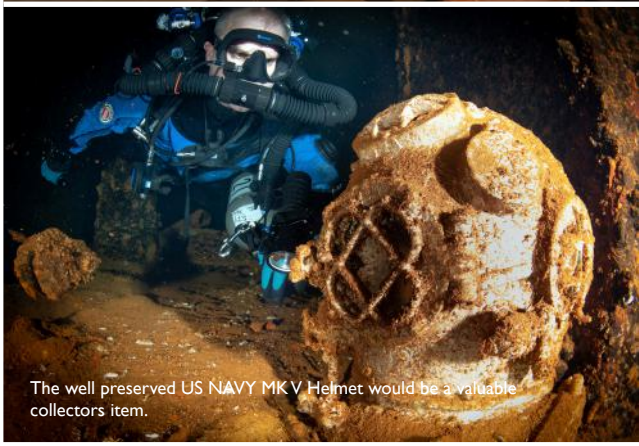
When a heavy battleship sinks, it almost always ends up, upside down. The tall superstructure, the weapons and the solid armouring make the ship so heavy over the waterline, that it invariably topples over when lethally damaged – say by a shock wave created by an underwater A-bomb.

Just as Prinz Eugen, Nagato's biggest highlights are the four enormous propellers and the twin 16,1-inch guns – the biggest in the world at the time. The pagoda style superstructure is partly squashed under the weight of the hull, but it is possible to squeeze into the bridge and pretend you are Admiral Yamamoto listening to the famous radio codeword, Tora! Tora! Tora! – the signal to commence the attack on Pearl Harbor on December 7, 1941. Yamamoto was actually against attacking the US base in Hawaii as he feared it would bring the Americans into the war. And rightly so. His alleged post-Pearl Harbor prophecy, "I fear all we have done is to awaken a sleeping giant and fill him with terrible resolve" turned out to be famous last words…

The bridge on the Nagato where admiral Yamamoto directed the attack on Pearl Harbor.

The diving locker deep inside the Saratoga complete with umbillical-hose and drysuits.

Aron Arngrimsson (left) and Richard Lundgren (right) studying the Saratoga plans before the next dive.



The well preserved US NAVY MK V Helmet would be a valuable collectors item.

Careful finning techniques are necessary inside Saratoga's silty and rusty passageways.

GHOST DIVE CENTRE

The responsible crew on the Truk Master recommends reducing the diving activities mid-trip to off-gas a little bit after several days of intensive diving. So today, instead of setting out on an afternoon dive, we explore Bikini Island. After a couple of kilometres walking from the old jetty, we arrive at the small settlement that until ten years ago, hosted Bikini Atoll Divers. The dive centre was run by the Bikini Atoll Council and opened in June 1996. The plan was to provide an economic base for a possible future resettlement of Bikini Island. But in 2008, the Council had to shut down the operation. A combination of local airline reliability issues, soaring energy costs and the decline of the world economy that also impacted dive tourism, made it impossible to run the business. The dive staff was stranded on the island for a month as the last plane that was supposed to evacuate them broke down.

The area has an unnerving post-apocalyptic atmosphere – it is apparent that the island was left in a hurry when a boat finally offered to extract the stranded dive centre personnel. The last dive briefing is still to be seen on the whiteboard in the dive centre and in another building, dive equipment, spare parts, compressors, service room, rinse tanks and everything related with running a dive operation is in place. It is all very spooky.

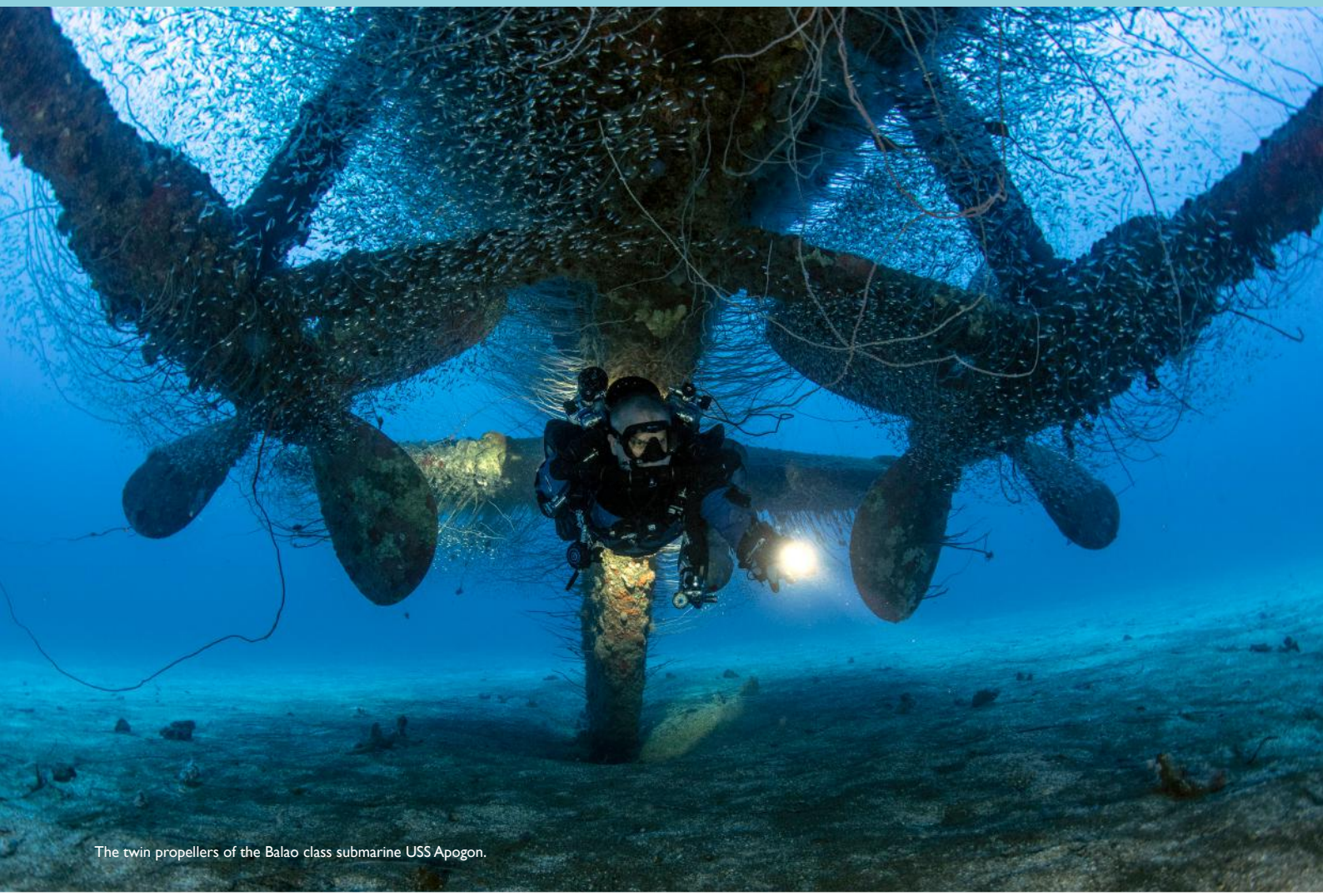
Since the land-based dive centre was abandoned, nobody has had any permanent residence on the island, but a little handful of caretakers stay from time to time.

USS LAMSON

The Saratoga is of course the crown jewel of Bikini with The Nagato being a close runner-up. The size, the history and the details of these two wrecks place them in a league of their own – not just in Bikini, but everywhere in the world. However, during our expedition, we had the chance to dive a handful of other wrecks from Operation Crossroads. Destroyers, battleships, and submarines. My absolute favourite among those "smaller" vessels (everything is small compared to Saratoga and Nagato), is the destroyer USS Lamson.

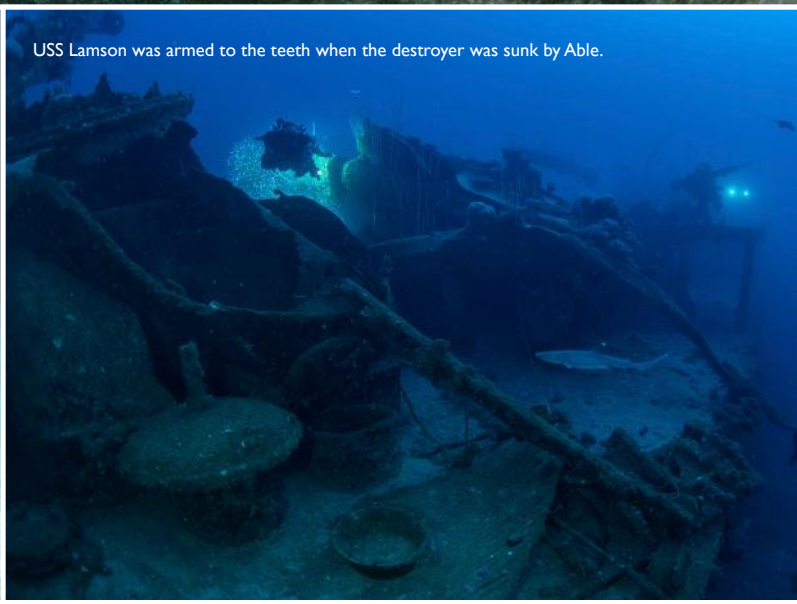
We descend along the mooring line and are met with a pleasant surprise. Lamson sits upright on the sandy bottom and the visibility is the best we have seen in Bikini so far. Lamson was armed to the teeth when she was sunk by Able. The ship is full of artillery, canons, deck guns, racks with mines, depth charges and torpedoes.

The impact of the blast is quite apparent as the mid-section is just a big twisted and mangled area. Next to the wreck on the sand at 50 metres, I spot a sleeping white tip reef shark. I approach it very slowly and carefully from one side, while Richard gets in position from the other side. I need to get very close to get a decent shot. With my 15mm fisheye lens, everything looks



The twin propellers of the Balao class submarine USS Apogon.

Sleeping reef shark in front of USS Lamson.



USS Lamson was armed to the teeth when the destroyer was sunk by Able.

small from a distance. But the silence of our rebreathers is a giant advantage and I manage to move very close before the shark wakes up and swims away rather annoyed to be disturbed during its nap.

TIME BOMB

I've been fortunate enough to dive some of the most iconic shipwrecks in the world such as Umbria, Thistlegorm and Britannic and the wrecks of Truk Lagoon. But the Bikini Experience has been something else. It feels very meaningful to be able to document the history of this place, not only the war records of all the wrecks, but also the impact on nature and the population that the Truman Administration's decisions have had. The banishment of the natives is ongoing as radiation still prevents permanent sustenance from living on the island paradise.

And the wrecks themselves are a ticking time bomb. A lot of them were fuelled to 80% capacity and that fuel will eventually escape, when the wrecks decompose. That is a potential environmental disaster in Exxon Valdez-magnitude and it is not a matter of if it will happen, only when.

So, if you are a serious wreck diver, you should make plans to go to Bikini, even if you have to sell a kidney to get there. And with Aron Arngrímsson's Critical Element expeditions in partnership with the Truk Master, it has never been more convenient to explore Bikini's nuclear fleet.

The silvery sweepers almost cover the conning tower of the submarine Apogon.

FACT FILES

TRUK MASTER IN BIKINI

Truk Master spends three months in Bikini every year, July to October. As such Master Liveaboards are the only consistent and scheduled dive operator in Bikini since the land-based dive centre was abandoned some ten years ago. The rest of the year, the liveaboard is based in Truk Lagoon. Truk Master's four decks provide ample space for relaxation, dive equipment and camera preparation. The vessel is ready to cater for the needs of tech-divers on open and closed circuit and is equipped with twin oxygen-makers, an ample supply of helium, twin-sets, rebreather-tanks, deco-tanks and scooters for rent. It is a huge challenge to run a liveaboard operation in such a remote location, where everything has to be shipped from far away. But the crew on Truk Master makes it look very easy and you almost forget how far from civilization you really are.

www.masterliveaboards.com

BIKINI AND TRUK TECH EXPEDITIONS

Throughout 2019, 2020 and 2021 the wreck explorer Aron Arngrímsson is hosting a series of expedition style trips with Truk Master exclusively for technical divers on CCR. The Dirty Dozen trips in Truk and the Critical Experiment trips go to Bikini.

You can get in touch with Aron Arngrímsson through Facebook or mail him at:
info@thedirtydozen.org

OPERATION CROSSROADS

Operation Crossroads was the codename for a series of nuclear weapon tests conducted by the United States at Bikini Atoll in July 1946. These were the first detonations of nuclear devices since Hiroshima and Nagasaki in August 1945.

President Truman ordered his generals to initiate a series of tests "to determine the effect of atomic bombs on American warships". But many historians also agree that the Americans had a hidden agenda – they wanted to flex their nuclear muscles to deter the new emerging East Bloc superpower. Truman wanted to show the world that he had nuclear weapons under control and could detonate them at will.

The US Generals looked for a remote location far away from shipping lanes and air traffic. And far away from Washington DC, of course. Bikini seemed an obvious choice. There was, however, one small snag. The Islands were inhabited.

In February 1946 the military governor Ben H. Wyatt persuaded the local chief King Juda to convince his people to evacuate the islands. The Americans claimed it was "for the good of all mankind and to end all world wars".

In preparation for the nuclear test programme, 242 naval vessels, 156 aircrafts, 25,000 radiation devices and thousands of experimental rats, goats, and pigs were put in place. It was a massive operation that included 42,000 military and civilian personnel.

The Crossroads tests were the first of many nuclear tests conducted in the Marshall Islands and the first to be publicly announced beforehand and observed by an invited audience, including a large press presence. The huge amount of PR supports the hidden agenda theory. The Truman Administration wanted the event broadcasted all over the world. The Baker explosion was at the time the most filmed event in history.

The target fleet was hit with two detonations of plutonium implosion-type nuclear weapons of the same kind dropped over Japan, each with a yield of 23 kilotons of TNT. The first test was code named Able. It was dropped from the B-29 Superfortress on July 1, 1946. Able detonated 158 metres above the target fleet and caused less than the expected amount of ship damage because it missed its aim point by 649m. The second test code named Baker was detonated 27 metres underwater on July 25, 1946. Radioactive sea spray caused extensive contamination. A third deep-water test named Charlie was planned for 1947 but it was cancelled primarily because of the United States Navy's inability to decontaminate the target ships after the Baker test.

THE SWIMSUIT ISSUE

What is the connection between the remote coral atoll in the Pacific and the famed two-piece swimsuit that shares the name? The French designer Louis Réard introduced the risqué and skimpy two-piece costume in July 1946. Parisian runway models refused to model the suit, so he had to hire nude cabaret dancers to do the job. He named his creation after the Bikini Atoll where the first test of a nuclear bomb took place just a few days before. The controversial and revealing garment was slow to be accepted in the general public. That gradually changed when film stars like Brigitte Bardot, Raquel Welch, and Ursula Andress started to strut their stuff in bikinis on the beaches and in films in the early 1960s.

WRECK FACTS

On our expedition, we dived seven of the best wrecks in the Marshall Islands. Here are the details of each vessel:


USS Saratoga

USS SARATOGA

Nationality: American
Launched: 7 April 1925
Position: Upright
Diving Depths: Top 15m, deck 27m, sand 50m
Class & Type: Aircraft Carrier
Displacement: 54,000 ton
Length: 295m (waterline) 268m (overall)
Beam: 32m
Draft: 7.3m
Propulsion: 16 × boilers at 300 psi (2.1 MPa)
Speed: 33 knots
Range: 10,000 nautical miles at 10 knots
Crew: 2,200 officers and men
Sunk: By Baker July 25, 1946

USS ARKANSAS

Nationality: American
Launched: 14 January 1911
Position: Upside down
Diving Depths: Deck 36m, sand 57m
Class & Type: Wyoming-class Battleship
Displacement: 26,000 tons
Length: 171m
Beam: 91m
Draft: 28m
Propulsion: 4 steam turbines, 4 propellers
Speed: 20 knots
Range: 8,000 nautical miles at 10 knots
Crew: 58 officers, 1,005 men
Sunk: By Baker July 25, 1946

USS ANDERSON DD-411

Nationality: American
Launched: 4 February 1939
Position: Upside down
Diving Depths: Deck 36m
Class & Type: Sims-Class Destroyer
Displacement: 2,211 tons
Length: 106m
Beam: 11m
Draft: 4m
Propulsion: High-pressure super-heated boilers, twin propellers
Speed: 35 knots
Range: 3,660 nautical miles at 20 knots
Crew: 10 officers, 182 men
Sunk: By Able July 1, 1946

PRINZ EUGEN

Nationality: German
Launched: 22 August 1938
Position: Upside down
Diving Depths: Top 0m, sand 34m
Class & Type: Enlarged Admiral Hipper-class Heavy Cruiser

Displacement: 18,700 ton
Length: 212.5m
Beam: 21.8m
Draft: 7.2m
Propulsion: 3 steam turbines, 3 three-blade propellers
Speed: 33.5 knots
Range: 7,200 nautical miles at 20 knots
Crew: 42 officers, 1,340 men
Sunk: December 22, 1946, after being towed to Kwalajein Atoll


HIJMS Nagato

HIJMS NAGATO
Nationality: Japanese
Launched: 9 November 1919
Position: Upside down
Diving Depths: Top 28m, sand 54m
Class & Type: Nagato-Class Battleship
Displacement: 42,850
Length: 221m
Beam: 35m
Draft: 9m
Propulsion: 4 steam turbines, 4 propellers
Speed: 25 knots
Range: 8,560 at 16 knots
Crew: 1,734
Sunk: By Baker, July 30, 1946

USS APOGON
Nationality: American
Launched: March 1943
Position: Upright
Diving Depths: Top 44m, sand 50m
Class & Type: Balao-Class Steel Submarine
Displacement: 2,424 tons
Length: 95m
Beam: 27.3-feet
Draft: 15 feet
Propulsion: Twin Elliot electric motors
Speed: 25 knots surface, 8,75 knots submerged
Range: 11,000 miles surfaced at 10 knots
Crew: 10 officers, 70 men
Sunk: By Baker, July 25, 1946

USS LAMSON DD-367
Nationality: American
Launched: June 17, 1936
Position: Upright
Diving Depths: Top 35m, sand 50m
Class & Type: Destroyer
Displacement: 1,500 tons
Length: 104m
Beam: 10.5m
Draft: 2.8m
Propulsion: 2 General Electric steam turbines
Speed: 37 knots
Range: 7,000 miles at 12 knots
Crew: 158 officers and men
Sunk: By Able July 1, 1946

TRAVEL FACTS

HISTORY
After World War I, Japan was given the power to govern the former German colonies in the Pacific as part of the Treaty of Versailles. The South Pacific Mandate included Micronesia (Chuuk or Truk Lagoon) and Marshall Islands. The low-lying Marshall Islands did not offer the same protection as the mountainous lagoon in Truk but the Japanese understood Bikini's strategic position and they build a watchtower to guard against American invasions. American forces captured Kwajalein Atoll during Operation Flintlock from 3 January to 4 February 1944.

GEOGRAPHY AND CLIMATE
The Marshall Islands rests on submerged volcanoes on the floor of the ocean. The country has 29 atolls and a few isolated islands and is situated halfway between Australia and Hawaii. The Kwajalein Atoll is the largest with 16 km^2 land that surrounds a 1,700 km^2 lagoon.

Bikini Atoll is probably the most remote diving destination on the planet. Bikini is located just north of the equator in the Pacific Ocean halfway between Australia and Hawaii and consists of 23 islands of which only two were habitable.

The dry season is between December and April and the wet season is May to November. The weather is changing all the time, and it rains heavily every now and then, but often only for short periods. The climate is stable, hot and humid with temperatures lingering around 29-30 degrees Celsius all year round – both on land and in the water.

TRAVEL
United Airlines operates two routes to Kwajalein, one coming from Guam and one from Honolulu. From UK or US, going to Honolulu is the shortest option, but from Central Europe going to Guam via Manila is the shortest. Guam and Honolulu are US territories and even if you are only in transit, you must have a valid entry clearance to the United States (ESTA).

Kwajalein is a US army base and they do not particularly care for civilians. You must carry a sponsor letter from the tour operator to get entry and as soon as formalities are done, the military personnel will escort you to the ferry to the neighbour Island, Ebeye. Here you will either embark directly on the Truk Master or stay in a hotel until the boat is ready. From Kwajalein there is a cruise of 25-30 hours to the Bikini Atoll, depending on the weather.

CURRENCY
US Dollars

COMMUNICATION
There is limited cell phone coverage in the Marshall Islands. The Truk Master offers satellite Wi-Fi, so if you absolutely have to be on Facebook while you are in Bikini, you can. But beware, it is expensive. Otherwise, remember that JOMO is the new black – JOMO is the joy of missing out.

TIME ZONE
Marshall Islands are on GMT +12 – almost on the dateline.

DIVING
The diving is relatively easy diving with only weak or no current. Most of the wrecks lie outside of recreational limits. Divers with rebreathers and decompression skills will be able to explore a lot more, not only because they can go deeper, but because they can stay longer.

The visibility varies from wreck to wreck and seasonally, but it is usually quite good. A full 3mm wetsuit is sufficient. However, most technical divers will attack the wrecks in dry suits as we did. Also, consider wearing gloves and a hood for protection – especially if you are doing penetration.

Most wrecks are at 50 metres, and we usually did two hours runtime divided between 60 minutes for the dive and 60 minutes deco. The decompression stops are very pleasant with virtually no current and a solid deco bar as support on the last stops.

SCHEDULE
The long runtimes on a rebreather limit the number of daily dives to two. The normal daily routine is a dive in the morning after breakfast and a dive in the afternoon. Truk Master enforces a mandatory and sensible minimum surface interval of four hours between technical dives.

HEALTH
There is no chance of recompression therapy in the Marshall Islands. Serious DSC problems require evacuation to Guam or Honolulu. Make sure you have your diving insurance in order and that it covers emergency evacuation. Dive conservatively, make extended stops and stay hydrated to prevent decompression sickness.

ELECTRICITY
110 V in US style plugs in Guam, Honolulu and Marshall Islands. On board the Truk Master, the central European plugs have 220 V. Bring an adapter if you are staying in hotels before or after the diving part of the trip.

PERMITS
The Marshall Islands requests a mandatory marine park fee of 500 US Dollars.

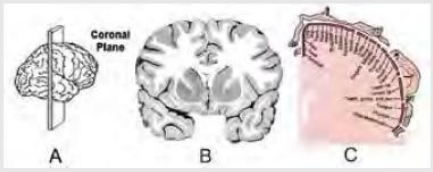


FIGURE 1
The sensory cortex of the brain: The coronal plane (A); a coronal section of the brain showing the surface grey matter (B); and a representation of the various sensory areas of the body on the surface (cortical) grey matter (C).

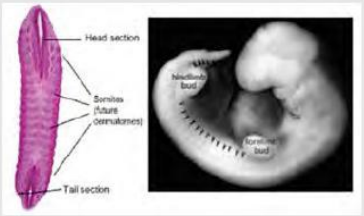


FIGURE 2
Embryo with sections called somites that eventually become dermatomes

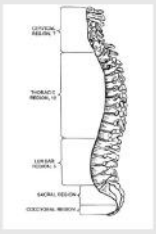


FIGURE 3
Vertebral column: 33 vertebrae associated with 31 pairs of spinal nerves
Vertebral column: 33 vertebrae associated with 31 pairs of spinal nerves

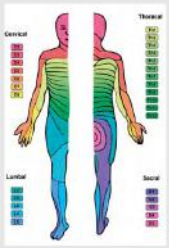


FIGURE 4
Dermatomes: The stacked somite disks in the embryo become dermatomes. The development of the arms and legs extend the original disks downwards and outwards.

ALL THAT TINGLES IS NOT THE BENDS

FEATURE **FRANS CRONJE**

Divers are taught to pay attention to any abnormal signs and symptoms after diving. They are instructed to consider them as being possible decompression illness (DCI) until proven otherwise. However, this attitude not only adds a certain amount of anxiety, but may also lead to an unhealthy level of attentiveness and concern about completely benign conditions that appear during or following diving activities.

Mild headaches, mild transient joint aches, skin irritations and even mild tingling or numbness may be attributed to DCI quite erroneously resulting in unnecessary medical evacuations, hospital admissions, recompression treatment and even the loss of diving fitness or a subsequent fear of diving. On the other hand we do not want to discourage divers from seeking assistance nor should they deny or overlook potentially serious manifestations of DCI. So there is a need to assist divers in better distinguishing between benign and serious conditions.

First of all, the risk can be reduced: Limiting the probability of developing decompression disorders by performing 5-S (i.e., Shorter, Shallower, Sensible with Safety Stops) dives will reduce the concern that minor symptoms may be bubble-related. It does not eliminate the risk, however, and we would like to caution divers not to fall into the "I-was-diving-within-the-tables-so-I-cannot-be-bent fallacy. As many as 50% of DCI cases in the DAN DCI database were diving within table or computer limits. However conservative diving does reduce the chances of developing serious DCI even if symptoms were to occur.

Another way to exclude an unnecessary over-diagnosis of DCI is to recognise certain common patterns of symptoms that are known to be due to causes other than DCI even though they may be associated with diving activities. For instance, in the previous edition of Alert Diver we addressed the various causes of diving-related headaches. So in this article we will be discussing paraesthesias (i.e., Greek for "partial excitement" or "feeling") – which is an abnormal skin sensation usually described as burning, pins and needles or tingling.

PARESTHESIA AND NEUROPRAXIA

Paraesthesia or tingling is the result of a partial interruption of sensory nerve conduction between the skin and the sensory cortex (i.e., the part of the brain responsible for making us aware of skin sensations).

Anaesthesia is the result of a complete interruption of impulses. In most cases, paraesthesia is a very temporary and benign condition. Often it is the result of direct pressure on a peripheral cutaneous nerve (i.e., skin nerve) due to a prolonged application of external pressure to the skin overlying a nerve. An example of this is the numbness that follows sitting in a fixed position for a period of time.

These mild crushing or stretching injuries to nerves are called neuropraxias. This means that the structure of the nerve is preserved but it ceases to transmit impulses for a period of time. In most cases reversal of symptoms follows pressure relief to the area almost immediately. However with long periods of pressure it may take several days and in rare cases even weeks for skin sensation to recover and for tingling to subside. This may happen when wearing tight-fitting or heavy gear such as a tight fitting wetsuit, weight belt or heavy BC-tank configuration for extended periods of time.

Because any interruption in nerve conduction between the skin and the brain can potentially cause these disturbances, it is important to determine the underlying cause. Short-term neuropraxia due to a tight-fitting wetsuit is much less significant than arterial gas embolism or decompression sickness. Yet both may cause numbness and tingling. Fortunately it is possible to make these distinctions fairly easily with a little bit of background knowledge. That is one of the objectives of this article – knowing when tingling is serious and when it is not.

THE BRAIN, SPINAL CORD AND NERVES

Both paresthesia and anesthesia may be the result of damage to the brain, spinal cord or nerves. However, each of these latter injuries has a very specific distribution and it is possible therefore to make distinctions fairly easily.

THE BRAIN

The brain contains several functional areas. The surface layer of the brain (also called the grey matter) is where we perform conscious thinking; where voluntary movements are initiated (called motor function); and the where the various physical sensations and the signals from our five special senses reach our consciousness (called sensory function). The picture below shows how the brain is divided into the coronal plane (A); followed by a coronal section of the brain (B); with a further illustration showing where the sensations from various body parts are recorded on surface of the brain (C).

What should be obvious from this illustration is that a small injury to the cortex will result in a large area of skin numbness or tingling. Accordingly, cortical parasthesia – as this is called – usually affects an entire arm or leg. It is rare for both arms or both legs to be affected simultaneously, however. The typical impairment involves the left or the right side of the body respectively (i.e., hemi-paresthesia or hemi-anesthesia) and there is usually an associated weakness or paralysis of the affected area (i.e., hemiparesis). Therefore large areas of numbness – especially if a whole arm or leg is affected and there is associated weakness or paralysis – are very suspicious of brain involvement and require urgent medical attention.

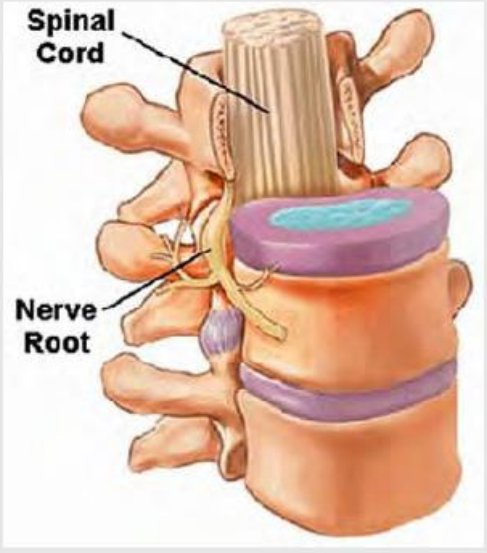


FIGURE 5

Part of the vertebral column showing the spinal cord with its filaments and a spinal nerve root leaving the spinal cord in-between the vertebra. Notice the purple intervertebral disk. Rupture or bulging of this disk could affect the spinal cord and / or the spinal nerve roots. Spinal cord involvement results in more widespread, downstream, multi-dermatomal effects whereas spinal nerve root involvement causes effects in a single dermatome.

SPINAL CORD

Like our brain, the spinal cord also contains areas responsible for relaying impulses for movement and sensation. There are also a large number of interconnecting filaments (axons) that run between the brain and the target organs or tissues. The spinal cord is arranged like a stack of cylindrical disks in the unborn embrio (Figure 2). Each disk has a segmental nerve supply and maintains this relationship as the embrio grows and changes shape

As the face and limbs form, the disks are stretched downwards and outwards. However, the sequence of the dermatomes remains unchanged even though they no longer look like a stack of coins. In the fully formed fetus there are 33 divisions in the spinal column. Each has a corresponding vertebra or bone – 7 in the neck (cervical vertebrae); 12 in the rib-cage or thorax (thoracic vertebrae); 5 in the small of the back (lumbar vertebrae); 5 in the sacrum (sacral vertebrae) and 4 in the tail bone (coccyx).

Without getting into the numbering of the associated nerves, which differs somewhat from the vertebrae, the general picture is apparent and it is illustrated in Fig. 4. Notice how each of the disks in the embryo has now become a dermatome.

The reason for providing this background is that injuries to the spinal cord or spinal nerve roots affect the motor function and/or sensory function within the respective dermatomes. The difference is that an injury to the spinal cord also affects the subsequent dermatomes to some extent as the nerve filaments are interrupted on their journey from head to tail. A spinal nerve root injury only affects that specific dermatome.

Paraesthesias or weakness in the distribution of a dermatome indicates probable spinal cord or spinal nerve root involvement. Although this may be due to other causes, such as a prolapsed intervertebral disk (i.e., the cushion of fibrous cartilage between vertebrae), these manifestations require urgent medical assessment. If there is associated weakness, paralysis or loss of bowel or bladder control, it is a medical emergency.

PERIPHERAL NERVES

Peripheral nerves are the continuation of the filaments (i.e., axons) in the spinal cord. They form the unbroken electrical links between the brain and the target organs or tissues they supply. The first section of these nerves, as they leave the spinal cord, are called spinal roots. In the sections of the spinal cord supplying the arm and the leg, the spinal roots mingle and merge to become a tangle of nerves called the brachial (i.e., arm), lumbar, and sacral plexus (i.e., network or webs) respectively.

See Fig 6. The tangles eventually separate out into a number of blended peripheral nerves to supply the skin of the upper and lower limbs respectively.

This is one of the main reasons why there is a significant difference in the way spinal cord or spinal root damage presents itself vs. nerve plexus and peripheral nerve injuries, and why this background information is important: It allows us to make the necessary distinctions. Unlike damage to the spinal cord, which follows the "stacked" dermatomal pattern of sensory loss, injuries to the brachial plexus or peripheral nerves are patchy in nature.

Fig 7 shows the important patches of skin supplied by these peripheral nerves.

If numbness or tingling is limited to a seemingly random patch of skin and does not affect the entire limb (i.e., it is not cortical/regional) or a circumscribed segment (i.e., it is not spinal/dermatomal), then it is probably due to a peripheral nerve or nerve plexus injury. Importantly, from a management point of view, any injury or illness causing loss of strength, weakness or loss of function is always to be considered a medical emergency. Similarly, all anesthesia in an area that lasts more than a minute or two (e.g., due to direct mechanical compression of a nerve due to position or compression by diving gear, etc.) is in need of immediate medical attention. It is only in the area of partial sensory changes – or paraesthesias – where we would like to assist divers in distinguishing trivial from more serious injuries.

Fig 8a shows the contrast between spinal/dermatomal vs. peripheral nerve distribution to the skin. This allows for easier distinction between the areas of skin that would be affected by injuries to the spinal cord or peripheral nerves respectively. (Fig. 8b)

COMMON DIVING-RELATED INJURIES

Now that the distinction between dermatomal and peripheral nerve-related paraesthesias has been made, we will show five common diving-related conditions that are frequently attributed to DCI but are almost invariably related to a compressive injury of a peripheral nerve (Fig.9).

Pressure on the upper parts of the brachial plexus present as numbness of the lower part of the forearm including the hand. This is common with heavy BC's in slender individuals.

Tight fitting wetsuits or leaning on the elbow may compress the ulnar nerve in the region of the cubital tunnel (i.e., the funny bone) causing numbness of the lower palm of the hand. Note, unlike the brachial plexus injury this excludes the forearm and is limited to the hand only (Fig.10).

Median nerve compression may occur due to a tight fitting wetsuit cuff, gloves or holding onto the boat gunnels during launching (Fig.11).

Pressure on the sciatic nerve due to sitting on a hard surface may cause numbness in a large area of the back of the leg. Boat rides are notorious (Fig.12).

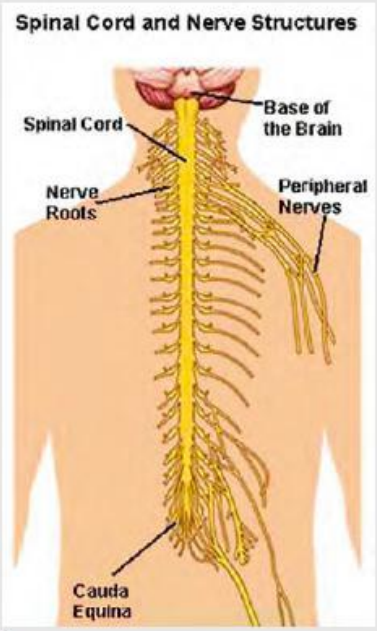


FIGURE 6

Peripheral nerves are extensions of spinal nerve roots. However in the area of the arm and the leg there is (1) a merging and mingling of nerves to make up the networks called the brachial (i.e., arm) and lumbar (i.e., leg) plexus (i.e., web or network) respectively; and (2) a subsequent separation of some nerve fibers

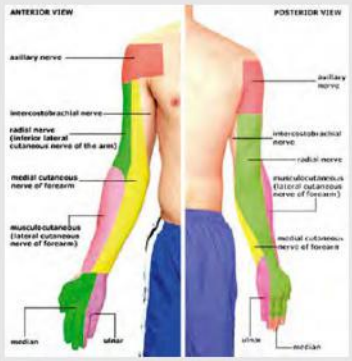


FIGURE 7

Peripheral cutaneous nerve distribution. These illustrations show areas of skin supplied by various cutaneous nerve branches for the upper limbs. Any partial interruption of conduction in the underlying nerves branches higher up in the arm or neck will result in burning or tingling in these areas. This differs from cortical or spinal type injuries that have more a more extensive or segmental distribution.

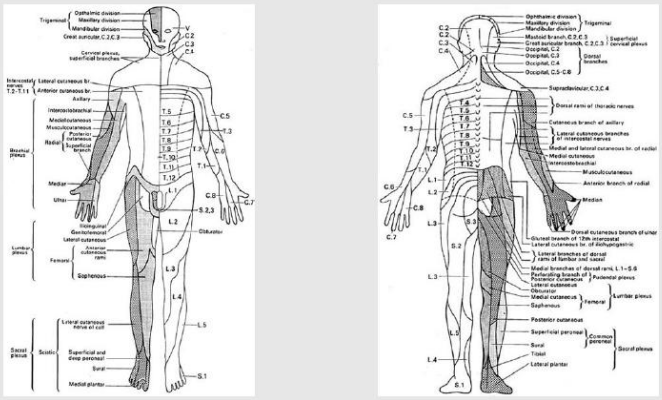


FIGURE 8a 8b
Peripheral nerve (shaded) vs. dermatomal distribution of skin sensation

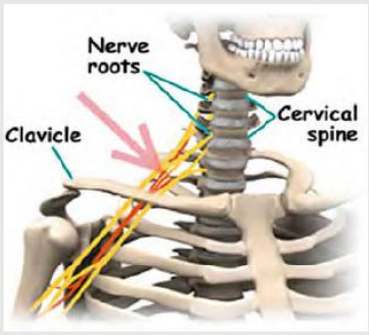


FIGURE 9
Brachial plexus injury ("heavy BC syndrome")

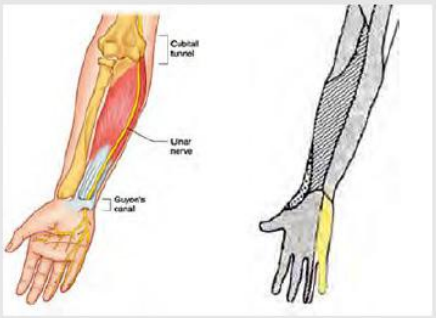


FIGURE 10
Ulnar nerve ("funnybone" syndrome)

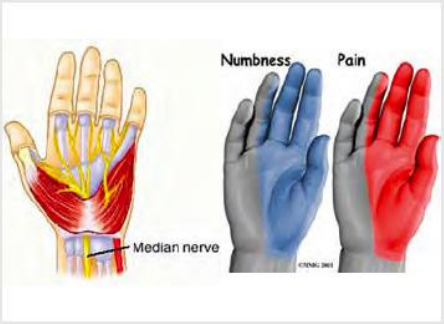


FIGURE 11
Median nerve ("Carpal tunnel" syndrome)

Obesity and compression by a weight belt can cause an impingement of the lateral femoral cutaneous nerve resulting in paraesthesias of the upper outer thigh (Fig.13).

SUMMARY

The purpose of this article is only to separate out the tingles that are not bends. Any injury or illness causing loss of strength, weakness or loss of function, including bowel or bladder function, is always to be considered a medical emergency.

All anesthesia in an area that lasts more than a minute or two (e.g., due to direct mechanical compression of a nerve due to position or compression by diving gear, etc.) is in need of immediate medical attention.

Paraesthesia or tingling is the result of a partial interruption of sensory nerve conduction between the skin and the sensory cortex Both paraesthesia and anaesthesia may be the result of damage to the brain, spinal cord or nerves. Large areas of numbness – especially if a whole arm or leg is affected and there is associated weakness or paralysis – are very suspicious of brain involvement and constitute a medical emergency.

Paraesthesias or weakness in the distribution of a dermatome indicates probable spinal cord or spinal nerve root involvement. Although this may be due to other causes, such as a prolapsed intervertebral disk (i.e., the cushion of fibrous cartilage between vertebrae), these manifestations require urgent medical assessment.

If numbness or tingling is limited to a seemingly random patch of skin and does not affect the entire limb or a circumscribed segment, then it is probably due to a peripheral nerve or nerve plexus injury.

The most common of these are compression or minor injuries of: (1) lower brachial plexus; (2) ulnar nerve; (3) median nerve; (4) sciatic nerve and (5) lateral femoral cutaneous nerve.

Remember – when in any doubt – contact Divers Alert Network for assistance and advice.

www.diversalertnetwork.org.

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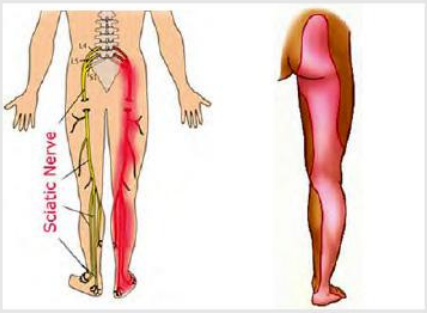


FIGURE 12
Sciatic nerve ("Numb bum" syndrome)

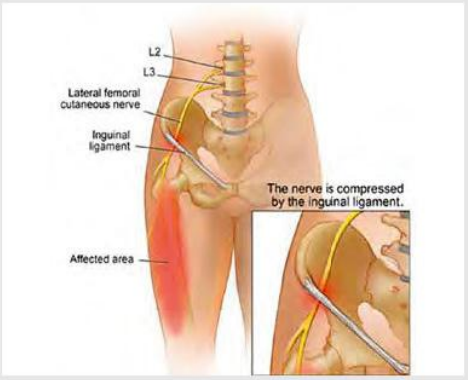
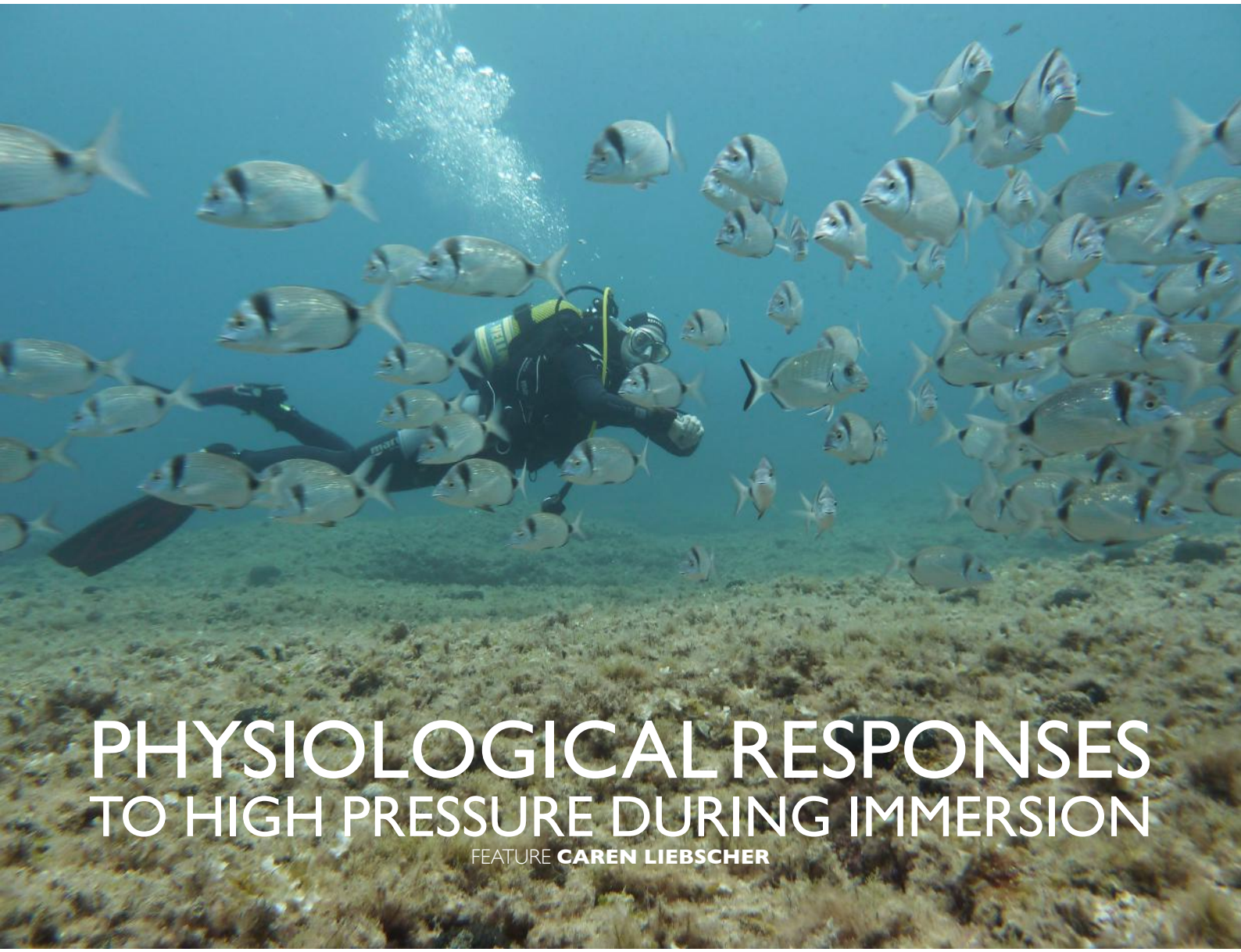


FIGURE 13
Lateral Femoral Cutaneous nerve ("Weightbelt" syndrome)



PHYSIOLOGICAL RESPONSES TO HIGH PRESSURE DURING IMMERSION

FEATURE **CAREN LIEBSCHER**

The body's physiological response to high pressure during immersion.

Have you ever been bothered by any of this during your scuba dive? Getting narced, equalisation problems, the urge to relieve yourself, or headaches after diving?

GETTING NARCED

Some love the feeling but not everybody experiences it – the narcotic effect of nitrogen, famous for depths at or beyond 30 metres. Its more poetic name, rapture of the deep, describes it very well. Signs and symptoms are pretty silly behaviour. People mostly have a crazy smile on their faces and show movements similar to drunkenness. Divers often report a sense of joy, wellbeing or

euphoria. People are not equally susceptible and, besides this individual difference, the effects it can also differ in the same individual from one day to the other.

Generally you can say: the rapture of the deep is triggered by an increased nitrogen partial pressure which interferes with the communication between nerve cells. When nitrogen partial pressure decreases, the symptoms of the rapture of the deep disappear.

BUT HOW DOES IT HAPPEN PHYSIOLOGICALLY?

First of all – according to P.B. Bennett – the narcotic effect is believed to be of physical and not of biochemical nature. Its main target is our central nervous system (CNS). It's probably best explained by the Meyer-Overton-Hypothesis. Narcosis happens when the inert gas – Nitrogen – penetrates the lipids of the brain's nerve cells and interferes with the transmission of signals from one nerve cell to the other.

For the nerds among the divers: Nitrogen is making up 78% of our air. On land there is one atmosphere of pressure (i.e. the partial pressure of Nitrogen is 0.78), while at 10m in the water we are breathing under two atmospheres of pressure, meaning twice the pressure (i.e. the partial pressure of Nitrogen is 1.56). With increasing pressure while descending beyond 10m, the partial pressure of nitrogen increases (at 20m it's 2.34, at 30m it's 3.12 and so forth).

While some people compare it to the effect of LSD, other smart people compared the mental impairment by nitrogen narcosis to having a martini on an empty stomach. This is why the same smart people called it the Martini Effect. If narcosis hits you and no one pulls you back up and you keep descending, then for every subsequent 10-15m the effect on mental impairment is the equivalent of having had one more martini. Narcosis itself is not life-threatening, but your responses to your environment or any equipment problems underwater could be. As any right-minded person wouldn't drive drunk, you shouldn't continue diving narced.

To avoid narcosis, it doesn't help to drink alcohol the evening before the dive or if you feel stressed, overworked or anxious. These factors will all multiply the narcotic effect or trigger it more easily. Further influencing factors can be hard work, cold water, fear, descent rate, fatigue, illness, medication, obesity, and probably more. Your best life insurance, if you are prone to Nitrogen narcosis, is your dive buddy who just needs to pull you in shallower depths as soon as you start acting weird.

Besides Nitrogen, gases like Helium, Neon, Argon, Krypton and Xenon are also inert gases and can cause gas narcosis by solving in the nerves' lipoids and interfering with their electric signals. The narcotic effect of inert gases depends on the degree of their fat solubility and differs between the different inert gases. Helium has less lipoid solubility and therefore a less narcotic effect. So, deep divers use it. Xenon has the highest lipoid solubility and therefore a high narcotic effect. It is actually used for anesthesia in medicine. Nitrogen ranges somewhere between these two. It is narcotic under pressure.

EQUALISATION PROBLEMS

Equalising your ears is what most of us have learned even before they started diving, namely when they had their medical check-up whether they were fit to start scuba diving at all. The ENT usually asks you to clear your ears.

In scuba diving equalising is a necessity in order to protect your eardrum, a very subtle membrane in your ear, from bursting due to increased pressure underwater while you are descending. With a hole in your eardrum you not only hear less but water can also come in and irritate your balance system (which sits in the vestibular organ in your inner ear). Besides, a ruptured eardrum hurts and will keep you from diving for several months. If not healed properly, you can suffer from permanent hearing loss, vertigo and inflammation. So, better make use of the Eustachian tube inside your skull that connects your ear with your throat and enables you to push air against the inside of your eardrum. This will compensate – or equalise – the pressure from the outside. The deeper you descend, the more pressure will again push on the outer side of your eardrum. This is why you have to repeat the procedure many times when going down. The best is to equalise your ears early enough and often enough!

Since we are all different and some people have difficulties equalising their ears, it is nice to hear there are at least 5 different techniques for equalisation. Pick the best for you!

1. **Valsalva Technique:** simplest, well-known technique. Pinch your nose and blow air into it.
2. **Toynbee Manoeuvre:** close your nostrils and swallow. This opens the Eustachian tubes and the tongue movement will push air into them.
3. **Frenzel Manoeuvre:** close your nostrils and the back of your throat and try to make a "k sound". This needs a bit of practicing.
4. **Edmunds Technique:** tense your soft palate and throat muscles. Push your jaw down and outwards and try the Valsalva. (It's a difficult one)
5. **Voluntary Tubal Opening:** many freedivers know and use this technique. It needs practicing. Contract the muscles in your throat and move your jaw downward and forward. It's a bit like trying not to yawn. By this movement, the Eustachian tubes open up, enabling you to equalise.

If you keep having problems equalising your ears, you should go to a specialist and have your ears checked. Don't force anything. You can 'blow up' your eardrum. After all, it's a very fine membrane.

THE URGE TO RELIEVE YOURSELF

With submersing into water a lot of physiological changes take place due to changes in temperature, gravity, oxygen absorption and, simply, the dive reflex.

Our cardiovascular system deals with the most important changes while adapting to the "new" environment by a so-called blood shift. Through the increased ambient pressure and its compression on our veins, especially in deeper immersed body parts, the blood in the legs is squeezed towards the body's core, i.e. the abdomen and chest (if the diver is positioned vertically with head up). Approximately 400 to 800 ml of the venous blood is shifted this way. The little capillaries – arterioles that surround the alveoli of the lung – holds this blood like a sponge and acts against the pressure. This blood shift irritates the blood volume regulatory circuit. It activates the sensors but instead of real blood volume increase this is caused only by a volume shift. It triggers a whole physiological chain which was described first by Gauer and Henry and therefore called the Gauer-Henry-Reflex: the expansion of the thorax by the volume shift of blood and plasma activates receptors on the heart and the lungs which in turn signals the kidneys – via nerves and hormones – to increase urine secretion. The overall goal is to relieve the heart. Because of the surge of blood, the heart has to work more which it compensates with a larger stroke volume. The heart rate stays almost the same. In short: immersion triggers increased kidney activity and higher urination which leads to dehydration and electrolyte deficiency in the long run. To compensate for it, it is advised to start hydrating – drinking water – two hours before a dive and also in between dives.

Furthermore, if you have ever encountered headaches after diving, the reason for it might have been one of these:

- dehydration
- a squeezing mask
- too much alcohol the evening before
- bad breathing technique while scuba diving (e.g. skip-breathing can accumulate carbon dioxide)
- no sleep
- sunstroke
- overheating
- ear/equalisation problems caused, for example, by congestion of your sinuses
- signs and symptoms of DCS

If headaches don't resolve quickly, you may need to see a doctor.

DAN | AlertDiver

UPCOMING EVENTS

EDA MOVIE NIGHT WITH VOX CINEMAS

SEA OF LIFE | VOX Cinemas, Mercato Mall
Wednesday 14th November 2018 | 18:30 Registration, 19:00 Start

Right now what's happening in the ocean is largely out of sight and out of mind. Sea of Life is about to change that. Filmed over three years in seven countries, Sea of Life dives into some of the most spectacular ecosystems on the planet, exposing both the destruction that's happening in the ocean and the efforts underway to stop it. Creating a world that's beautiful for all species will require the greatest heroes of our generation to rise up and tackle the biggest challenge the world has ever faced.

ABU DHABI DIVE CLEAN UP ARABIA

DIVE CLEAN UPS | ABU DHABI (EDA MEMBERS ONLY)
Friday 2nd November 2018 | Various Locations

Dive and Mangrove clean ups will be conducted in Abu Dhabi through Al Mahara Diving Center and Ocean Dive Center. A lunch will follow where everyone will regroup and hand in their clean up results, venue TBC. Details to follow.

EAST COAST DIVE CLEAN UP ARABIA

DIVE CLEAN UPS | EAST COAST (EDA MEMBERS ONLY)
Friday 9th November 2018 | Various Locations

We will be holding this year's dive clean ups through individual dive centres on the East Coast with Al Boom Diving Al Aqah, Extreme Water Sports Fujairah, Freestyle Divers Dibba, The Palms Dive Centre Fujairah, Sandy Beach Dive Centre Fujairah, and Divers Down Al Aqah. A lunch will follow at Le Meridien Al Aqah Beach Resort and Spa. Details to follow.

COASTAL CLEAN UP ARABIA

COASTAL CLEAN UPS | 5 EMIRATES (EDA MEMBERS ONLY)
Friday 23rd November 2018 | Buses to Various Locations

We will be holding our beach clean ups separately this year and buses will take members on to 5 different locations in Umm Al Quwain, Ras Al Khaimah, Dibba, Khorfakkan and Abu Dhabi. A lunch will follow where everyone will regroup and hand in their clean up results, venue TBC. Details to follow.

DID YOU KNOW?

Why You Should Never Flush Your Contact Lenses Away

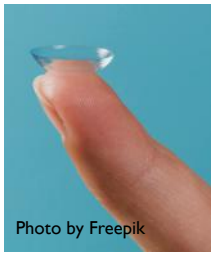


Photo by Freepik

If contact lenses are kept in for too long, all kinds of eye problems such as infections may arise, but throwing them out the wrong way can be just as harmful to the environment! Contact lenses are a large part of the microplastic pollution that swirls around in the oceans and other waterways. Approximately 45 million Americans who wear them, flush them down the toilet or swirl them down the sink. Research has been conducted on 11 different types of lenses (most make it past filters, surviving wastewater treatments) and they all break up into microplastics and take in more pollutants during their journey through the sewers to then later be ingested by marine life as they sink to the bottom of the oceans. Little fish eat the polluted fragments of lenses, bigger fish eat the littler fish – and the cycle continues, until it eventually makes its way into human food. And it doesn't just stop there. A recent study found that microorganisms borne by microplastics that then snag on a single coral, can sicken entire reefs.

It is estimated that six to 10 metric tonnes of lenses end up in wastewater each year in the US alone. If you wear contact lenses, please dispose of them in the correct way – in the trash.

MISSION STATEMENT

To conserve, protect and restore the UAE marine resources by understanding and promoting the marine environment and promote environmental diving.

LEGISLATION

Emirates Diving Association (EDA) was established by a Federal Decree, No. (23) for the year 1995 article No. (21) on 23/02/1995 and chose Dubai as its base. The Decree stipulates the following responsibilities for EDA.

- To legislate and regulate all diving activities in the UAE.
- Ensure environmentally respectful diving practices in all EDA members.
- Promote and support the diving industry within the UAE by coordinating the efforts of the diving community.
- Promote diving safety in the commercial and recreational diving fields through standardization of practices.
- Promote and preserve historical aspects of diving within the gulf region and enhance environmental education to diving and non diving communities through EDA activities.

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EDA
جمعية الإمارات للغوص
Emirates Diving Association

THE YEARLY CLEAN UP CAMPAIGN OF THE UNITED ARAB EMIRATES

REGISTER FOR CLEAN UP ARABIA 2018 | TOGETHER WE MAKE THE CHANGE TO MAKE A DIFFERENCE!
2 NOVEMBER – DIVE CLEAN UPS AUH | **9 NOVEMBER** – DIVE CLEAN UPS EAST COAST | **23 NOVEMBER** – COASTAL CLEAN UPS

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EDA is a non-profit voluntary federal organisation and is accredited by UNEP as an International Environmental Organisation.

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