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DIVERS FOR THE ENVIRONMENT

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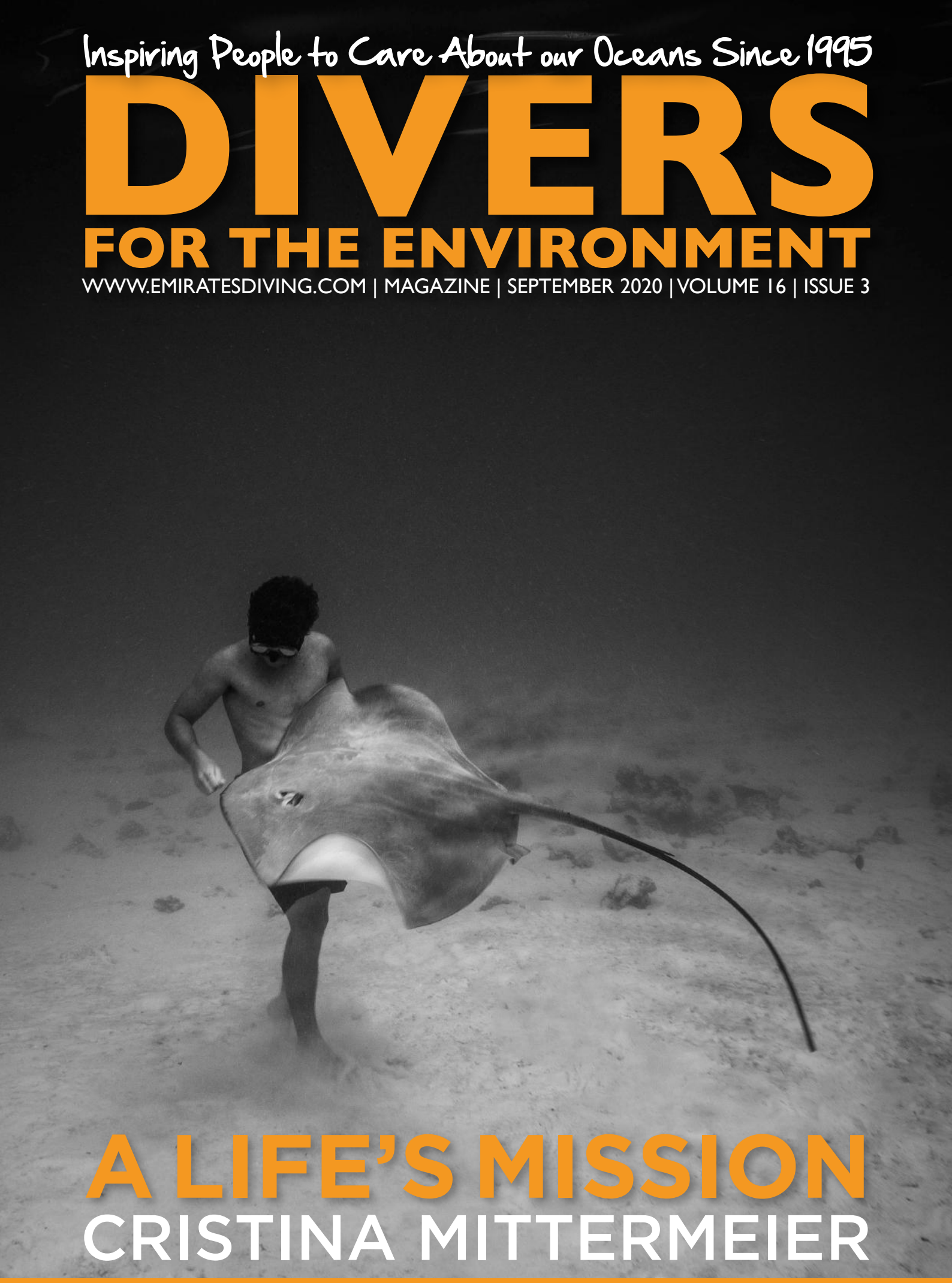

A LIFE'S MISSION
CRISTINA MITTERMEIER

EDA'S SEA OF SHADOWS SCREENING • **FIGHTING FOR SUNSHINE** • PROJECTS ON BONAIRE
• **THE DARA WRECK CLEAN-UP** • PADI ELEARNING • **AUSTRALIAN WINTER DIVING**

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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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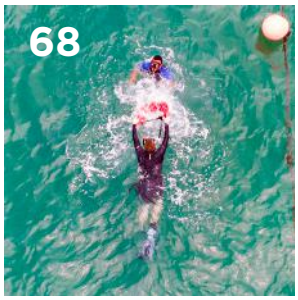


REGULARS

NEWS

KIDS CORNER

REEF CHECK

FEATURES

PRODUCT REVIEW

UW PHOTOGRAPHY

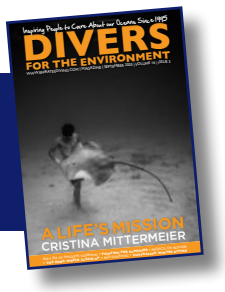
DIVERS FOR THE ENVIRONMENT

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 2020. Send all articles, feedback or comments to: **magazine@emiratesdiving.com**

COVER

PHOTO BY CRISTINA MITTERMEIER

Titouan Bernicot, Coral Gardeners Founder playing with a pink whip ray off the shallow waters of Mo'orea.



REDUCE REUSE RECYCLE

DIVING DESTINATIONS

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 & GRAPHIC DESIGNER

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

THE QUARTERLY CONTRIBUTORS

Meet the regular magazine contributors who share their passions and interests with our readers. Want to contribute? Email: **magazine@emiratesdiving.com**

SIMONE CAPRODOSSI
Simone is an award winning Italian underwater and travel photographer. He lived in Dubai for 12 years and has been a main feature contributor to the EDA Magazine and is one of EDA's Digital Online competition judges. Simone now resides in Australia where he owns and manages the Sundive Byron Bay dive centre.
www.sundive.com.au | Instagram: @scaprodossi

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.

LORENZO MITTIGA
Lorenzo Mittiga is an Italian marine conservation visual story-teller, Marine Biologist and an Aqua Lung Ocean Ambassador. Based on Bonaire, Netherland Antilles, he works as a full time photographer specialising in underwater photography. **www.lorenzomittiga.com**

SARAH MESSER
Sarah has been living in Dubai since 2012 and discovered her diving addiction just 3 years ago. Since then she dives whenever and wherever she can, both locally and internationally. When not working in her actual day job, Sarah organises dive trips for her UAE based diving group, Dubai Divers Team.

PATRICK VAN HOESERLANDE
Diving opens up a whole new world. Being a writer-diver and co-editor of the Flemish divers magazine, Hippocampus, Patrick personally explores our underwater world and shares his experiences through his articles. You'll find a collection of them on **www.webdiver.be**.

LIFE POST COVID-19

IBRAHIM AL-ZU'BI
EDA Executive Director

I hope you and your families are well and safe and you are all adjusting to the new norms that the COVID-19 pandemic has put on us. As tragic as these past months have been, the pandemic has taught humanity crucial lessons on how to curb climate change, respect the environment and survive. Let me share with you a very brief lesson learnt from it:

- "If one of us falls, we all fall." Humans are neither immune to the coronavirus nor pandemics in general. We are only as safe as the most vulnerable of us. In our modern world, geography will not stop global challenges from spreading. These challenges will require systemic changes, not only by governments or companies, but also individuals. They will need global collective action, which is, unfortunately, an excuse for inaction. People have not been abiding by public health warnings around the world, which has had, and is still having, a disastrous impact on the spread of the coronavirus.
- Prevention is better than cure.
- The public needs to understand and learn about the gravity of the situation.
- The Power of Global Focus.
- Trust the Experts.
- Change Behaviours.
- We can, and should, imagine options for a sustainable future.

Life will for certain be different post COVID-19, I do hope we will appreciate the environment and especially our marine life more. Enjoy and value nature. It is a wonderful world, make sure to enjoy it responsibly.

The COVID-19 pandemic will eventually pass, but it should be a wake-up call to all of humanity on how complex the climate challenge is and how greater global collective action is needed. We should not waste this crisis.

Together, we can make a difference!

Dive Safe,

Ibrahim Al-Zu'bi

Ibrahim Al-Zu'bi

A VIRTUAL EDA MOVIE SCREENING
SEA OF SHADOWS

For us to be able to share our EDA Movie Screenings with all our members, we have kept our August screening (begins 19 Aug) an online one with the continued protocols of social distancing still an important requirement to keep everyone safe and comfortable. We have also taken our EDA members living in the other Emirates into consideration who are not able to make it to Dubai to watch the films via the big screen with our partners at VOX Cinemas – which also includes our members living internationally, who are not based in the UAE. Our online screenings will make them more accessible for all our members to take part and watch these important documentaries. Our Online Movie Screenings remain accessible only to EDA members and their families. You will still have to register with us in order to receive a special link to play the films via the online platform.

ABOUT THE FILM

A looming disaster in one of the most spectacular environments on Earth sparks a rescue mission unlike any other in SEA OF SHADOWS, a riveting new documentary with the intensity of a Hollywood thriller from National Geographic Documentary Films, produced by Terra Mater Factual Studios and winner of the Sundance audience award. When Mexican drug cartels and Chinese traffickers join forces to poach the rare totoaba fish in the Sea of Cortez, their deadly methods threaten to destroy virtually all marine life in the region, including the most elusive and endangered whale species on Earth, the vaquita porpoise. SEA OF SHADOWS follows a team of dedicated scientists, high-tech conservationists, investigative journalists and courageous undercover agents as well as the Mexican Navy as they put their lives on the line to save the last remaining vaquitas and bring the vicious international crime syndicate to justice.

TAKE ACTION

SEA OF SHADOWS has brought together a powerful coalition of scientists, investigators, activists, politicians and nonprofits working together to save the vaquita and to help highlight the plight of endangered species across the globe.

The film aims to communicate the urgency of the crisis and harness public attention to inspire meaningful action. SEA OF SHADOWS shines a spotlight on the links between wildlife crime, global security and economic instability, mobilizing audiences to help advance policy and on-the-ground protections. The film has screened for the United Nations in New York City and for politicians on the floor of the Mexican Senate, is touring as part of the US State Department's American Film Showcase and was presented at the United Nations in Geneva, Switzerland, by the secretary general of CITES (Convention on International Trade in Endangered Species).

With your help we will continue to fight for key conservation victories, including enforcement of the gill net ban in the Sea of Cortez by November 2019 and a return of the compensation programme for local fishermen during the transition to economic alternatives.

SIGN AND SHARE THE CHANGE.ORG PETITION: https://bit.ly/2Fdi48l

ABOUT THE VAQUITA (*Phocoena sinus*)

- The vaquita is a species of porpoise; it is the smallest of all cetaceans, a marine mammal group that includes whales and dolphins.
- The vaquita grows to a length of 5 feet and lives only in the northernmost waters of northwestern Mexico.
- The vaquita was not known to science until the 1950s and the first photograph of a living vaquita was not captured until the 1980s.
- Shy and solitary, vaquitas avoid boats and often are seen alone or in pairs.
- The vaquita feeds off schooling fish, squid, octopus and crustaceans.
- Vaquita means "little cow" in Spanish and they weigh about 120 pounds with a lifespan of 20-25 years.

WHY THE VAQUITA IS DISAPPEARING

The vaquita is being driven to extinction by an illegal fishing industry run by organised crime elements throughout Mexico and China that exists to illegally traffic wildlife products to black markets in China. Despite decades of international protections for their habitat, the elusive vaquitas are most likely to die by drowning when they get caught in illegal gill nets that are put out from early November to June each year to catch a similarly sized and also endangered species of fish call the totoaba (*Totoaba macdonaldi*). The vaquitas get trapped in the nets, preventing them from surfacing for air.

The swim bladder of the totoaba is purported to have healing powers and is a valuable albeit illegal commodity in China, where it is worth more, ounce for ounce, than gold or cocaine. Due to its black market value, totoaba swim bladders are purchased and trafficked by Mexican drug cartels and Chinese organised crime groups, creating a demand that many fishers in rural communities around the Sea of Cortez are tempted to fill. In a place that Jacques Cousteau called "the aquarium of the world" for its stunning biodiversity, there are now thousands of miles of illegal gill nets killing the vaquita, totoaba, sea turtles, seals, stingrays, sharks and many other species in the Sea of Cortez. Efforts to rescue the vaquita and put it in human-made habitats until totoaba fishing is curbed have been fruitless as the small number of vaquita that have been brought to captivity have not adapted well. Rescue and release is no longer considered a viable option for conservation.

The fight to save the vaquita is complex, requiring action by scientists, communities and governments to address variables including corruption, enforcement and economics. Wildlife crime is the fastest-growing source of revenue for organised crime and terrorist organisations worldwide, with an estimated value of $20 billion USD per year. Efforts to save the vaquita, and other endangered species, require participation of not only conservationists and scientists, but governments and international law enforcement agencies. SEA OF SHADOWS puts a local face on a global issue, highlighting how one endemic species in a small part of the world can fuel transnational crime and corruption. While this can feel overwhelming, it also means there are a number of ways in which we can positively impact the conservation of endangered species.

TIMELINE RECOGNISING THE VAQUITA'S ENDANGERED STATUS

1958 The Vaquita was first described by science.

1985 Listed as "Endangered" on the US Endangered Species Act in 1985, then designated as "Critically Endangered" on the IUCN Red List in 2008.

1990s Bilateral efforts to protect the vaquita have been ongoing since the 90s, with participation of the US National Oceanic and Atmospheric Association (NOAA), Southwest Fisheries Science Center, Mexican government, Canadian government and numerous NGOs and conservancy groups.

2005 The Upper Gulf of California and the Colorado River Delta Biosphere Reserve was designated as a UNESCO World Heritage site in 1993 and an official Vaquita Refuge was established, banning commercial fishing with gill nets in core vaquita habitat in 2005.

2008 The US, Mexico and Canada tasked the Commission for Environmental Cooperation with delivering a North American Conservation Action Plan for the vaquita, which called for mitigating threats from gill nets, developing alternative fishing gear and livelihoods, and increasing awareness about the vaquita. Despite the Mexican government investing over $40 million USD enforcing the fishing ban, provisions for alternative livelihoods in the region have been inconsistent and the vaquita population has continued to decline precipitously.

WEBSITE: www.films.nationalgeographic.com/sea-of-shadows


THE CARTELS, THE BLACK MARKET AND THE FIGHT TO SAVE A SPECIES.
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ENVIRONMENT AGENCY – ABU DHABI JOINS FORCES WITH THE NATIONAL AQUARIUM FOR SIGNIFICANT REHABILITATION PROGRAMME TO PROTECT THE WILDLIFE IN ABU DHABI

THE TURTLE REHABILITATION FACILITY WILL BE THE LARGEST IN THE REGION


HE Dr Shaikha Al Dhaheri signing the agreement with TNQ.


Fouad Mashal, CEO of Al Barakah International Investment during signing ceremony.

Abu Dhabi, 8 July 2020: The Environment Agency – Abu Dhabi (EAD) has signed an official agreement with the largest aquarium in the Middle East – The National Aquarium – to help create the largest and one of the most innovative rehabilitation schemes of its kind to protect and rehabilitate wildlife in the emirate of Abu Dhabi. According to the agreement, both parties will be working closely together to conserve wildlife, specifically wild sea turtles, which will be rehabilitated within the aquarium.

The virtual signing ceremony was held between Her Excellency Dr Shaikha Salem Al Dhaheri, Secretary General of EAD and Fouad Mashal, CEO of Al Barakah International Investment, developer of Al Qana and The National Aquarium.

Furthermore, the five-year contract outlines how The National Aquarium will support to EAD with some of its ongoing wildlife conservation programmes, the development of new awareness campaigns and unique educational experiences in the region. The National Aquarium will also work with the agency in further research studies and gathering of data, while encouraging exciting internship opportunities for students of biology, ecology, and veterinary education.

Her Excellency, Dr Shaikha Salem Al Dhaheri, EAD's Secretary General said, "We are delighted to initiate this rehabilitation project, in collaboration with The National Aquarium. Having such facilities within the confines of Abu Dhabi will assist our continuous efforts to preserve wildlife in the emirate. By collaborating with The National Aquarium, we will be able to rehabilitate various wildlife species before releasing them into their natural habitats, while expanding our scientific studies."

She added that Sea turtles would be one of the main species that the project will focus on, and this agreement will add to the successful rehabilitation projects that have taken place over the years.

She stated, "As far back as 2001 we have been working on conserving Sea turtles in Abu Dhabi waters. Now, the overall foraging Sea turtle populations, namely Hawksbill and Green turtles, have been relatively stable over the last decade. Based on data from aerial surveys, we have more than 5,000 wild sea turtles in our waters."

Fouad Mashal, CEO of Al Barakah International Investment, developer of Al Qana and The National Aquarium said, "The National Aquarium is one of the key attractions that will play an important role in Al Qana's life. Beyond the social dining and entertainment destinations, our vision is to also raise awareness in Abu Dhabi and across the globe. With The National Aquarium set to become one of the UAE's top tourist attractions, we have a unique opportunity to speak to people from all around the world about the great conservation work being done here in Abu Dhabi.

We are honoured to partner with EAD and invest in such an inspiring programme. To bring this exceptional project to life, we have hired a world-class team of experts to manage the rehabilitation of important marine and terrestrial wildlife in the Emirate."

Paul Hamilton, General Manager of The National Aquarium said, "We want to create memorable moments for people to reconnect with nature. Our daily lives have become disconnected from the natural world and while we are slowly realising the impact that humans are having on the environment, there is still a long way to go to address these issues. That is why it is so important to reach new audiences and educate future generations about the importance of protecting and rehabilitating our wildlife and ecosystems."

He added, "We recognise the important role we must play with regards to education and the conservation of Abu Dhabi's natural treasures. Hence, we have constructed specialised facilities and a rapid response vehicle to assist our veterinarians in effectively reacting to wildlife emergencies."

The National Aquarium is going to provide full veterinary treatment support and in-house care, as well as general animal husbandry expertise, until the animals are fully recovered before their release back into nature. They will also collaborate with EAD for satellite tagging and services, when required.

Wild sea turtles are among the most highly migratory animals on the planet, and their numbers are a great reflection of the condition of marine environments. Of the seven species of marine turtles in the world, two occur in Abu Dhabi's waters: the Critically Endangered Hawksbill turtle and the Endangered Green turtle.


Hawksbill Turtle. Photo by Hanne Jens Eriksen.

HAMDAN BIN ZAYED EXPRESSES HIS OPTIMISM
ABOUT THE RECORDED IMPROVEMENT IN ABU DHABI FISH STOCKS

Abu Dhabi, 15 July 2020: His Highness Sheikh Hamdan bin Zayed Al Nahyan, the Ruler's Representative in the Al Dhafra Region and Chairman of the Environment Agency – Abu Dhabi (EAD), expressed his optimism about the recorded improvement in fish stocks of some of the major commercially fished species in Abu Dhabi waters.

This noticeable rise is attributed to the policies and management measures that have been taken to improve the deteriorating position of the stocks of several fish species that were being depleted. A comprehensive protection plan designed for the recovery of fish stocks and sustainability for future generations has witnessed positive results within just one year of its implementation which will be a vital contribution to the organisation of food security in the country.

His Highness said, "Because fishing is an important component of our marine heritage, a plan had to be devised to revitalize and replenish the fish stocks in Abu Dhabi by following ideal methods and ways to ensure the sustainability of fisheries. We implemented a series of decisive administrative measures and procedures that reduced pressure on fisheries in the commercial and recreational sectors, in addition to improving fish stocks and rehabilitating the habitats of fisheries."

Sheikh Hamdan praised the cooperation of the fishermen in implementing the plans and following procedures that contributed significantly to reducing the effects of overfishing on the marine environment and in achieving a balance between environmental, economic and social goals. He stressed his hope that fish stocks will witness further improvement with the continued commitment to implementing the existing measures in a way that achieves the desired results in an environmentally sustainable fisheries sector.

His Excellency Mohammed Ahmed Al Bowardi, Vice Chairman of EAD, praised the results achieved by EAD, considering it a step in the right direction to rebuild the main fish stocks above the sustainable threshold of the Spawning Biomass per Recruit (SBR) KPI which is 30 per cent. He also praised

سمو الشيخ حمدان بن زايد آل نهيان
ممثل الحاكم في منطقة الظفرة

H.H.SHEIKH HAMDAN BIN ZAYED BIN SULTAN AL NAHYAN
RULER'S REPRESENTATIVE IN AL DHAFRAH REGION

the management of commercial fisheries for acting in an effective manner that ensures environmental stability, consistent with meeting the needs of the population by contributing to food security.

His Excellency Al Bowardi emphasized that the agency is continuing to achieve its desired goals in cooperation with the Ministry of Climate Change and Environment and its strategic partners within the framework of comprehensive efforts to protect marine resources through the National Framework for Sustainable Fisheries of the United Arab Emirates.

The framework extends up to the year 2030 within a national plan that was developed to ensure the restoration of fish stocks and reduce the effects of overfishing on the marine environment in the UAE, as well as the promotion of environmentally sustainable, feasible and socially responsible fisheries.

His Excellency emphasized that despite the high results of the Sustainable Exploitation Index, which indicates that it is moving in the right direction to recover fish stocks, the numbers are still below the target sustainability levels. He also stressed the importance of continuing to implement administrative measures to prevent the use of Gargoor fishing gear in Abu Dhabi waters until the targeted results are achieved.

Her Excellency Razan Khalifa Al Mubarak, Managing Director of EAD confirmed that the goals set by the agency, which are in accordance with international best practices, would not have been achieved without the continuous support of the wise leadership. Additionally, the positive results were possible due to the support of the strategic partners of EAD such as the Critical Infrastructure and Coastal Protection Authority, the Ministry of Climate Change and Environment and the Abu Dhabi Fishermen Cooperative Society, who played an effective role in supporting the agency's efforts to achieve sustainability in the fishing sector.

Her Excellency also stressed the important role played by fishermen through their commitment to the decisions and actions taken by EAD to ensure the recovery of fish stocks. She added, "Through the active participation and cooperation of all concerned authorities in the emirate to continue the measures and procedures that have been taken, it will be possible to stop the decline in fish stocks and ensure their recovery, maintain the fishing profession and support environmental tourism, cultural and recreational activities in Abu Dhabi."

EAD employs two main sustainability indicators to monitor fish stocks. The first key indicator is the Spawning Biomass per Recruit (SBR), which is the percentage of the fish that are old enough to spawn, thus allowing for the renewal of the stock. This index is used for species such as Hamour, Shaari, Farsh and Kanaad. The second indicator is the Sustainable Exploitation Index (SEI) that is used to describe the proportion of species that are sustainably exploited from the total assessed landings.

EAD revealed at the beginning of 2019 the results of a fish resources survey that it carried out during the period 2016-2018, which showed that fish stocks were in urgent need of protection from overexploitation and that necessary measures and procedures must be


Shaari


Hamour


Safi


Badah

taken for their sustainability and development.

The results of the survey also showed that fisheries are subject to depletion as a result of overfishing, indicating that the main fish species, such as Hamour, Shaari and Farsh are the most exposed species at a rate of three to five times the limits of sustainable fishing. According to the results, the species faced over-exploitation, with the adult stock size only 7 per cent for Hamour, 11 per cent for Shaari and 6 per cent for Farsh respectively, indicating that more than 85 per cent of the stock size of these species is subject to excessive depletion.

The agency's data revealed a noticeable improvement in the Spawning Biomass per Recruit (SBR) which determines the ratio of the adult stock size for three main commercial fish species: Hamour, Shaari and Farsh in comparison to the size of their untapped stock. There was an increase observed in the mean adult stock size of 7.6 per cent in 2018 to 8.1 per cent in 2019. Furthermore, a clear improvement was noted for five main fish species compared to 2017, where the Spawning Biomass per Recruit (SBR) for both Hamour and Kanaad increased at a rate of 65 percent, while the Safi Arabi increased by 18 per cent, Shaari by 13 per cent and Farsh at a rate of 9 per cent.

It is expected that these indicators will continue rising in the future if the implementation of the existing measures are sustained, especially the banning of Gargoor fishing that targets the main species that include Hamour, Shaari and Farsh. However, increases may not appear immediately especially that changes may arise due to natural variation. Nonetheless, as such no instances have been recorded for the commercial fishing of Farsh since May 2019. Likewise, the use of Ghazal nets (encircling nets) that target pelagic fish species such as the Kanaad, have been prohibited.

With regards to the Sustainable Exploitation Index which describes the proportion of species that are sustainably exploited out of the total assessed catch, the data of EAD revealed a noticeable increase during a short period of time from the application of fishing measures and procedures, as the index increased from 5.7 per cent in 2018 to 29.3 per cent at the end of 2019. This increase is attributed to the ban on Gargoor fishing, which specifically targets the species that have been classified as being vulnerable to overexploitation, such as Farsh, Shaari and Hamour.

The recent study revealed that there is an improvement in the stock of Badah fish and the mean size of the fish has also increased considerably. In addition, the oldest fish reported is 10 years as compared to 7 years in 2003.

All these observations, combined with EAD's efforts to prevent fishing during breeding seasons since 2009 have proven to be an important indicator in the recovery of the species in Abu Dhabi waters.

The data collected from the commercial landings of Jesh Um Al Hala showed a substantial increase in the mean size of this species which is a positive indicator of the recovery of stock. This species has an average life span between 4 to 10 years and are considered the second largest species of fish found in the country.

Additionally, Hamour were detected in large sizes during this year, with a maximum length in excess of 100 cm or the equivalent of one metre, and were estimated to be about 12 years old and is a good indication of an improvement in stock.

Her Excellency Dr. Shaikha Salem Al Dhaheri, Secretary-General of EAD said, "These positive indicators reveal the importance of the measures taken by EAD in response to population growth and the growing demand for fish that led to increased pressure on fish resources. Furthermore, these new policies have enabled fish stocks to recover in the long term and provide an opportunity for at least 70 per cent of fish resources to replenish by 2030."

She also added that the Sustainable Exploitation Index increased to 29 per cent and that the administrative measures implemented in fisheries are moving in the right direction.
Dr. Al-Dhaheri added, "In cooperation with its partners, EAD worked to adopt worldwide procedures to manage fish stocks. These efforts led to the establishment of several marine reserves, the introduction and application of a commercial and recreational fisheries licensing system, and the regulation of the use of fishing equipment. Moreover, a seasonal ban to protect fish was applied and during breeding seasons, a minimum size for fish that can be caught was set. This is in addition to banning unsustainable fishing methods such as Gargoor which was re-enforced on May 1st 2019, and the ban on encircling nets came into effect on December 23rd 2018."

Her Excellency emphasized that firm management decisions regarding fisheries require a period of time to ensure that the state of stocks changes from overexploitation to sustainable use.

QUEENSLAND'S SHARK NETS ARE AN INTERNATIONAL EMBARRASSMENT

BY **NATALIE BANKS – MARINE CONSERVATIONIST**

News of whales recently caught in shark nets in Queensland has travelled across the seas to friends and colleagues globally. As an Australian living overseas and working in marine conservation, I am often asked about these shark nets and why they are in place. The reactions vary, but one thing that remains consistent is that every single person I liaise with believes that these shark nets should be removed during the whale migration in Australia. It appears to be "common" sense, given that this time of the year is also when beach numbers are usually lower, and that the migration occurs during Australia's winter months where weather patterns such as storms and strong winds, usually result in the government having to remove the shark control measures for days at a time. In fact, New South Wales and even South Africa remove their nets during migration patterns that impact whales.

It is beyond the pale that on one hand, Australia is seen by its own Environment Department as a leader for the protection and conservation of cetaceans and is focussing on whale numbers rebounding, yet on the other hand, is seen at least in one state, to do very little to reduce whale entanglements. Australia is known globally for its wealth of marine life and many people I speak to, talk to me about the hope that they will get to visit and see Australia one day, but they want to see the amazing whales migrate free and alive, up and down the coastline as they migrate to and from Antarctica. They are horrified to hear that instead of seeing this, they may end up seeing whales thrashing about, attempting to set themselves free from a mesh net that the government has placed there. Further more, they are bewildered to hear that a man trying to help free such a majestic animal, which attracts scores of tourists to Australia, would face a AU$60,000 fine.

The Gold Coast is well known overseas as having some wonderful beaches, fantastic theme parks and a great vibe, but the shimmering light is starting to dull at a time when Australia should be doing all it can to boost the tourism economy. Too often, the Australian Government will simply rest on their laurels and claim that the shark nets are in place to protect tourism, well, ignoring the fact that the focus should be on local beach protection, its arguable that they are in fact hurting the very thing that they are trying to protect.

Shark nets have been in place in Queensland since the 1950s. There is no reason that can outmatch the "common" sense argument that shark nets should be removed in Queensland during whale migration, particularly when concerns of shark encounters can be mitigated by a range of non-lethal alternatives such as drones, personal shark repellents, and a raft of other options highlighted by the Australian Senate inquiry into shark mitigation and deterrent measures three years ago.

Let Australia truly be the leader for the protection and conservation of cetaceans, save the whales and save the international embarrassment that comes from every time a whale is caught in these nets.

RELAXING AT DEPTH

PRESSURE ADAPTATION FOR DEEPER DEPTH RELAXATION

BY **BASSEL OUNAH – FREEDIVING INSTRUCTOR TRAINER AT APNEA ZONE**

Relaxation in freediving plays an important role. The state of mind significantly affects a diver's performance, which makes it essential to increase relaxation before starting each dive. Each individual will react differently throughout the different stages of freediving, which is why a deeper understanding of how the body reacts both physically and mentally, will lead to more comfortable and successful freediving experiences.

During training, while descending with a descent line and buddying another freediver, I can easily recognise how physical relaxation decreases when descending deeper. This stress can be identified in the neck and shoulder areas. The main three causes of this distress are in the awareness of the increasing depth being reached by the diver, any equalisation difficulties that the diver may experience and the increasing pressure on the body that is felt during the decent. An increasing depth will inevitably lead to more physical stress on the body, but does not necessarily need

to increase mental stress on the freediver. This is why it is essential to attend trainings to learn more about physical relaxation and adaptation to deeper waters in order to maintain an increased sense of calm. Both physical and mental elements can affect the diving experience. Often, when discomfort is experienced during a decent, it can cause the freediver to hyperextend the head to try to see the bottom plate to check the remaining distance. This positioning of the head actually causes equalisation issues as well as a disturbance in the hydrodynamics of the body which will decrease speed and thus increase dive time. In these cases, I try to correct the freedivers head position by gently moving the head back to the optimal position. Most of the time this correction is easily made, however, other times the freediver is too tense in the neck and shoulder area which makes it difficult to adjust. It is important to always keep your neck, shoulders and arms relaxed in freediving. Feeling discomfort when in the upside down position is normal and this is something that the diver will gradually get used to. Maintaining the correct head positioning is an essential part of achieving physical relaxation. Correct chin placement also makes a significant difference to the overall dive success. Another tip is to visualise the dive before starting. This will help to ensure correct body positioning and a deeper sense of comfort and relaxation. It goes without saying that continuous training and repetition will ensure any mistakes are corrected and will also help the freediver to gain confidence and reduce stress during the dives. Training always creates improvement and perfection requires time. Dive safe and always enjoy the blue!

PADI INTRODUCES FACE COVERINGS MADE FROM RECYCLED OCEAN PLASTIC

PADI®, the world's largest diver training organisation, has introduced an innovative range of ocean-friendly reusable face coverings to help people care for the ocean when purchasing cloth face coverings.

The company has teamed up with their rash guard partner, Rash'R, to offer face coverings manufactured from plastic bottles recycled from the ocean. These coverings contribute to the removal of plastic pollution from the ocean while helping to meet consumer demand for face masks during the pandemic.

Available through the PADI Gear collection of earth-friendly apparel and accessories, the collection includes balaclava-style face guards and dual layered cloth face masks.

The versatile face guards are breathable and easy and comfortable to wear. They feature two layers of UPF + 50 polyester to cover your nose and mouth and similar to a balaclava, can be worn in a variety of ways and easily pulled up over the face when needed. The cloth face masks feature stretchy elastic ear bands to fit faces tightly.

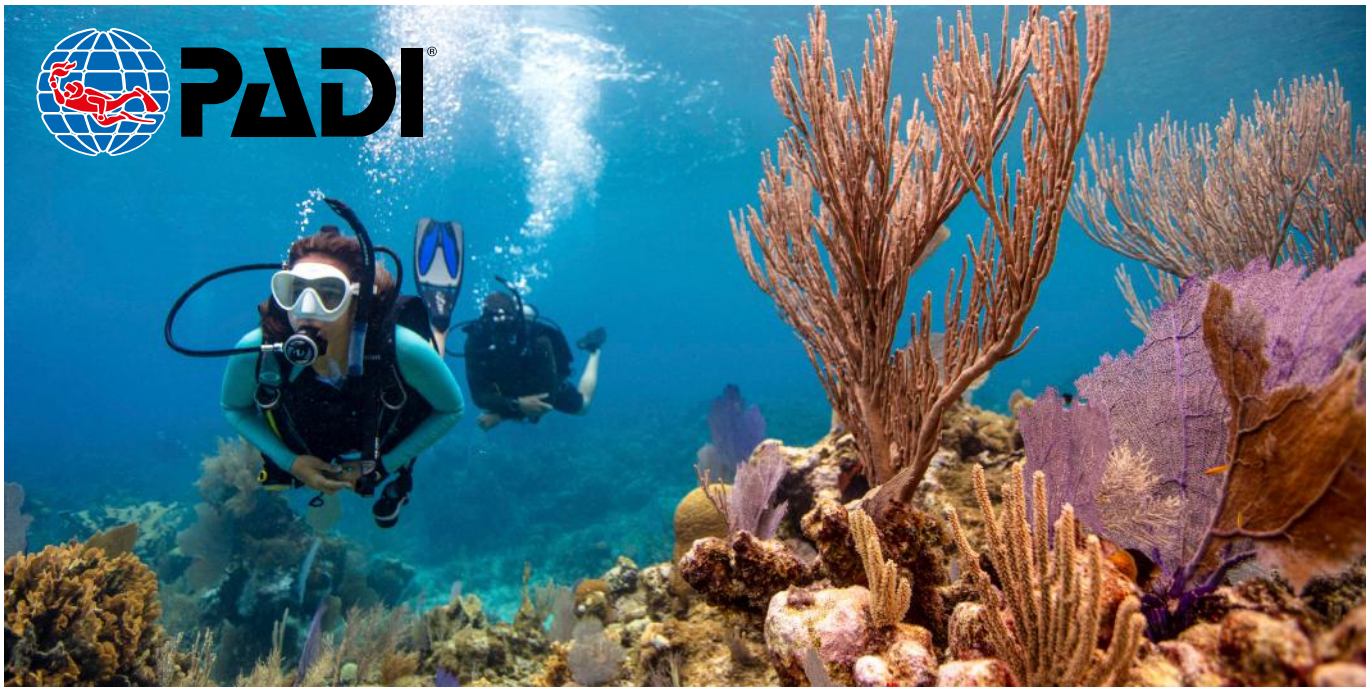
Both coverings, made from quick drying, moisture wicking recycled polyester are reusable, washable at high temperatures and feature a filter pocket for PM 2.5 carbon filters.

The multi-use face guards are packaged with two carbon-activated replacement filters and the faces masks come with five. Each last for around eight hours and additional filters can be purchased at padigear.net.

To date, based on the number of face masks purchased, PADI and its partners have removed and reused more than 812 kg of ocean plastic.

PADI Gear face guards are available in a range of seven attractive designs and PADI Gear face masks are available in adult and child sizes, featuring a variety of different patterns depicting marine life. The face coverings can be purchased through www.PADIGear.net.

PADI LAUNCHES COVID-19 DIVE STATUS WORLD MAP SHOWING WHERE DIVING IS AVAILABLE



For over 50 years, PADI®, the Professional Association of Diving Instructors, has enabled people around the globe to experience the wonder of the underwater world.

COVID-19 has disrupted travel and scuba diving operations across the globe but as the world slowly opens again, PADI wants to help divers get back in the water so they can enjoy the sport they love.

PADI has created a new interactive map to make it easy to identify in real-time where diving is permitted and what dive shops are open locally and around the world. This information is collated at source from 6750 dive centres around the world and updated regularly as situations evolve. The easy-to-use map is available on the PADI website: https://travel.padi.com/scuba-diving-after-coronavirus-world-map/.

The handy, user-friendly map features clear navigation. Just click on any country to see what travel restrictions apply, accessibility of diving in that country and the latest status for each PADI Dive Centre and Resort.

PADI hopes this map will help people discover amazing underwater places, both close to home as soon as possible and in far-flung destinations when the times allow.

BACK TO PORT

STORY BY PATRICK VAN HOESERLANDE ILLUSTRATION PETER BOSTEELS

Diving in the sea was fantastic. Skubba had really enjoyed it. Fred had also been there to help out and asked the captain hundreds of questions. The boat no longer held any secrets from Fred. He could now maybe become a captain too one day. Then he could sail and take Skubba diving in the sea himself.

During the trip back to port, it started to get dark and all the boats started to switch their lights on. Their boat also had its lights turned on. Fred noticed the lights on the right side of the boat (which the captain called the starboard side) were all green, and those on the left side, which is called the port side on a boat, were all red. Isn't that weird?

"Why are there different coloured lights?" he asked the captain.

"Ah, you discovered that one too. I wondered how long it would take you to come up with that question," the captain smiled standing behind the wheel. "With the lights – navigation lights we sailors call them – we know which direction a boat is moving."

Fred thought for a moment. Starboard is green, and port is red. Yes, he understood it now.

"Are those colours used anywhere else?" Fred asked.

"Yes, green and red are very common in navigation. Just look at the buoys," the captain explained while he pointed to the chart.

Fred took the binoculars and scanned the horizon for buoys. He saw them in all kinds of shapes and colours. On the starboard side, he saw many green buoys with a top. On the port side, most were red and those ones had no tops.

"To sail to port, we have to sail between the green and red buoys, with the green ones on our starboard side," the captain said, pointing to the chart. Fred thought it was very clever.

Boats passed alongside them. It was a very nice and peaceful trip. Skubba and Fred loved it.

After a while, Fred noticed that the buoys also had lights on them. It did not surprise him now that there were green and red buoys. What struck him was a great light that occasionally flashed. The light came from a high tower.

"That's a lighthouse," replied the captain to Fred's question of where the light came from.

"A long time ago, they used to light a big fire in the top of a tower, but now there are big lights inside of them instead," said the captain with a big smile.

"Why do they do that? Is that so you can see better?" Fred asked curiously.

"No, a lighthouse points you in the correct and safe direction to get to the port." the captain said as he picked up a chart.

The chart showed all the water ways and routes, and he explained how the flashing light pointed to which lighthouse it was you saw. He also showed them how you could safely enter the harbour by focusing on the light of the correct lighthouse.

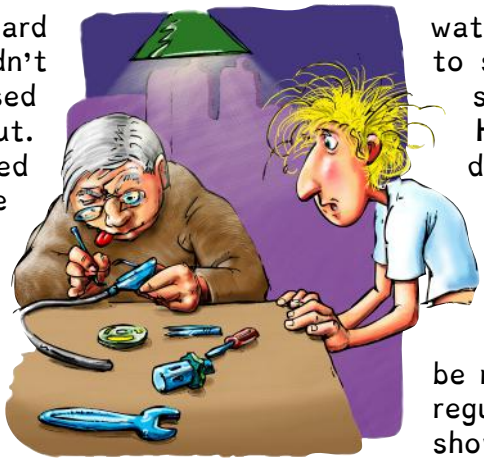
Being a captain was not an easy job! You had to know so many things.

The captain gently docked the boat and they finished up by putting everything away neatly. After saying goodbye, everyone left to make their way home.

Our two friends talked excitedly in the back of the car. Then, suddenly all went very, very quiet. What could they have been dreaming of? About their trip out at sea?

INSPECTION UNDER PRESSURE

STORY BY PATRICK VAN HOESERLANDE ILLUSTRATION PETER BOSTEELS



Our friends were looking forward to today's visit. There wouldn't be any diving, but it promised to be an interesting day out. Skubba's Mother had agreed with the owner of a dive centre that they could visit his workshop. He would show them around and tell them all about his job.

When they came home from school, they immediately started their homework because they wanted to leave as quickly as possible. After a short drive, they arrived at the dive shop. It was closed but the owner let them in making them feel very special. They walked across the courtyard to a garage. The man opened the large door and they walked into the big space where they fill all the scuba tanks up with air. Skubba looked at the colourful collection of tanks. Tall ones, short ones, thinner ones, thicker ones, with one or two valves... and some had some amazing designs on them. They loved the one with an octopus painted on it. In another corner stood some very, very big tanks. How long could you dive with one of those tanks?

"Those ones are not for diving," the man said as if he read Skubba's thoughts, "but they're to fill other tanks. The compressor, a kind of large bicycle pump, behind this door fills the tanks, but if many divers want air at the same time, those large tanks help to do that."

Fred studied the pipes, metres and valves used to fill the tanks. Some valves had the word "NITROX" marked on them.

"That is air with extra oxygen for a long dive with lesser deco stops," said the owner. "It's quite difficult to quickly explain what deco stops are," he said, seeing Fred's curiosity. Diving with deco stops? Fred wrote it down because he wanted to know more about it.

They carried on with their guided tour. To the left of the entrance was the workbench for repairing and maintaining regulators. The man took a regulator apart while they watched. They were surprised to see that there were so many small parts inside a regulator. He said that during a dive, dirt could come between all those small things and that his job was to remove that dirt. Also, by using the regulator, the seals wore off and therefore needed to be replaced regularly. If not, the regulator could start leaking. He showed them how he removed the dirt and replaced a seal. Once everything was back in its place, he checked the regulator with a special device to see if it worked correctly. Skubba and Fred watched with eyes wide open.

Then they went over to the bench for testing scuba tanks.

"To be sure that a tank does not rupture while diving, it must be tested regularly," the man said. "We do this by filling a tank with water and then we pressurise it. The tank should not expand too much. If that happens, we throw the tank away because it is no longer safe to dive with."

"Why water? Isn't air normally in a dive tank?" asked Fred.

"Right, but if a bad tank filled with water cracks during testing, only water sprays out. On the other hand, if that tank had been filled with air, it would explode with a big bang. Not something you want to happen. With water in it, the work is less dangerous."

While they were standing at a safe distance, he showed them how he tested a tank and then pointed to a pile of some rejected tanks. After that, they then learned a bit about repairing diving suits.

The visit was over far too quickly. Fred had written down a lot of notes in his booklet and Skubba had learned a lot about diving equipment. The man was exhausted from explaining his work, but he was happy with a visit from such an interested audience.

AUSTRALIA'S NORTH QUEENSLAND
SHOWING SIGNS OF CONTINUED REEF HEALTH

BY **REEF CHECK AUSTRALIA**

The Reef Check Australia (RCA) team recently headed to Fitzroy Island to complete a reef health survey at one of the sites on the northwestern side of the island. The site has been surveyed three times over the past 13 months and continues to show strong signs of continued health. Hard coral cover has increased from 31% to 49% in that time, highlighting reef growth since substantial declines were recorded after the 2017 bleaching. Bleaching this year was evident, but most of the coral the team saw during our survey was healthy. Where bleaching was still evident, the corals were in recovery and looked like they will continue that way throughout 2020. Other notable observations included low levels of algal growth and no recently dead coral. The team was also lucky to spot a turtle relaxing amongst the corals toward the end of their survey.

Furthermore, Low Isles in the Port Douglas region of the Great Barrier Reef is truly spectacular. On a cool winters day in the shadow of COVID-19 the scene was quiet, however the reefs are looking spectacular demonstrating strong recovery from the bleaching that severely affected it three years ago. There were minimal signs of bleaching impacts in 2020 however. Thank you to Wavelength Reef Cruises for hosting RCA out on the reef and assisting them in completing their work.

INVASIVE ALGAE SARGASSUM HORNERI
FOUND IN MONTEREY

During a dive along the Breakwater in Monterey, California in early June, Melanie Moreno, a Reef Check volunteer diver, observed what she suspected might be the invasive species, *Sargassum horneri*.

Sargassum horneri has been nicknamed "devil weed" as it has the ability to take over ecosystems and supplant lush kelp forests with bushy fields. It is native to Japan, Korea and China, and most likely arrived on a commercial vessel coming from Japan. It was first identified in California in Long Beach Harbor in 2003 and has since spread from the Northern Channel Islands to Guadalupe Island, Mexico. If Melanie's observation was correct, it would be the first sighting north of Point Conception. Concerned that her find might represent the beginning of an invasion of this problematic species, she sent a photo of it to Reef Check to confirm the identification of the specimen. Reef Check staff confirmed the observation and immediately planned a dive to locate the specimen and look for others.

After several dives searching the site for the plant came up empty, Reef Check divers, Dan Abbott and Maxwell Seale, stumbled upon it while practicing fish transects. It measured 12 cm (5 in) in diameter, meaning it was juvenile and had not yet reached a reproductive stage. The dive team did an extensive search of the area but only found this single plant. Photos and GPS coordinates were taken and the California Department of Fish and Wildlife was immediately notified. Since this site is located within the Ed Ricketts State Marine Conservation Area, a scientific permit is required for the removal of most species, including invasives. As news of this observation spread quickly in the local research and management community, calls for the removal of this specimen were made.

A dive team from the California Department of Fish and Wildlife coordinated with Reef Check to search the site and remove the plant if found. Not only did they do so, but they found a second plant which they were able to remove. Removal of these new invaders before they have a chance to reach a reproductive state is key to protecting Monterey's productive kelp forest ecosystems, and none of it would have occurred without the watchful eyes of a Reef Check volunteer.

When asked for permission to credit the photos and her observation, Melanie said, "Please just credit a 'Reef Check volunteer diver'. If I hadn't been trained and required to recertify for Reef Check every year I would not have been as focused on looking for invasive seaweeds. Not everyone who is trained goes on to complete Reef Check surveys, but the education provided puts hundreds of eyes out in the water to watch what's going on in our marine environment."

Reef Check California volunteers continue to look for new and potentially invasive species whether during a Reef Check survey or while diving recreationally. If you notice anything unusual during a dive, please contact your Reef Check California regional manager. Together, we can help protect these incredibly important Kelp Forest Ecosystems.

MALAYSIA'S TIOMAN MARINE CONSERVATION GROUP
A SUCCESS STORY

BY **REEF CHECK MALAYSIA**

Research by Reef Check Malaysia (RCM) revealed that a vast majority of villagers on Tioman Island were interested in working for the Department of Marine Parks Malaysia (DMPM), the authority in charge of Marine Protected Areas in Malaysia. However, due to government hiring regulations, the islanders did not qualify to work within the DMPM. To address this issue, RCM formed the Tioman Marine Conservation Group (TMCG) in 2015. The TMCG would provide locals the opportunity to work alongside DMPM staff through a system of subcontracts, allowing them to gain valuable experience and play an important role in reducing local threats to marine life and managing the Island's Marine Park.

Now, five years later, the Tioman Marine Conservation Group has a team of 25 villagers, all of whom are active in tourism and community service and new members are recruited on an ongoing basis. Team members have taken on numerous tasks and have made many valuable contributions to the protection and conservation of their local marine environment while working with Reef Check Malaysia, local tourism and dive operators and the DMPM, all along balancing this important work with their full-time day jobs.

Some of their most notable achievements are the installation of mooring buoys in collaboration with the Tioman Dive Association to protect the reefs from anchor damage. They are responsible for the monitoring and maintenance of reef rehabilitation projects in several locations around the island and conduct annual Reef Check monitoring surveys at 20 locations around Tioman to evaluate the health of their local reefs. Some TMCG members even helped to train others as Reef Check EcoDivers to increase the impact their work has on protecting Tioman's reefs. This was particularly evident when this group played a vital role in monitoring the bleaching of corals around Tioman during the 2016 Global Bleaching crisis and when they monitored and helped contain Crown of Thorns sea star outbreaks to protect their reefs.

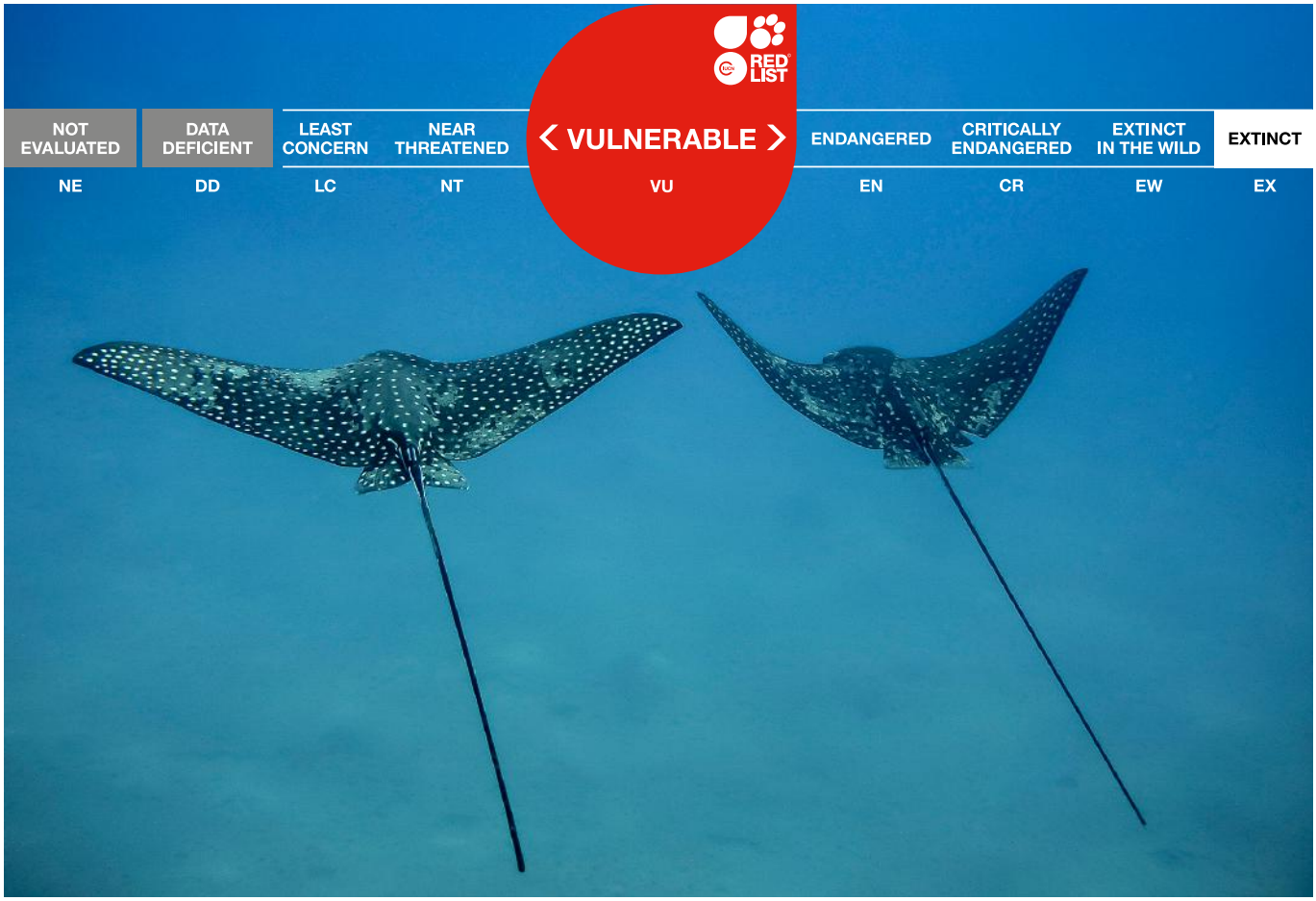
In addition to these ongoing activities, TMCG members have been called to respond to major oil spills, dead or injured marine wildlife sightings, illegal activities within the protected area, for the removal of ghost nets from reefs and they have even helped in the search for people missing at sea. Furthermore, they also train snorkel guides and consult with tour operators on sustainability and reef protection.

Over its five years of existence, the TMCG has had a real success involving the local community in co-managing marine resources. It has demonstrated how the local community can rise to the challenge of protecting its natural resources and participate in their management. It only takes a small budget, some basic training and support, but most of all it takes the willingness of all involved to work together. Reef Check Malaysia hopes to replicate this success and work with other communities to better their livelihoods by increasing reef conservation through co-management.

FEATURE CREATURE

OCELLATED EAGLE RAY (*AETOBATUS OCELLATUS*)

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



RED LIST CATEGORY & CRITERIA: VULNERABLE

Scientific Name: *Aetobatus ocellatus*

Synonym(s): *Aetobatus guttatus* (Shaw, 1804), *Myliobatus ocellatus* (Kuhl, 1823)

Common Names: Spotted Eagle Ray, Ocellated Eagle Ray, Sharpwing Eagle Ray, Spotted Duckbill Ray

TAXONOMIC NOTES

Aetobatus ocellatus (Kuhl, 1923) was previously considered to be an Indo-West and Central Pacific form of the wider ranging *Aetobatus narinari* (Euphrasen, 1790). Comparative analysis of the morphology, molecular and parasite diversity has resulted in the redescription of *A. ocellatus* from tropical and warm-temperate waters of the Indian Ocean and West-Central Pacific Ocean with *A. narinari* being restricted to the Atlantic Ocean (Richards et al. 2009, White et al. 2010). Molecular analyses suggest greater levels of speciation within the Aetobatus genus, with distinguishable groups in the Western Indian Ocean and Northwest Pacific (Schluessel et al. 2010, White et al. 2010). This requires further examination to delineate species boundaries.

JUSTIFICATION

The Ocellated Eagle Ray (*Aetobatus ocellatus*) has recently been re-described as a separate species from the White-spotted Eagle Ray (*A. narinari*). This is a large eagle ray with a widespread distribution across the Indo-Pacific in tropical and warm-temperate waters. Recorded over the continental shelf from the surface to 60 m depth in coastal and open ocean environments. It sometimes enters lagoons and estuaries and is often associated with coral reef ecosystems.

The Ocellated Eagle Ray is recorded from landing sites across much of its range, particularly within Southeast Asia and the Indian Ocean. It is susceptible to capture from a variety of fishing gear and its range overlaps with areas of intense and generally unregulated fisheries in coastal and offshore environments. Estuarine habitats in which it occurs are affected by development and pollution across parts of its range.

The Ocellated Eagle Ray has low population rebound potential with low fecundity (1-4 pups per litter); long gestation period (12 months) and possibly 2-3 years between pregnancies; late maturation (five years), and an approximate 12-year generation period. Molecular studies demonstrate considerable population structuring for this eagle ray within the Indo-Pacific region, suggesting limited recruitment to exploited populations. Based on inferred population declines of >30% across much of its range, with ongoing threats due to largely unregulated fishing pressure and habitat degradation and destruction, the Ocellated Eagle Ray has a global assessment of Vulnerable. In Australian and Oceania waters (Pacific Island nations) where there is limited fishing pressure and some conservation measures in place through the use of marine reserves, this species is assessed as Least Concern.

GEOGRAPHIC RANGE

Australia (Coral Sea Is. Territory, New South Wales, Northern Territory, Queensland, Western Australia); Bahrain; Bangladesh; Brunei

Darussalam; Cambodia; China; Egypt; Eritrea; Fiji; India; Indonesia; Iran, Islamic Republic of; Iraq; Israel; Japan; Jordan; Kenya; Korea, Democratic People's Republic of; Korea, Republic of; Kuwait; Madagascar; Malaysia (Sarawak); Maldives; Marshall Islands; Micronesia, Federated States of ; Mozambique; Myanmar; New Caledonia; Oman; Pakistan; Palau; Papua New Guinea; Philippines; Qatar; Saudi Arabia; Singapore; Solomon Islands; South Africa; Sri Lanka; Sudan; Taiwan, Province of China; Tanzania, United Republic of; Thailand; Timor-Leste; United Arab Emirates; United States; United States (Hawaiian Is.); Viet Nam; Yemen.

A previous lack of taxonomic resolution of the 'spotted eagle ray' group has led to uncertainty over the exact distribution of the Ocellated Eagle Ray, which was previously considered to be an Indo-West and Central Pacific form of the wider ranging White-spotted Eagle Ray (*Aetobatus narinari*). The Ocellated Eagle Ray is probably widespread throughout the Indo-West and Central Pacific (White et al. 2010).

POPULATION

There is limited information on the population demography and structure of the Ocellated Eagle Ray. Molecular analysis of mitochondrial markers in the Indo-West Pacific showed considerable population structure between three main regions (East China Sea, Southeast Asia, and Australia) (Schluessel et al. 2010).

HABITAT AND ECOLOGY

The Ocellated Eagle Ray is found in tropical and warm-temperate waters in coastal regions and over the continental shelf from the surface to 60 m depth (Compagno and Last 1999). It sometimes enters lagoons and estuaries and is often associated with coral reef ecosystems (Michael 1993, Homma et al. 1994, Last and Stevens 2009). It is also encountered well offshore in open water (Last et al. 2010). Around coral reef environments, the Ocellated Eagle Ray often enters coral lagoons to feed (for example, Pohnpei Island, Federated States of Micronesia; Homma et al. 1994).

Reproduction is viviparous with aplacental histotrophy (Last et al. 2010). Little information is available on reproductive biology although it is known to have low fecundity, bearing up to four pups per litter (Last and Stevens 2009). Homma et al. (1994) observed three gravid females in the Caroline Islands, two individuals carrying a single embryo and one carrying two embryos. Schluessel et al. (2010) observed a single mature female in Australia with four embryos. Gestation has been reported at 12 months (Michael 1993) and reproductive periodicity may not be annual (Schluessel et al. 2010). Based on a few samples only, the left uterus appears to be functional (Schluessel et al. 2010). These factors combine for a limited reproductive output and generation length is approximately 12 years. This species is reported to reach sexual maturity after 4-6 years (Last and Stevens 2009). Maximum size of 330 cm disc width (DW) has been reported but the species is more commonly observed to about 160 cm DW (Compagno and Last 1999, Last et al. 2010). Size at maturity is reported as >150 cm DW (Schluessel et al. 2010) for females, and 100-110 cm DW (Last et al. 2010) or 130 cm DW (Schluessel et al. 2010) for males. Size at birth is 33-36 cm DW (Last et al. 2010).

Catches taken in the protective shark nets off the beaches of KwaZulu-Natal, South Africa, occur throughout the year but peak in summer (January and February) (Young 2001). The overall sex ratio is unity but there is a significant association between sex and time of year, with more males than females caught in summer and more females than males in winter. Median DW for each sex is 100 cm (Young 2001). Catches are rare in the southern part of the netted region, an apparent consequence of lower water temperatures (Young 2001).

THREATS

Details of catches of the Ocellated Eagle Ray throughout its range are scant. Nevertheless, its small litter size, schooling behaviour, inshore habitat and hence availability to a wide variety of inshore fishing gear (beach seine, gillnet, purse seine, benthic longline, trawl, etc.), its marketability, and the generally intense and unregulated nature of inshore fisheries across large parts of the species' range, pose significant risks to the global population of this ray. The species is probably widely utilised across its range (Compagno and Last 1999) due to its availability to fisheries.

There are a few parts of its range where this eagle ray faces lower levels of threat, including the Maldives (where the exportation of ray product is banned), Australia, and parts of Oceania where human populations are low.

The Ocellated Eagle Ray occurs in coastal inshore waters where fishing pressure is typically very heavy, especially in Southeast Asian waters. The strong swimming nature of this species makes it quite susceptible to a range of fisheries, especially inshore gill net fisheries, which are extremely intensive in some regions (for example, Kalimantan, Indonesia). The species also enters estuarine waters where fishing pressure is extremely high and where (in Southeast Asia at least) pollution is also a major factor for all marine life.

This ray is likely to contribute substantially to numerous inshore artisanal fisheries across its range and regular landing sites are known. In Southeast Asia, the Ocellated Eagle Ray is landed in most countries within its range including: Indonesia (White et al. 2006, Last et al. 2010), Thailand (Vidthayanon 2002, Krajangdara 2014), the Philippines (Compagno et al. 2005), Taiwan (Schluessel et al. 2010), and Malaysia (Manjaji 2002, Last et al. 2010). In Indonesia this eagle ray is commonly taken by demersal tangle net, bottom trawl, inshore gillnet, and to a lesser extent, demersal longline (White et al. 2006, Last et al. 2010). These are all countries where fishing pressure on the inshore environment is intense and generally unregulated.

Extensive trawling in the Arafura Sea (Blaber et al. 2005) and in the Java Sea (Blaber et al. 2009) is likely to affect eagle rays in these regions. Documented large declines in shark and ray catches associated with corresponding increases in fishing effort in the Java Sea (Blaber et al. 2009) are likely to have a large effect on eagle rays in Indonesian waters and may be representative of fishing effects across the region.

In Australian waters eagle rays contribute to bycatch and byproduct in the East Coast Inshore Fin Fish fishery (Harry et al. 2011), and bycatch in the Pilbara Trawl fishery (Western Australian Department of Fisheries 2010). Eagle rays contribute to the minor catch in the 'Other Sharks and Rays' category by purse seine and longline in the Tuna Fisheries of the Western and Central Pacific Ocean (Oceanic Fisheries Program 2010).

A prawn trawl fishery consisting of about nine vessels operates in the Gulf of Papua in southern Papua New Guinea; the fishery is managed under national laws and regulations, and there are some seasonal closures in place. While bycatch reduction devices are not currently in place, there are plans to implement these in the near future (L. Baje, National Fisheries Authority, pers. comm. 2015). Detailed species composition data for the bycatch is currently being investigated (L. Baje, National Fisheries Authority, pers. comm. 2015), however the Ocellated Eagle Ray is caught in low numbers.

Pressure on the inshore environment through artisanal fishing activities in the Bay of Bengal is likely affecting this species. Landings are recorded from India (Theivasigamani and Subbiah 2014), Bangladesh (Hoq et al. 2014), and the Thailand Andaman Sea (Krajangdara 2014).

The Ocellated Eagle Ray is a popular public aquarium species and is collected for the marine aquarium trade. In some localities it is likely to be persecuted when considered a pest of mollusc aquaculture farms, as has occurred with other myliobatid species, for example, the Bat Ray (Myliobatis californicus) (Gray et al. 1997) and annual culls on the Longheaded Eagle Ray (A. flagellum) (Yamaguchi et al. 2005).

While there is some taxonomic uncertainty for this species in the Western Indian Ocean with molecular analyses separating samples from Qatar from the rest of the Indo-Pacific region (White et al. 2010), the following

information from that region may relate to the Ocellated Eagle Ray or a conspecific.

Off eastern Africa, it is commonly caught by artisanal fishermen, in bottom set gillnets, trawls, and longlines in Tanzania (Bianchi 1985), by artisanal gillnet fisheries off northern Madagascar (Doukakis and Jonahson 2003), and by hook and line and harpoon off Somalia (Sommer et al. 1996). Eagle rays are also reported from fish markets in the Red Sea (Saudi Arabia; Spaet and Berumen 2015), the Persian Gulf (Iran; Paighambari and Daliri 2012) and Oman (Henderson et al. 2007).

In South Africa, between 1981 and 2000 there was a non-significant increasing trend in catch of this eagle ray in the protective shark nets off KwaZulu-Natal (Young 2001). Of the mean annual catch of 16 animals, 82% were released alive. This species contributed 4.6% to the total batoid catch. It is also taken in small numbers as bycatch in a shallow water prawn trawl fishery that operates off central KwaZulu-Natal (Fennessy 1994).

USE AND TRADE

The Ocellated Eagle Ray is caught for its meat and cartilage in Southeast Asia, including Indonesian and Malaysian waters, and elsewhere (White et al. 2006, Last et al. 2010). It is likely caught for their dorsal skin as well (Roy 2010). The species is also collected for the marine aquarium trade.

CONSERVATION ACTIONS

Fisheries taking the Ocellated Eagle Ray are generally unmanaged throughout large parts of the species' range. Attempts to monitor and regulate fisheries in these regions would greatly improve conservation of this and other chondrichthyans. Monitoring (including species-specific catch details) of any directed elasmobranch landings and bycatch are necessary to provide valuable information on the population status of these rays. Fishery-independent surveys of this and other elasmobranchs are necessary to provide estimates of abundance and biomass.

Of highest priority is the resolution of taxonomic issues to better define the actual ranges of the various forms/species within the 'spotted eagle ray' species-complex.

The species is afforded protection on the east coast of Australia in the extensive Great Barrier Reef Marine Park (although only a third of the park is closed to commercial fishing) and the use of turtle exclusion devices (TEDs) in prawn trawl fisheries across northern Australia is mandatory. TEDs are likely to decrease the catch of at least large individuals, as was shown for numerous batoid species by Stobutzki et al. (2002). The spiritual significance of these rays to some indigenous communities has limited traditional catches in parts of northern Australia (Puruntatameri et al. 2001).

In the Maldives, the species is afforded protection in marine reserves created around diving sites in recognition of the high value of sharks and rays to tourism (Anderson and Waheed 2001). The Maldives also banned the export of rays in 1995 and the export of ray skins in 1996. Again, this was to protect the tourism resource (Anderson and Waheed 2001).

A recent reduction in the number of protective shark nets off KwaZulu-Natal, South Africa, will help to limit catches in that region. The recreational line fishery in South Africa is managed by a bag limit of one/species/person/day for unspecified chondrichthyans, which includes eagle rays.

CITATION

Kyne, P.M., Dudgeon, C.L., Ishihara, H., Dudley, S.F.J. & White, W.T. 2016. *Aetobatusocellatus*. The IUCN Red List of Threatened Species 2016. **www.iucnredlist.org**

Small, fuzzy, and fearless, a penguin chick stands its ground in the safety of its crèche; the term for a small group of baby penguins. But in a drastically shifting climate, these little birds are far from safe. The Antarctic peninsula is facing warmer weather with an increase in rainfall instead of snow flurries. This small change in the environment seems like it wouldn't have much of an impact, but its effects are disastrous. To learn more, visit: www.SeaLegacy.org.

A LIFE'S MISSION

FEATURE **TONY SIDGWICK & ALLY LANDES** PHOTOGRAPHY **CRISTINA MITTERMEIER**

"Images can help us understand the urgency many photographers feel to protect wild places. My work is about building a greater awareness of the responsibility of what it means to be human. It is about understanding that the history of every living thing that has ever existed on this planet also lives within us. It is about the ethical imperative – the urgent reminder that we are linked to all other species on this planet and that we have a duty to act as the keepers of our fellow life forms."

CRISTINA MITTERMEIER

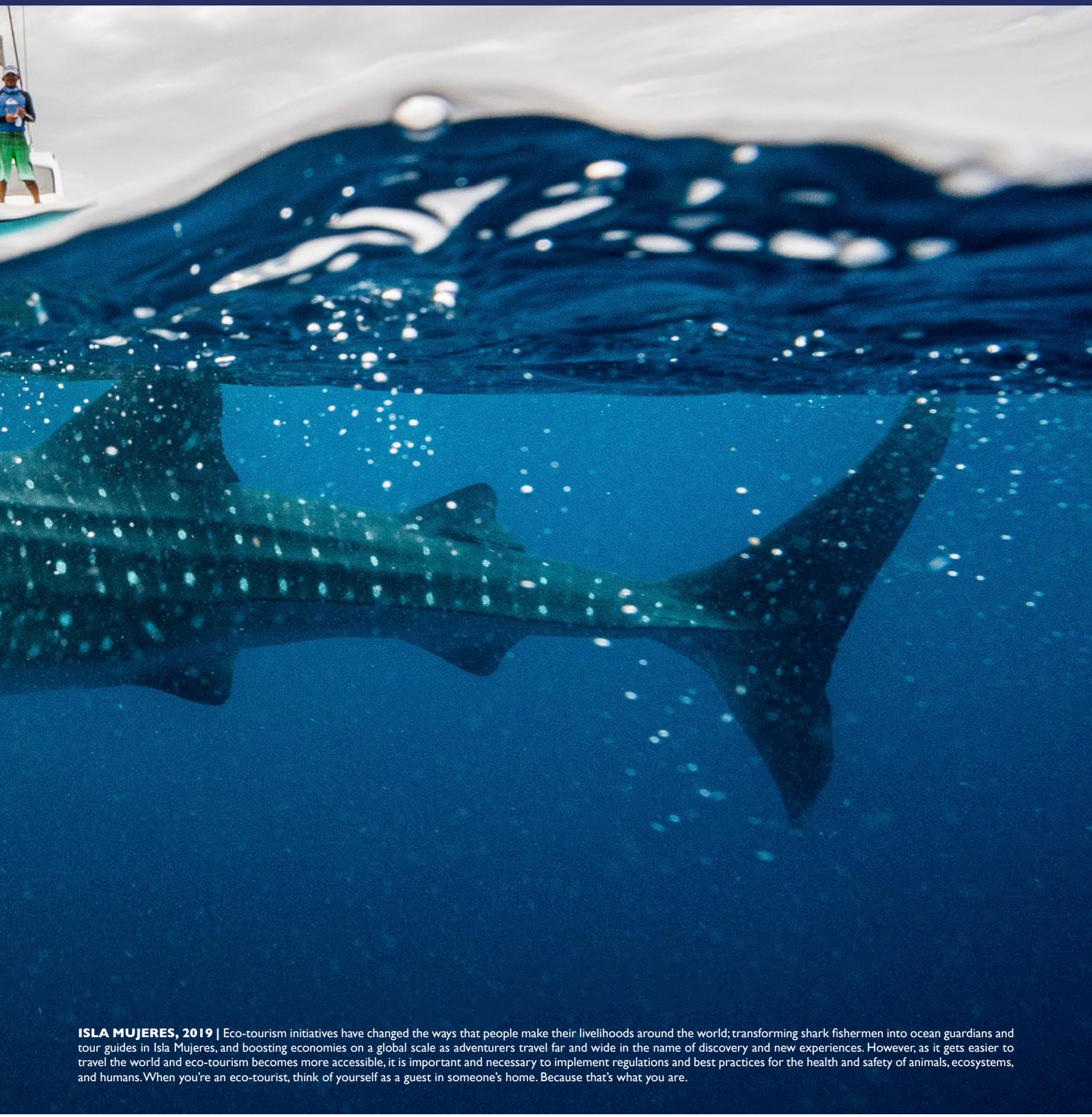
Cristina Mittermeier is a world-renowned conservationist and award-winning photographer and documentarian. A marine biologist who has been working as a writer and photographer for the past 25 years, her work has been featured in hundreds of publications, including some of the world's most prestigious journals – TIME, National Geographic, MacLean's and The Atlantic, to name a few.

Cristina has made it her life's mission to highlight the spectacular beauty of the world's natural environment, as well as the many grave challenges it faces, through her photography. Her work bridges the gap between the efforts of countless scientists and conservationists the world over, and a public largely unaware of their monumental efforts to monitor, protect and conserve the planet's delicate and complex ecosystem.

A highly active conservationist, Cristina has participated in many international environmental programmes the world over, and co-founded several organisations of her own, including the International League of Conservation Photographers (ILCP) in 2005, the non-profit organisation SeaLegacy in 2014, and a first-of-its-kind ocean conservation action platform called Only One launched earlier this year.

THE POWER OF AN IMAGE

Cristina and her partner, renowned National Geographic photographer Paul Nicklen, captured the world's attention in 2017 when they released images and footage of an exhausted and emaciated polar bear struggling to survive in an Arctic environment almost completely devoid of sea ice. When Paul posted the footage on social media, he added the caption, "This is what starvation looks like."



ISLA MUJERES, 2019 | Eco-tourism initiatives have changed the ways that people make their livelihoods around the world; transforming shark fishermen into ocean guardians and tour guides in Isla Mujeres, and boosting economies on a global scale as adventurers travel far and wide in the name of discovery and new experiences. However, as it gets easier to travel the world and eco-tourism becomes more accessible, it is important and necessary to implement regulations and best practices for the health and safety of animals, ecosystems, and humans. When you're an eco-tourist, think of yourself as a guest in someone's home. Because that's what you are.

However, when National Geographic featured the same footage, they went with the more sensationalist, "This is what climate change looks like." This would go on to cause a storm of controversy, as many claimed that it was impossible to prove a direct link between climate change and this individual bear's struggle to survive. Polar bears can starve due to a number of non-climate-related reasons, including illness, injury, age and sheer bad luck.

The power of the imagery and footage was undeniable – it became National Geographic's most-viewed video ever, and was picked up by news platforms across the world, reaching an estimated 2.5 billion people – but by then Cristina and Paul had lost control of the narrative.

Cristina maintains that their work was not intended to highlight the plight of this particular bear, but more to provide a stark visual warning of the potential fate that awaits ALL polar bears if their natural habitat continues to be destroyed by climate change and human activities such as pollution, resource extraction and over-fishing.

In a follow-up article a year later in National Geographic, Cristina wrote, "Perhaps we made a mistake in not telling the full story – that we were looking for a picture that foretold the future and that we didn't know what had happened to this particular polar bear. I can't say that this bear was starving because of climate change, but I do know that polar bears rely on a platform of sea ice from which to hunt. A fast-warming Arctic means that sea ice is disappearing for increasingly longer periods of time each year. That means many more bears will get stranded on land, where they can't pursue the seals, walruses, and whales

EGG YOLK JELLYFISH Bridging the gap between above and below, this egg yolk jellyfish dances on the thin blue line; a symbol of how connected the two worlds are. (Salish Sea, British Columbia, Canada.)

that are their prey and where they will slowly starve to death."

When all was said and done, though, the most important achievement of the footage was to demonstrate the power of visual media in highlighting the plight of wildlife and broadcasting it to vast audiences across the world. As the old saying goes, "A picture paints a thousand words." And thanks to the digital age, these days a picture can reach a billion people too.

"One of the major lessons to come from this was how much work there is still to do. The volume of climate change deniers that are out there was revealed. It was a shocking glimpse into the depth and range of denial," says Cristina.

CRISTINA'S LIFE'S WORK

A woman with an incredible and formidable life's mission, Cristina's achievements over the course of a lifetime are truly an inspiration.

In 2005, she founded the International League of Conservation Photographers (ILCP) providing photographers a platform to work on environmental issues. When she began her career as a professional photographer, she discovered that many nature photographers were not interested in using their images to promote conservation, but there were a handful, however, who did.

She convened a meeting of photographers at the 8th World Wilderness Congress in Alaska and this is where they created the ILCP organisation which allowed them to raise money for conservation projects by focusing on imagery and storytelling. Cristina was the Executive Director and the President of the ILCP until 2010.

In 2014 she co-founded SeaLegacy with her partner, Paul Nicklen. SeaLegacy is a non-profit organisation dedicated to promoting the protection of the world's oceans through storytelling. Their mission is to create healthy and abundant oceans, for everyone and for the planet. It was during a SeaLegacy mission to the Canadian Arctic that Cristina shot her now-infamous polar bear imagery that was to resonate around the world.

In 2019, SeaLegacy expanded their team with the Blue Sphere Foundation in order to bring the world's top photographers, conservationists, scientists, storytellers and strategists together to engage one billion people into ocean conservation through a bold new movement still pursued under the banner of SeaLegacy.

The core of each SeaLegacy mission is built around an expedition. They travel across the oceans, telling powerful visual stories that move people from apathy to action. The Compass is their diverse expert council which guides them to select locations and issues in most need of conservation. Cristina says, "Extraordinary opportunities exist to restore and sustainably develop our oceans in order to protect them and sustain all life on this planet."

This year, in 2020, SeaLegacy co-founded Only One under Cristina's leadership and guidance, in collaboration with other leading organisations. A soft opening was launched at the end of June, and the complete platform will be introduced later this fall. Only One is a streaming service showcasing relevant and beautiful content that provides an interactive experience to a global audience.

Cristina and Paul recently did a podcast for PADI Dive Stories with Ocean Allison, who asked them about the phrase they commonly reference – "this thin blue line" that separates air from water and what it means to them to slip below it. Cristina's response was, "One of the things that happens after you have been a diver for a while, is that diving is no longer the important thing. It's just another tool in your tool kit for the best picture that you can

Cristina takes a photo of Paul Nicklen photographing this leopard seal. On assignment for National Geographic and SeaLegacy back in 2017 in Antarctica.

take. I spend most of my time on the surface. Diving is just the occasional thing that needs to happen, but sometimes it's freediving. It has stopped being about the dive, and more just being comfortable in the water and knowing what the situation calls for."

WHERE IT ALL BEGAN…

Born in Mexico City in 1966, Cristina grew up in the sunny state of Morelos and graduated from the ITESM University in Mexico with a degree in Biochemical Engineering in Marine Sciences. Diving was a compulsory course for Cristina's marine biology degree, but it took her another 25 years before she held her first underwater camera, which she borrowed from her partner, Paul, who has said, "Cristina is my ocean hero. She's always had a powerful voice in leadership in conservation, so she's following in the footsteps of Sylvia Earl and Jane Goodall, and people who are really driving change on a massive scale."

Cristina started out as a scientist and stumbled into photography completely by accident, but that moment of taking her first underwater photograph changed everything for her. Realising that she had a talent for it, she decided to go back to school to do the Fine Art Photography programme at the Corcoran College for the Arts in Washington DC. She started her career as a volunteer photographer with Conservation International and soon moved into the Communications Department, where she eventually became the Senior VP of Visual Communications. This is where she discovered that there was a gap in communication which storytelling could address.

According to Cristina, "The vast majority of people on this planet – all they will ever get to see and understand of our oceans, is what they see on the surface. The story of our oceans lies in the vastness and the mysterious depths that we're just beginning to explore." And that's what she's doing – connecting the world with everything that is going on in the ocean.

In an interview she did with Latria Graham for the Elysian, she sums it up perfectly: Cristina felt that science was not the best tool to communicate to a large audience as science does not speak to regular people. She herself has edited or co-authored more than 28 books. "If you don't have a scientific background, it's hard to read scientific papers. Visual communication is a better way of inviting a larger audience into this very important conversation. That's why I picked up a camera."

Since then, Cristina has been published in hundreds of publications, and has the largest female photographer social media following in the world.

"When I look at my Instagram account and my portfolio of fine art, I really think about it as if I'm building a bridge of empathy for the natural world. The best way to express that empathy, is by sharing how it feels to be there and the reasons why I care. Making those reasons accessible to others so they too can dig into how they connect to the natural world. It's all about building a sense of community and relationship, not just to the ocean, not just to its creatures, but to each other."

AWARDS & ACKNOWLEDGMENTS

- Awarded the Mission Award in 2010 from the North American Nature Photography Association (NANPA) and the Smithsonian Conservation Photographer of the Year Award.
- Received the Imaging Award in 2016 for Photographers who Give Back.
- A member of the World Photographic Academy.
- A Sony Artisan of Imagery.
- Recognised as one of the World's Top 40 Most Influential Outdoor Photographers by Outdoor Magazine.
- Named one of National Geographic's 2018 Adventurers of the Year.

PLATFORMS

www.cristinamittermeier.com
www.sealegacy.org
www.only.one

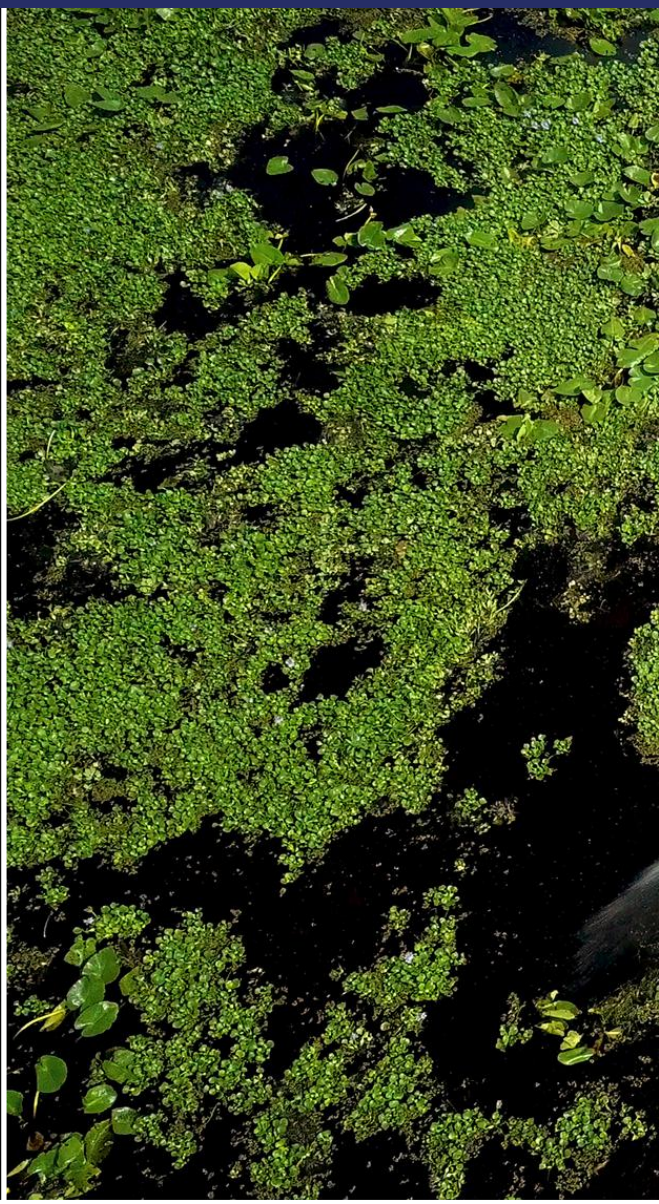
www.sealegacy.blue-search.org
(Use sealegacy.blue as your daily search engine. Your searches generate revenue for SeaLegacy. The funds are invested into restoring abundance in our oceans.)

INSTAGRAM: @mitty
FACEBOOK: @cristinamittermeier
TWITTER: @cmittermeier

FIGHTING FOR SUNSHINE

FEATURE **SILVANA PORCEDDU** PHOTOGRAPHY **CASSANDRA SCOTT & DYLAN JON WADE COX**

Florida is a Mecca for many people and a wonderland for wildlife. Fighting for Sunshine introduces us to a wide array of environmentalists and ocean warriors who are fighting to bring awareness to the water crisis and loss of marine life while highlighting the beauty from coast to coast. This film carries us through a celebration of nature as well as exposes the underbelly of shark fishing, the international fin trade, herbicides, rapid construction, water quality and much more.



Embark on a journey with Florida native and documentarian Wilson McCourtney on a mission to protect wildlife in the Sunshine State. Fighting for Sunshine is an eye-opening, environmental film that celebrates the natural beauty of Florida while promoting shark conservation and exposing the abuse of Florida's natural habitats and precious resources.

Growing up in a coastal gem like Sarasota, Florida allowed McCourtney to witness the ebb and flow of the tides on a molecular level. Issues that have plagued the gulf coast are completely unknown to people living in other seaside regions of the United States, proving to be hyper local issues that only affect the residents. Now that Florida has become the top growth state in America with approximately 1,000 people moving there per day, the numbers are unsustainable and with the population continuing to boom, so do the environmental issues. There is a great opportunity to create change and make Florida a shining model of conservation for the rest of the world. With such lush wetlands teaming with birds and reptiles, immense biodiversity, and an abundance of marine life, Florida attracts adventure seekers and animal enthusiasts from all corners of the globe. However on the flip side of that coin, there is also tons of corporate greed exploiting the natural resources, party animals and polluters, algae blooms, irresponsible fishermen, trophy hunters, shark finning, and wildlife abuse.

Following the devastating 2018 outbreak of Red Tide (toxic algae bloom), Fighting for Sunshine introduces us to a wide array of environmentalists and ocean warriors who are fighting to bring awareness to the water crisis and loss of marine life while highlighting the beauty from coast to coast. This film carries us through a celebration of nature as well as exposes the underbelly of shark fishing, the international fin trade, herbicides, rapid construction, water quality and much more.

Florida's great city of Miami has now replaced Houston as the new American hub for the international shark fin trade as millions of fins from Central and South America move through the port every year en route to Asia. As divers and ocean explorers, we all agree the fin trade is a global crisis that must be stopped in order to maintain the health and balance of our oceans. In Florida alone, there are 1.2 million sharks killed every year by the recreational and commercial fishing industry which target them for trophies, thrills, meat, fins, and livers. The act of shark finning is illegal in the US but the trade is not. The trade is only illegal in 13 states and we are fighting to make Florida the 14th. Lead by the courageous team from Shark Allies, watch the efforts put forth by local ocean and shark enthusiasts as they tirelessly fight to pass Senate Bill 680, also known as the Kristin Jacobs Ocean Conservation Act to stop this pillaging of our ocean's top apex predators. We lose an estimated 75-100 million sharks

A spray boat pumping poisonous herbicides into lakes and ponds.

The results of the Red Tide.

Shark fins, photo by David McCguire from Shark Stewards.

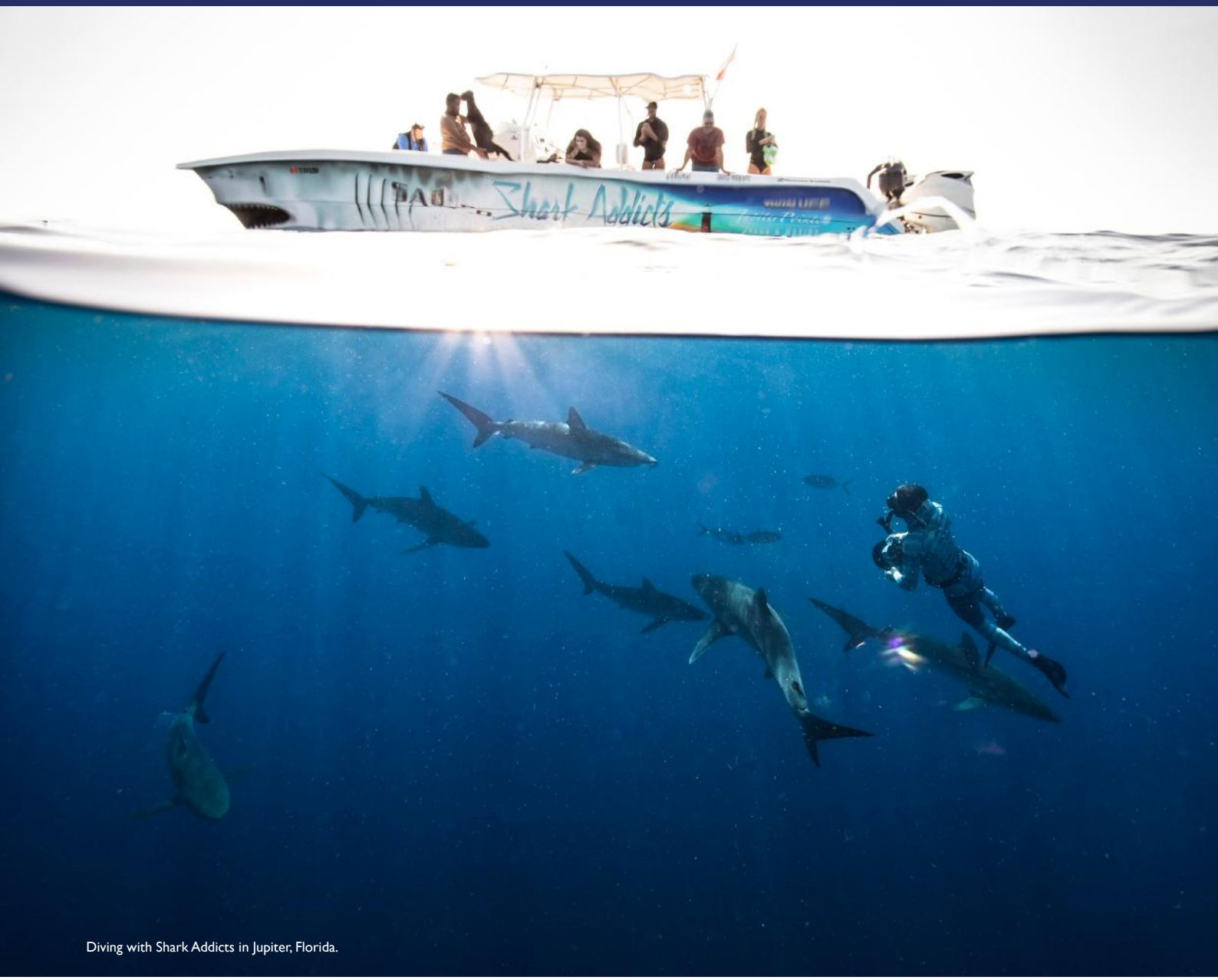
a year, that's 11,000 sharks per hour and 3 per second. These numbers are devastating and pushing many shark species to extinction. Each state that has successfully passed these fin bans have not only outlawed these barbaric practices but also removed the ability to trade fins being smuggled internationally. Luckily these efforts have pushed the needle forward in raising awareness and shifted the mindset to protection over extermination and now it's Florida's turn to step up and become a powerful voice for shark conservation.

The economic impact of shark diving and eco tourism is exponentially more financially beneficial to the Florida economy than the fin trade. Florida alone brings in $221 million a year for their shark diving industry, in comparison to the $1 million a year in shark fin sales throughout the ENTIRE United States. This also translates to nearly 4,000 full-time Florida jobs in the eco tourism industry driven by shark encounters. Quite simply, Sharks are worth more alive than dead and Wilson McCourtney's film sets out to prove that.

One shark encounter can truly change the way these creatures are viewed and spring board a path from voyeurism to conservation. For McCourtney, upon experiencing the spellbinding presence of sharks in their environment, he was immediately fascinated by these misunderstood creatures and knew that they not only deserved our respect but our efforts to protect them. The experience educated him on the incredible injustice that sharks have suffered for decades and this film follows his journey to raise awareness and pass the fin ban, all of which are stepping stones towards his ultimate dream of turning Florida into a shark sanctuary similar to what the Bahamas have done.

Throughout the filmmaker's quest to highlight and expose Florida's natural beauty, the sunshine state was hit with a devastating outbreak of Red Tide on the gulf coast. This toxic algae bloom ravaged the fish populations and killed large mammals that have previously been unaffected by this naturally occurring phenomenon, turning the beaches into graveyards and the ocean into a polluted wasteland. The growing nutrient pollution (nitrogen and phosphorous) of Florida's waterways from agricultural runoff, excessive use of fertilizer, waste water treatment facilities, and a failed aquatic plant management programme fuel these issues that cost the tourist industry hundreds of millions of dollars in losses. For McCourtney, the most devastating aspect was witnessing the staggering loss of wildlife which included 2,000 tons of dead fish, dozens of dolphins, 300 endangered sea turtles, 150 manatees, countless birds, and even a 27 foot whale shark. With a heavy heart, he reacted quickly and joined water quality experts to document the outbreak and dig deeper into the source of the nutrient pollution problems which act as steroids for Red Tide, leading him to the smoking gun – a state sanctioned chemical armada of air boats hell bent on spraying every lake, pond, and storm water ditch to death with poisonous herbicides in the name of controlling invasive plants.

As a mecca for many people, Florida is losing more and more of its green spaces to



Diving with Shark Addicts in Jupiter, Florida.

concrete jungles popping up in every pocket of the state and the water quality continues to worsen. All of these dismal issues facing Florida can be remedied with efforts that Fighting for Sunshine will discuss from small changes to senate bills that anyone can support with minimal effort. We are currently on the precipice of sustainability and have a great opportunity to move towards progressive change on many fronts that will protect the peninsula of Florida. McCourtney illuminates the need for conservation and illustrates small changes that every Floridian family can make in order to keep Florida beautiful with thriving ecosystems that act as safe havens for the breathtaking wildlife.

TO LEARN MORE, VISIT:
www.dreamreefcinema.com
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Tentative release date for Film Festivals is 2022. Official Movie Trailer Coming Soon!

Silvana Porceddu taking action.

THE HIDDEN FOREST
THE MANGROVES OF BONAIRE

FEATURE AND PHOTOGRAPHY **LORENZO MITTIGA**

Mangroves are disappearing three to five times faster than overall global forest losses, with serious ecological and socio-economic impacts. Current estimates indicate that mangrove coverage has been cut in two within the past 40 years.

Mangroves are rare, spectacular and prolific ecosystems on the boundary between land and sea. These extraordinary ecosystems contribute to the well being, food security, and protection of coastal communities worldwide. They support a rich biodiversity and provide a valuable nursery habitat for fish and crustaceans. Mangroves also act as a form of natural coastal defence against storm surges, tsunamis, rising sea levels and erosion. Their soils are highly effective carbon sinks, sequestering vast amounts of carbon.

Yet, mangroves are disappearing three to five times faster than overall global forest losses, with serious ecological and socio-economic impacts. Current estimates indicate that mangrove coverage has been cut in two within the past 40 years.

UNESCO is deeply engaged in supporting the conservation of mangroves while advancing the sustainable development of their local communities. The inclusion of mangroves in Biosphere Reserves, World Heritage sites and UNESCO Global Geoparks contributes to improving the knowledge, management and conservation of mangrove ecosystems throughout the world.

I've been working on this personal photographic conservation project for almost a year now with the aim to generate awareness on one of the most fragile and important habitats of the island of Bonaire. Through my photographs, I'd like to show the beauty of this environment and its incredible biodiversity hidden between the submerged roots and the aerial canopies.

As a marine biologist, I knew about the importance of mangroves, but I had never thought to "deeply" explore them, maybe because I only perceived underwater adventures and discoveries to be done at "depths" and not in the shallows. I was definitely mistaken. During my work – which is still in process, I've made some surprising discoveries, such as that of the invasive lionfish hiding in the submerged roots, the unusual creature, the Sargassum frogfish that has travelled thousands of miles to end up in the mangroves, lobster nurseries, and resident groups of nurse sharks. The more I explore the mangroves, the more I find, and the more I respect it.

Mangroves are not just a forest in a humid and muddy place full of rats and mosquitos; this is a

misconception made by most people.

Exploring the submerged parts of the mangroves is not an easy task. The visibility is very poor and the slightest movement lifts silt and mud that stays suspended for long periods, and taking photos becomes nearly impossible. The water nearby the mangroves contains many urticant particles due to the large aggregation of upside-down jellyfish; urticant organisms and epiphytes living around the submerged roots. I have been on numerous expeditions (and I have many more to go) in order to get clear shots.

THE MANGROVE ECOSYSTEM:

EXTREME CONDITIONS & EXTREMELY HIGH BIODIVERSITY

Mangrove forests are coastal forests and critical habitats that act as nurseries and protect the coasts from erosion.

Mangrove forests are found on coastlines in tropical and subtropical areas. Mangrove trees look a little strange because their roots are partially above water, making them look like they're standing on many gnarly stilts. The roots are exposed to help the trees take in oxygen in a waterlogged environment. Fish, shrimp, crabs, and molluscs are among the organisms that take shelter within mangrove roots. This ecosystem is home to a considerable biodiversity, but is unfortunately threatened by human activities (fishing, coastal development, trash dumping, discharged water inlets, etc.), sargassum invasions and rising sea levels.

COASTAL PROTECTION

Mangrove forests are able to bear the brunt of storms that hit the coast. They reduce the impact of strong waves on anything that lives further inland, including humans.

Mangrove trees also protect the coast from erosion by collecting sediments from rivers and ocean tides around their roots. These sediments build up and strengthen the shoreline.

THE OCEAN'S NURSERY

Mangrove ecosystems host a lot of biodiversity, in part due to the mangrove trees' strange root system. The roots serve as a nursery for the larvae of many fish species, such as barracuda, tarpon, and snook. This is where fish can develop into adults before moving out to the big, unforgiving ocean. In fact, around one-third of all marine fish species are sheltered from predators in mangrove forests, juveniles especially.

THE PROJECT:

MANGROVE MANIACS – BONAIRE LAC MANGROVE RESTORATION PROJECT

A big threat is erosion landslides. The sediments make the waters in the backwaters shallower and evaporation makes water hyper saline. High salinity for red mangroves

means stunted growth, and they eventually die off. Black and white mangroves can handle a salinity that is a bit higher – but they also have limits. The high erosion is due to loss of vegetation by grazers – indirect human influence, as humans introduced the grazers and left them to roam freely.

Another threat to the mangroves is the mangroves themselves: they grow and close off water circulation. If the mangroves are in an estuary, the risk is a bit less, but it's still there.

On Bonaire, the Dutch government funded a four year ecological restoration nature project in Lac Bay ('erosion control and ecological restoration', 'reforestation', 'coral restoration', 'caves', 'pig control', etc., all fall under the same category). The funding has now stopped and each project manager has the obligation to 'safeguard' the results of the projects. STINAPA Bonaire (the national park entity), pays for part of the maintenance as the project's executor. The Mangrove Maniacs – Bonaire Lac Restoration Project is a group that was formed during the project. The volunteers have a passion for this field (or like playing in the mud) and continue the work. They are supported locally. The success of hydrological restoration with the salinity and tidal connectivity (being able to measure tides in the backwaters), results in less smelly water, and the presence of fish.

Within 5 years of work, 5,113 m of channels were opened, and there are 1,276 m left to go.

The goal of the project is to improve the biodiversity of Lac Bay and the south coastline of Bonaire by restoring hydrological conditions, protecting the biodiversity and promoting sustainable tourism. The project began in December 2015 and was government funded through to October 2019. The project is coordinated through the department of Spatial Planning and Development (the Nature and Environment unit) of the Public Entity of Bonaire (DRO) which works closely with the management body of Lac Bay, STINAPA Bonaire. Sea Turtle Conservation Bonaire (STCB) and Wild Conscience BV are the project's principle partners, and Wageningen Marine Research (WMR) provides the crucial scientific support. STINAPA Bonaire also works closely with stakeholders, notably local fishermen who have considerable knowledge of circulation patterns in Lac Bay, as well as the feeder channels.

Saving and protecting the mangroves' ecosystem means a lot for the nearby ocean and reef habitats as the mangroves host a large variety of juvenile reef fish, biodiversity and larger predators (such as barracudas and sharks) that are key for maintaining the balance of the reef.

THE CORAL RESTORATION PROJECT ON THE ISLAND OF BONAIRE

FEATURE AND PHOTOGRAPHY **LORENZO MITTIGA**

The Caribbean's reef has declined since the 70s from 50% of live corals, to 8%, but there are new hopes from a clever project that is giving back – at least in part – to the original look of the shallow reefs.

The ocean is vast, but it is vulnerable. We have not even explored 5% of the world's oceans, and yet we've systematically destroyed 90% of the species in it. In Bonaire, Netherlands Antilles, a successful project of "coral restoration" has been in process for the last 7 years. Bonaire's marine park is a hot spot for marine biodiversity in the Caribbean, and its economy is based on scuba diving tourism.

The Caribbean's reef has declined since the 70s from 50% of live corals, to 8%, but there are new hopes from a clever project that is giving back – at least in part – to the original look of the shallow reefs.

Reef Renewal Foundation Bonaire (RFFB) is formed by a team of scientists, divers and volunteers who have put their efforts and skills together to conduct the project. The coral nurseries are rows of "trees" that are tethered to the seabed with sand anchors and buoyed with floats that sit just below the surface. Each tree holds a unique genetic strain of coral (genotype), and a "full" tree can hold anywhere from 100 to 160 corals.

Coral restoration means moving nursery-reared corals to restoration sites. After six to eight months of growing in the nursery, the corals become healthy and mature enough to be transplanted to a restoration site. Since the first outplant 5 years ago, the results today are very successful: the restored coral patches have grown fast and colonised back onto the degraded areas, and the corals (Staghorn and Elkhorn sp.) have been successfully spawning for the last 2 years.

1. RISING CORAL GARDENS

This pristine coral garden is on the windward side of Bonaire (image on previous page).

Healthy coral reefs, seagrass beds and kelp forests are home to diverse marine life, but warm waters, natural events and human impacts threaten the health of these very fragile ecosystems.

The ecosystem on the leeward side which is inhabited by humans, suffers greatly due to many reasons, but the human impact surpasses most. Unlike the leeward coast of Bonaire, the windward side is constantly beaten by strong winds and heavy underwater currents, and has zero human impacts. When nature makes it difficult for us to reach it, it remains beautifully intact.

2. Bonaire's Reef Belt: SOS

2. BONAIRE'S REEF BELT: SOS

An overhead view of Bonaire's south coast in the Netherlands Antilles, where coral reef degradation is already an ongoing process.

Entirely surrounded by a coral reef belt, the small Caribbean island of Bonaire – a marine park since 1979 – is facing a progressive coral degradation due to many different factors, both natural and anthropic. From hurricanes to excessive construction, the thin line of the natural balance is taken over, but action and restoring projects are already in progress.

3. THE WORST CASE SCENARIO

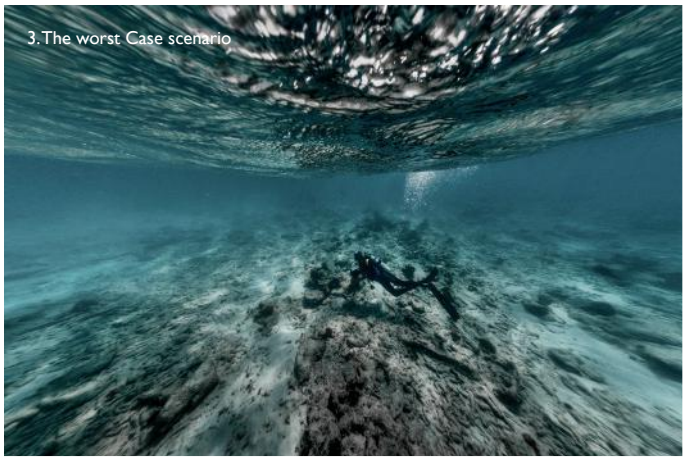
A diver swims over an empty, degraded coral reef site in the coastal waters of Bonaire. Conservation International considers the waters around Bonaire to be a hotspot of Caribbean biodiversity, but on the leeward coast of the island, some sites are exposed to dust coming from the ongoing coastal construction, and the corals are progressively suffocated by it. The particles of dust blow onto the reef line and once in the water, they cause many complications for the corals with risky consequences.

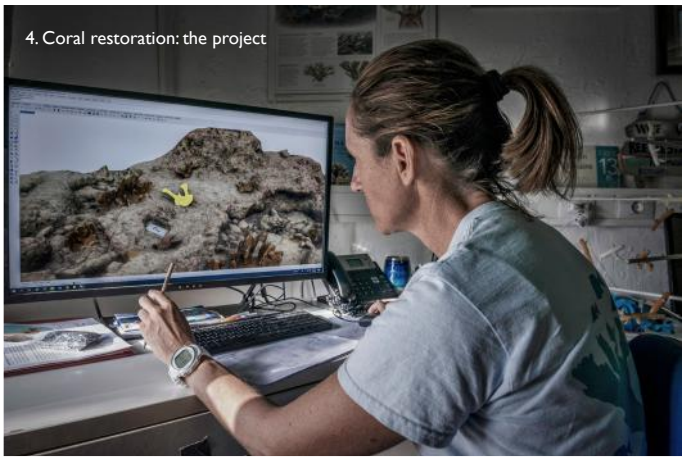
4. CORAL RESTORATION: THE PROJECT

Marine biologist Francesca Virdis investigates new possibilities for coral renewal using a photogrammetry software to recreate a 3D model of a restoration site for elkhorn coral. In this way she can evaluate the measures to take and make an efficient action plan.

5. THE CORALS

Two species are taken into consideration at the moment: the staghorn coral and the elkhorn coral. These two species are the most


3. The worst Case scenario


4. Coral restoration: the project


5. The Corals: Staghorn coral


5. The Corals: Elkhorn coral


6. The Coral Tree

vulnerable in the shallow waters along the island coast due to the impact of natural causes such as hurricanes and human activities.

6. THE CORAL TREE

One of the artificial coral trees seen on the right, holds a unique genetic strain, or genotype of coral in the nursery site. The coral nursery trees are the solution that have been adopted in order to hold fragments of corals that will grow to reach a certain dimension under the supervision of the biologists until they are outplanted in the "restoration site". A "full" tree can hold anywhere between 100 to 160 fragments of corals.

7. THE NURSERY

This large staghorn and elkhorn coral nursery (seen in the background on the following page) is in Kleine Bonaire. The Reef Renewal Foundation Bonaire currently takes care of 8 nurseries with over 115 "trees" in total.

8. THE UNDERWATER TEAM

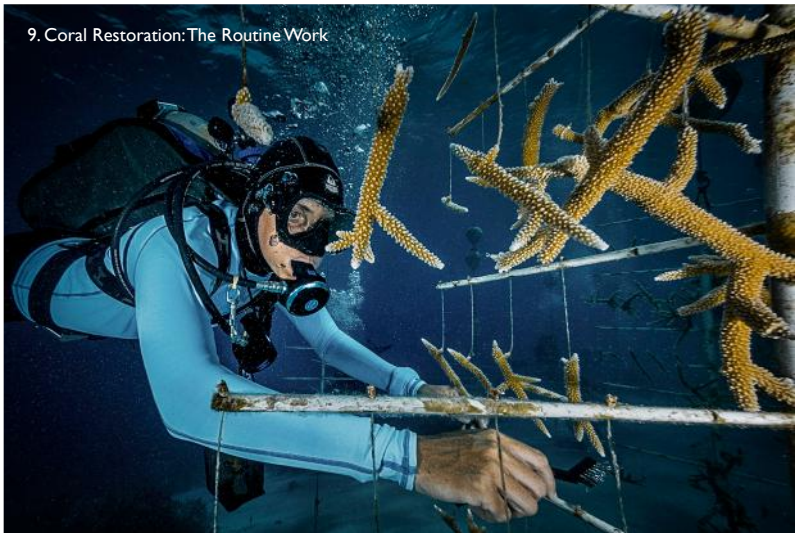
The project's scientific dive team are ready to get in the water for the weekly operation on the coral restoration and nursery sites of Bonaire. The Renewal Reef Foundation's coordinator, Francesca Virdis and her team are equipped with their working tools to get the water data and samples needed for the study of new outplanting techniques.

9. CORAL RESTORATION:
THE ROUTINE WORK

A team member performs one of the daily routine tasks on the fragments of coral on one of the coral trees. New algae grows on the structures and attacks the corals each and every day, and if not cleaned, they can suffocate them. Both the coral nursery and restoration sites are monitored regularly to check on the overall survival, including diseases, damages, predation, tissue paling, and broken branches to name a few. In nurseries, this helps control and prevent issues before they occur.

7. The Nursery

8. The Underwater Team



9. Coral Restoration: The Routine Work

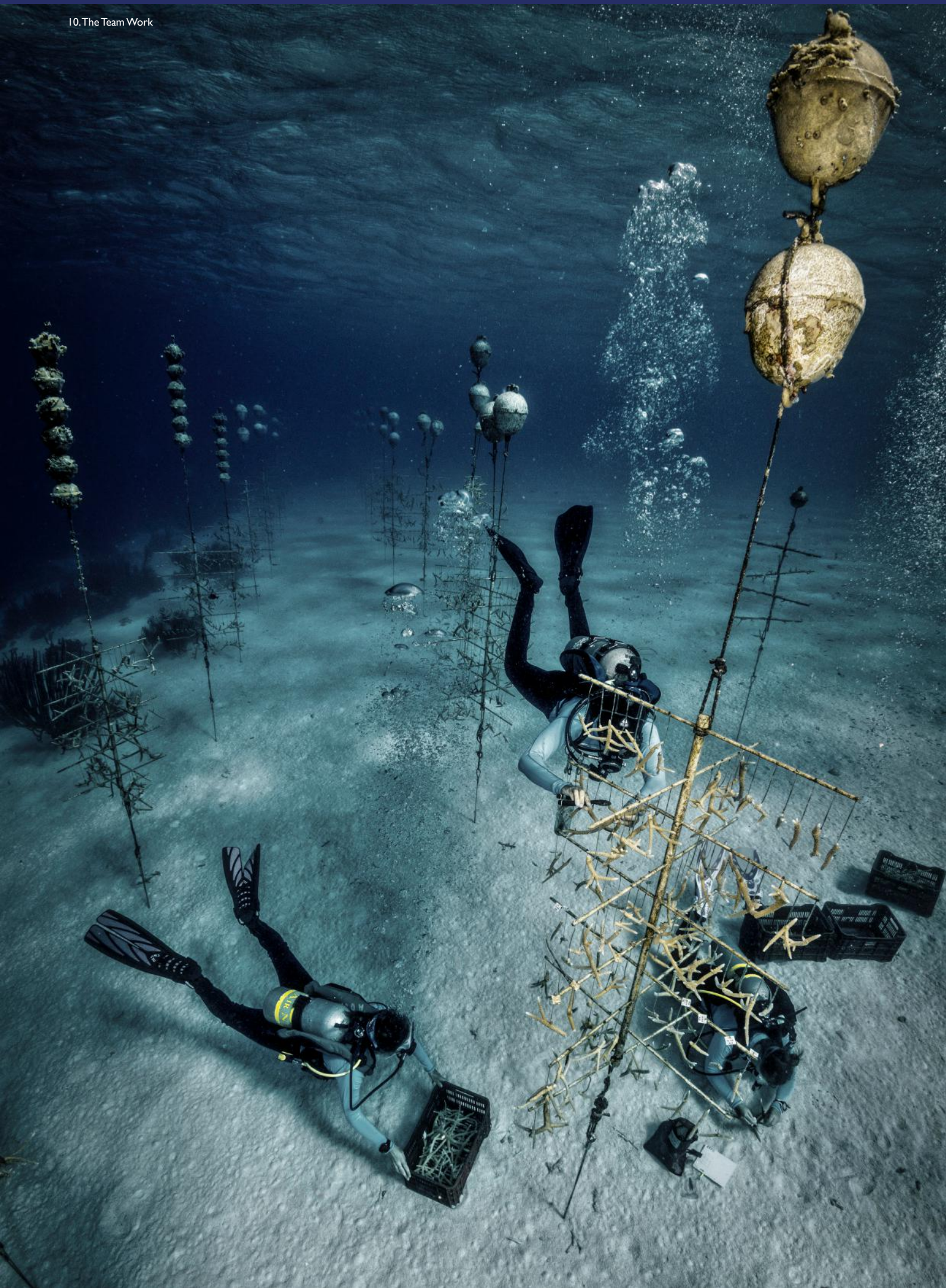
10. THE TEAM WORK
A team of divers at work on a "coral tree". After 4 months of assisted "propagation of the staghorn and elkhorn corals' fragments in the "coral nurseries" site, scientists harvest and tag the regenerated fragments in order to outplant them in a specific site for the final "coral restoration".

11. CORAL RESTORATION:
THE OUTPLANTING
A Marine Biologist busily outplants and monitors the staghorn coral's new clones at the restoration site. The square bamboo frames used as a structural support for the coral growing is one of the methods used by the scientists to outplant the single branches nursed previously on the "coral trees". Each new single branch is fixed onto a bamboo structure and will fuse with the one next to it. The structure will dissolve in a few years leaving only the new grown coral patch.

12. RESTORED CORAL SITE
A comparison between a 5 year old staghorn coral restored patch and a freshly outplanted new colony where the squared structure holding the new fragments is still visible.

13. CORAL RESTORATION:
COMMUNITY INVOLVEMENT
The project coordinator discusses an action plan with the project team and volunteers. Reef Renewal Foundation Bonaire protects and restores coral reefs in Bonaire by developing new and innovative ways to restore reefs that are supported by research collaborations and are shared worldwide through training, by engaging and inspiring local and international communities through volunteering, educational events, and outreach demonstrations that prove there is still hope for coral reefs through community efforts.

10. The Team Work




11. Coral Restoration: The Outplanting


12. Restored Coral Site


13. Coral Restoration: Community Involvement

14. CORAL RESTORATION: VOLUNTEERS HELPING

Trained volunteer divers are a vital part of the support to the coral restoration project. The project's scientific team involves a large community of divers to actively participate in the maintenance of the coral trees of the nurseries, so each volunteer receives specific training in order to carry out the necessary work required. Coral restoration means moving nursery-reared corals to restoration sites. After six to eight months of them growing in the nursery, corals are healthy and mature enough to be transplanted to a restoration site.

15. CORAL RESTORATION: A FRAGILE WORLD

These 5 year old Staghorn corals are restored and healthy. Since 1980, large populations of Staghorn and Elkhorn corals have collapsed throughout the Caribbean from disease outbreaks with losses compounded locally by hurricanes, increased predation, bleaching, elevated temperatures, algae overgrowth, and other factors. The project's results have been successful since the beginning of the restoration project, with a few of the degraded areas almost restored, and other areas are expected to potentially recover in the near future.

16. CORAL RESTORATION: REPRODUCTION

Marine Biologists are present at a Staghorn coral spawning event at night. Following the specific local prediction tables for coral spawning (the reproduction), the team monitors one of the restored coral sites (a 5 year old patch) during this unique event that occurs only 2 or 3 nights during the entire year and for only 30 minutes at a time. Spawning of restored corals is the last ring in the chain of the project that confirms a successful ending of a cycle.

17. CORAL RESTORATION: ASSISTED FECUNDATION

Marine Biologists take part in collecting coral capsules during the spawning event. The coral capsules contain fertilised eggs and sperm. By collecting them, mixing them together and releasing them back into the water, the biologists are able to help the corals' reproduction and diffusion by increasing the fecundation by a huge percentage. The assisted fecundation is an extraordinary technique to speed up the reef's recovery and rebalance the loss of coral from the environment that has occurred over the last 50 years.

18. THE PROJECT'S COORDINATOR

Project Coordinator, Dr. Francesca Virdis equipped with her daily tools ready to carry out her daily routine.

19. TAGGING

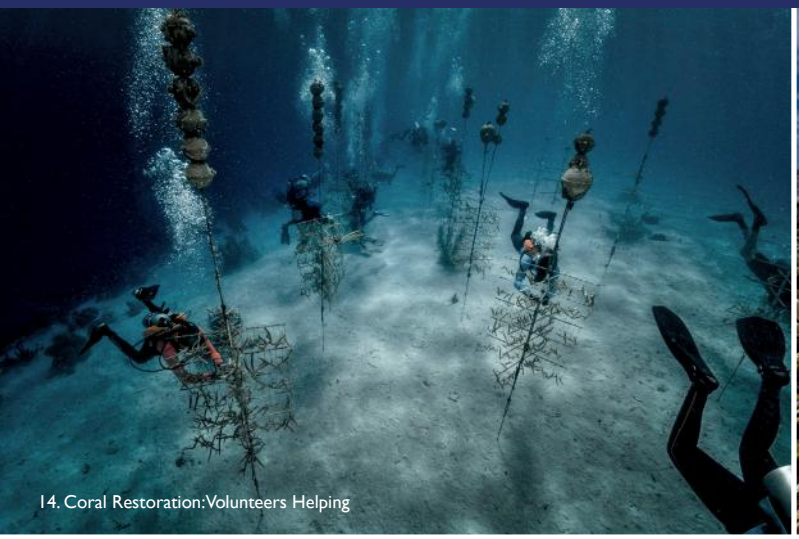
Dr. Francesca Virdis tags the fragments during the harvest. Each fragment is catalogued with the location of provenance, nursing time, nursing tree, date of harvest, and date it is outplanted. Scientists can then recognise each outplanted fragment and monitor its status through the different stages.

20. READY TO GO

The coral fragments are ready to be transported to the boat headed to the final restoration site.

21. HANDLE WITH CARE

Immediately after the fragments are harvested from the trees in the nursery, they are quickly transported to the restoration site in order to be outplanted. This is a delicate operation as the corals are fragile and have to be handled with care on the boat and during the transfer.


14. Coral Restoration: Volunteers Helping

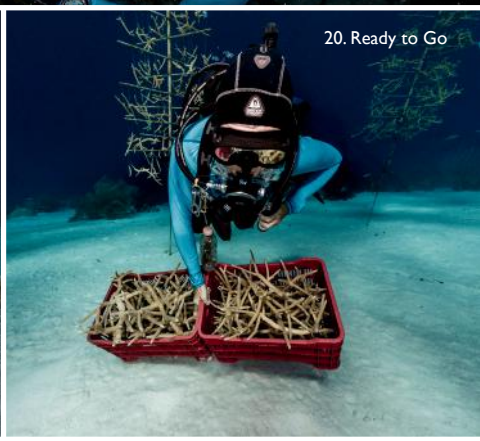

15. Coral Restoration: A fragile World


16. Coral Restoration: Reproduction


17. Coral Restoration: Assisted Fecundation


18. The Project's Coordinator


19. Tagging


20. Ready to Go


21. Handle With Care

RAJA AMPAT

FROM 'THE WORLD'S MOST BEAUTIFUL ISLANDS' TO 'THE LAST PARADISE'

FEATURE **LYNN LAWRENCE** PHOTOGRAPHY **GABRIEL BARATHIEU & THE SEA PEOPLE**

Genuinely responsible and sustainable tourism can be a force for good when it comes to natural environments. But it is a choice, which must be supported by careful management and implementation. Right now, we have a once in a lifetime opportunity to catch the runaway train that is tourism in Raja Ampat, to rebalance it to work for the environment, not against it.

'The world's most beautiful islands''. This is how Raja Ampat was once described; a remote archipelago, sparsely populated yet laden with tropical beauty. On land, slivers of gleaming white-sand beaches fringed with rustling palms surround lush interiors of jungle, blue lagoons, mysterious lakes, streams and waterfalls. The sea itself is an expanse of crystalline water that sparkles as the sunlight dances upon the surface, and beneath, coral reefs flourish, teeming with life, colour and movement. A few small villages dot the islands, but beyond this, all is quiet.

It is not hard to see how this cluster of islands came to be described as the most beautiful on Earth. This stunning scene above and below the water attracts divers, snorkellers, and adventurers each and every year, all of whom walk away deeply moved by the extraordinary abundance. Yet it is this very same natural beauty and abundance that leaves this special region vulnerable to exploitation, and has earned it a new, more alarming title; 'Raja Ampat, The Last Paradise'.

It is here, in this 'Last Paradise', that marine conservation takes on one of its greatest challenges yet, the fight to protect and preserve the most marine biodiverse place on Earth, and the world's last remaining coral stronghold.

Raja Ampat is a remote Indonesian archipelago located off the northwest tip of Bird's Head Peninsula in West Papua. This sparsely populated archipelago of 1,411 islands covers over 4.5 million hectares, and shelters an incredible abundance of life, forming what is currently known to be the most marine biodiverse ecosystem on the planet.

At the intersection of the Indian Ocean and the Pacific Ocean, and at the heart of the Coral Triangle, Raja Ampat has been described as a 'species factory'. With its powerful deep-sea currents and upwellings, waters rich in nutrients are funnelled into Raja Ampat's coral reefs, blue water drop-offs, mangrove flats, and seagrass beds, forming the foundation of a large and complex food web that supports a spectacular diversity of marine life.

Raja Ampat is home to 75% of the world's known hard coral species; in some areas, a single football field sized area of reef has nearly 5 times the number of coral species than the entire Caribbean Sea.

In the wider Bird's Head Seascape region there is a record breaking 1,800+ known species of reef fish, of which 1,600+ are present in Raja Ampat. Adding to this already extraordinary biodiversity, is the presence of 6 out of 7 species of rare and endangered sea turtles, 17 known species of marine mammals (including orcas and dugongs), a thriving shark sanctuary, and seasonal presence of both species of manta rays, something that only occurs in a small number of locations worldwide.

With the discovery of its biodiversity still underway, Raja Ampat is in every sense, a haven and sanctuary for an extraordinary amount of marine life. These stunning reefs, largely protected by their remote location and inaccessibility, also provides a rich and sustainable food source to the local communities scattered throughout the archipelago, who for centuries have survived through subsistence living; using traditional fishing methods and in some communities, small forest gardens.

However, it is the thriving coral reef systems and rich natural resources that has also caused Raja Ampat to be a target for exploitation, development and industry. Up until the early 2000s, this idealistic paradise was largely unheard of by the wider world, and as such, with limited protection, it was also the location of rampant shark finning, along with dynamite and cyanide fishing. These activities, typically conducted by outsiders, decimated shark populations and destroyed large tracts of reef, which, in many cases, to this day have not yet recovered and remain as lifeless acres of coral rubble. The region was also a potential location for resource extraction, with key areas being targeted for the development of mining, logging, fisheries, and gas and oil industries.

Given the ecological significance of the rich coral reefs in Raja Ampat, in the early 2000s, conservation organisations (Conservation International, The Nature Conservancy and WWF) placed significant efforts into working with local communities and the local government to establish the first of what is now a network of 9 Marine Protected Areas covering more than half of the region, with carefully designed zoning regulations, and an MPA Management Unit to oversee the area.

To compliment this, there was general agreement that sustainable tourism could provide a genuine solution to the existing conservation and socio-economic issues;

1) It would provide a sustainable and directly beneficial livelihood to local people by taking the place of extractive activities like bomb fishing, shark finning, mining or deforestation.
2) The presence of tourists would serve as an informal regulatory system that would discourage illegal and extractive behaviours.
3) The revenue generated from tourism could fund ranger patrols, and demonstrate the economic value of an intact marine ecosystem, and in doing so, protect it.

For a period of time, it seemed that a balance had been achieved, the presence of tourism contributed to local economy and helped fund conservation and management. Marine ecosystems were being protected and valued, and local communities were directly benefiting from this via better food security and livelihoods from a sustainable tourism industry. To this day, for these reasons and many more, Raja Ampat can be considered a modern conservation success story.

However, as has happened so often in the world's undeveloped and beautiful places, word quickly spread. Tourism grew, and then grew again, and prior to the COVID-19 pandemic, Raja Ampat was at the top of the list for scuba divers and intrepid travellers, seeking to travel to this seemingly untouched location, with the sentiment that they "must see it before it's gone", thus becoming the catalyst for what could become a self-fulfilling prophecy.

For the past 5-7 years, as a result of global marketing efforts, improved accessibility and the impact of social media, the region has experienced a period of unprecedented and rapid tourism growth, beyond what it is capable of supporting both ecologically and logistically. In the space of one decade, tourism numbers increased 10-fold, from 3,000 to 30,000, accommodated by 26+ resorts (with more under construction), 150 guest houses, 100+ liveaboards and a growing

number of private vessels; the majority of whom all crowd into the same area within the Dampier Strait.

Whilst to many this may not qualify as the 'mass tourism' seen in other areas such as Bali and Thailand who have had entire reef systems destroyed by over-development, this current level of tourism and associated development is already impacting local reefs. Prior to COVID-19, the rapid development brought to the region a range of environmental disturbances. The reefs of Raja Ampat became exposed to more boat traffic, increased anchor damage and boat strike to reefs, increased waste water/sewerage, plastic and chemical pollution and increased disease and degradation on reefs. In addition to this, the coral eating crown-of-thorns starfish have been appearing at outbreak levels on localised reefs, and climate change is slowly altering periodic ecological patterns in ways yet to be fully understood.

Tourism, which was once a feasible and viable long-term solution, has now become one of the primary threats to the region as it rapidly slides beyond a sustainable carrying capacity, and without careful management, down the slippery slope of mass tourism development.

The title of "The Last Paradise" has come about for a reason; on some level, all decision makers and the more discerning tourists know what happens when tourism grows too big, and grows too fast. Even with the current (pre-COVID-19) level, visitors complain about trash, pollution, too many divers or liveaboards at particular locations, or damage to reefs from anchors and trampling. Yet it seems that with respect to Raja Ampat, this does not incline people to reconsider their visit to the region, nor, for a multitude of reasons, slow the pace of development.

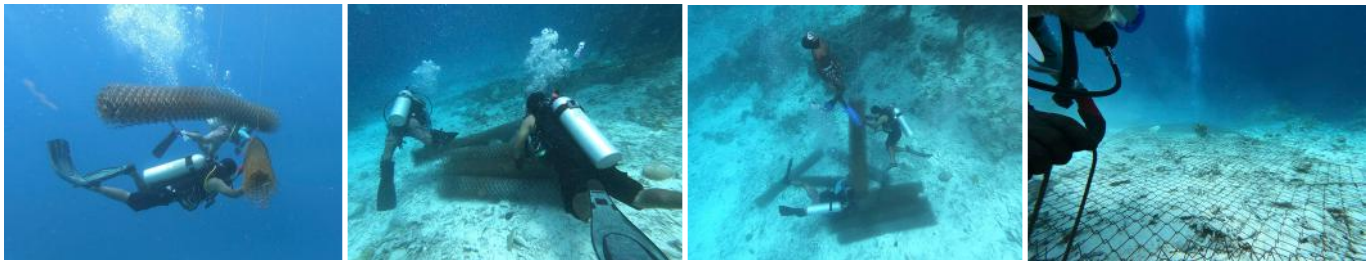
THE SEA PEOPLE

The SEA People (locally named 'Orang Laut Papua'), is a field based NGO working at a grassroots level to contribute to the protection of Raja Ampat's reefs and marine ecosystems. Founded by couple Lynn Lawrance (Australian) and Arnaud Brival (French), who have spent 6 years living in Raja Ampat, and long-time friend Tomi Kumanireng from Raja Ampat, The SEA People take a holistic approach to marine conservation. By combining science and technology with traditional skills and management techniques, the NGO focuses largely on capacity building; strengthening the ability of local community members to obtain the skills, knowledge and understanding required for improved management, protection and enhancement of local marine resources.

"In order to achieve genuine, long term solutions to environmental management in Raja Ampat, local people MUST be involved at the centre of all sustainable development and resource management activities. There is nobody that knows these reefs better, and communities feel very strongly about protecting them. We cannot truly protect the reefs, without the involvement and support of the local people" says Lynn Lawrance, Co-Founder of The SEA People.

One of the ways by which The SEA People contributes to ecosystems management in Raja Ampat, is through community based reef restoration. "Yaf Keru", which means 'coral garden' in Biak, one of the local Papuan languages, is a project led by the foundation's local Chairman, Pak Tomi Kumanireng, who explains, "I'm a dive guide in Raja Ampat. I often see coral reefs damaged, which is form of concern. Raja Ampat should be proud of being a paradise for the world's coral reefs; but there are many places where coral reefs are damaged and dead, and therefore coral restoration is needed. We really need the support of many parties so that tourism activities in Raja Ampat are sustainable".

Yaf Keru focuses on restoring areas of degraded reef, previously harmed by bomb fishing or more recently, by tourism activities.



The project stabilises substrates and provides structures upon which broken coral can be transplanted, and coral polyps can naturally settle and grow. Using this method, these degraded areas can be restored to their previous state and once again form a part of the rich reef system Raja Ampat is known for. In addition to the ecological output of reef restoration, Yaf Keru serves as a platform for education and improved environmental awareness for both local communities and visitors to the Marine Park.

Since its 3-year pilot project commenced in 2016, which saw the transplanting of 8,000+ coral fragments, The SEA People have trained 12 local community members as 'Coral Gardeners' and completed additional restoration projects at the front of 2 villages which experience high levels of tourism. Most recently, in July/August, The SEA People completed another Yaf Keru, and in doing so were able to provide income for 5 local people during a time when all tourism (the main employer in Raja Ampat) had been suspended, leaving many locals without a livelihood and income.

The SEA People aim to continue upscaling this programme in order to achieve its full potential in terms of ecological impact and environmental advocacy, and as a means to provide environmentally positive livelihoods for local people.

In addition to community based reef restoration, The SEA People works closely with local Marine Park Authorities to improve and modernise management systems throughout the Marine Protected Areas (MPAs). With over 2+ million hectares of MPAs, effective and optimised management requires the assimilation of widely spread environmental and socio-economic information and data. The sheer volume of data required to effectively manage large Protected Areas is not only difficult to obtain (and is therefore often lacking), but compiling, analysing and interpreting the data is both cumbersome and time consuming. This lagging workflow tends to generate inadequate environmental management and law enforcement response.

In collaboration with local stakeholders, and technological partners GISCorps, ESRI and EarthRanger, The SEA People have developed a range of custom data collections and monitoring tools that improve the efficiency of ranger patrol activities. Providing real time reporting of marine park violations, monitoring the megafauna species population dynamics, the tourism intensity and human induced degradation, and providing the ability to easily access, analyse and share the critical information needed to support the MPA Management.

COVID-19: DISASTER OR OPPORTUNITY?

Like so many places throughout the world, COVID-19 and its associated restrictions has severely impacted Raja Ampat; a region who's economy relies almost exclusively upon tourism.

With foreign visitors forbidden to enter Indonesia, and all tourism in Raja Ampat temporarily suspended, many local people find themselves without employment, which has a significant impact in a location where one employed individual may support 5 family members or more.

For those in the villages of Raja Ampat, life has had to return to its previous "pre-tourism" state. Dive guides, boat crew, resort staff and homestay owners have returned to more traditional village life; fishing, maintaining village infrastructure, or tending local gardens. Coral reefs and surrounding seas have also returned to their "pre-tourism" state with even greater aggregations of fish, manta rays, sea turtles, and at times, marine mammals on popular dive sites.

However, whilst rapidly developing tourism brings with it a broad range of environmental impacts and its absence is seeing many examples of marine life recovering and reclaiming natural habitats, it is not as simple as to say that no tourism is better for the environment.

The absence of tourism means that the entrance fees that funded essential marine park ranger patrols has ended, opening the door for opportunists to exploit the region with destructive activities. The absence of tourism has reduced local employment to almost nothing, meaning local people must seek other means of income or food supply. For some, this will mark a return to traditional fishing and subsistence living, for others, it could be a trigger for illegal fishing such as shark finning or dynamite fishing.

So where does the balance lie? The truth of the matter is, Raja Ampat will not survive the absence of tourism. Yet… its rich ecosystems will also not survive the presence of unregulated overtourism.

It has never been more clear then in this moment, that truly sustainable and responsible tourism is the only thing that will secure a future for the reefs of Raja Ampat, and that of the local people whose lives are so intimately connected to it.

"There are places on Earth where the well being of human societies is so intimately bonded to the state of the nature they live in. Raja Ampat is undoubtedly one of those places. Preserving the reef for nature is preserving the food, the culture and the traditions of an entire people" says Arnaud Brival, Co-Founder of The SEA People/Orang Laut Papua.

We all want to return to 'normal'. But in the case of Raja Ampat, we must ask ourselves… do we really WANT to go back to this 'normal'? Do we really want to return to continuous growth, using buzzwords such as 'sustainability' and 'eco' to greenwash ourselves that all is well? It simply does not make sense, particularly in a location such as Raja Ampat, where the only thing that ensures everyone's security and success long term, is a continued state of reef health.

Genuinely responsible and sustainable tourism can be a force for good when it comes to natural environments. But it is a choice, which must be supported by careful management and implementation. Right now, we have a once in a lifetime opportunity to catch the runaway train that is tourism in Raja Ampat, to rebalance it to work for the environment, not against it. Now is the time to reimagine and redefine a new future for Raja Ampat; one where this most spectacular and biodiverse region is not forsaken into being The Last Paradise, but rather, simply a Paradise; now and long into the future.

www.theseapeople.org

MY BUDDIES
THE HELMET DIVERS

FEATURE **PATRICK VAN HOESERLANDE**

The experience requires a long haul of preparation to kit up, but it is a very unique endeavour. It also gives you a sense of the adventure it was and the physical fitness needed by the first helmet divers back in the day.

I have already broadly interpreted the concept of 'buddy' in this series of articles, certainly much more loosely than I had anticipated at the start. For this article, I want to go beyond the original, rather limiting definition, written in almost every sports diving manual of a buddy as a fellow diver, without however, forcing the spirit of the word. The title has already given it away for my next 'buddy' dive, with a complete team of 'buddies'. After all, you can't do this kind of diving alone, not even with two, but rather with a group.

On a wonderful summers day in April, I drove to Lebbeke, Belgium for a dive in what 'The Patrouilleurs' call, the 'beaker'. It would not be a standard dive and having heard the name, I guessed that it would be in a mobile water tank with window displays. Still, I was looking forward to this experience. I have dived with quite a few helmets, but this group focuses on equipment used during World War I, so I expected to see authentic 'scaphandre' equipment.

After I had parked my car, I headed off to the square where the dive was to take place. There was a large group of people standing around a container. Something was clearly going on. I saw water spill from the top of the container, and someone was standing on the top holding a big tube pipe in his hands. A sure sign of an active dive tank. I looked around and got my camera out to take some ambiant pictures, and headed to the nearby tent.

While introducing myself to a group member, I noticed two men operating a pump. It was a manual air pump that looked like it could have been 100 years old. It looked as if I had landed in a scene from the beginning of the last century. There was suddenly a commotion at the top of the tank. I heard a staircase screech and then a helmet diver appeared. He slowly came down the stairs where he was then freed of his heavy equipment.

The leader, David Moortgat, introduced me to his team and I was given an overview of the work of Belgian divers in 'Bachten de Kupe' (the nickname of the non-occupied area between the river 'IJzer' and the North Sea) during the First World War. I learned that keeping the lock complex of Nieuwpoort open, was the work of military helmet divers who sometimes had to carry out their activities under artillery fire. The work was necessary to preserve the protective water in front of our troops in the trenches and thus to defend the last piece of free Belgian territory. A historical fact in the history of diving that I had not known about.

It had come to my turn to get in the water, an attractive proposal in the warm weather. The first task was to get into the suit, a challenging undertaking. There is only one opening, and that is through the thick rubber neck seal. Two men stretched the ring slightly, while I, with great difficulty, wrestled myself through the hole. Once you're through, things then go a lot faster. The many hands of a well-oiled team gear me up. With every second, I become heavier. When the diving helmet is placed on the copper ring, I suddenly find myself in my own 'beaker'. The only contact with the outside world was through the thick glass of my helmet's circular window, and the gravity forcibly pulled the lead attached to my body down towards the ground. David gave me instructions on how to equalise my ears and how to let the air out of the brass helmet. After confirming that the communication equipment worked, he gave me the signal to walk to the tank.

Every step required tremendous effort and at the top of the stairs, extra weight awaited me. Sweat was breaking out and I longed to get in that refreshing water. After a short pause, I was allowed to descend. With every step I took, I felt the force of gravity decrease and Archimedes took over. It was wonderful. Descending must happen ever so slowly because the pump crew must be able to follow the descent. In open water, a sudden and too rapid descent could result in the diver being forced, i.e. sucked, into the only incompressible volume, the helmet.

In the silence of the water, I could hear the reassuring sound of the pump at work. There were many spectators around the tank. I waved and posed for photos. It's not every day that bystanders can take pictures of you diving underwater. David asked me if there were any leaks. I only noticed some drops

of water most probably from condensation from the moist air pumped into the suit mixed with the cold interior of the helmet. I saw no reason for alarm. I walked along the bottom to appear at every display window. I heard David explaining things, but I couldn't understand what he was saying and I wasn't concerned. Those few cubic metres of water were now my kingdom.

Then I heard the click of the loudspeaker and David asked me to lie on the ground and let the air out of my suit. While I slowly moved into a reclining position, I pushed the back of my head against the outlet valve. I heard air escaping and the water pressure started to entangle my body. Fortunately, I didn't feel any pushing force towards the helmet. I had barely lay down on the bottom when I heard the frequency of the pump increase. The air pressure in my suit began to increase and I started to feel a lot lighter. Thanks to the extra volume and power of Archimedes, I could easily get back on my feet. When David saw that my suit had begun to ventilate, he gave the pump team a sign to reduce the pace. You are not supposed to rise all the way up to the surface.

I walked a few more laps in my tank and I was then given the signal to come back up and climb the ladder back out. With every step, the feeling of weightlessness diminished, and gravity got a tighter hold of me. Climbing the stairs required a lot of muscle strength and coordination. The heavy helmet was removed, and I got the opportunity to pose with the helmet just like a 'real' diver, completely sweaty. I was stripped of all the equipment in no time and the suit was all that was left. Now the so-called 'rebirth' process began. I had to crawl back out through the rubber seal again. I had to make myself as thin as possible, and three of the team stretched the ring as far as possible. Thanks to the group effort, I was stripped of everything within just a few minutes.

The experience requires a long haul of preparation to kit up, but it is a very unique endeavour. It also gives you a sense of the adventure it was and the physical fitness needed by the first helmet divers back in the day. Diving in open water with such a system in sight of the enemy must have required a very strong stamina, unlike my child's play in the tank.

We talked a bit about the dive and the history of helmet diving. When the team got ready for their final demonstration of the day, I thanked David and his team for giving me such a unique opportunity. Thanks to this group, a big part of Belgian underwater history will be preserved.

Who will be my next dive buddy? What part of diving will he or she introduce me to? Could you be my next buddy? If you are interested in proposing an invitation to something new, send me an email me at **patrick.vanhoeserlande@nelos.be**.

Dive Club: The Patrouilleurs
First Year: 2016
Total Dive Demonstrations: 10
Member Certifications: Two firefighter divers, one combat diver, one 2* and one 4* NELOS divers.
Special Equipment: 'Standard' diving equipment – 'Charles Petit' (Paris, France) and an air pump 'Grand Profondeur' – René Piel (Paris, France).
Favourite Dive Site: De Nekker, Belgium.
Most Fun Dive: A demonstration at the Passchendaele Museum in Zonnebeke, Belgium (2017).
Demo Location Wish: In a port with clear water.
Most Spectacular Helmet Dive: first dive after the restoration of the equipment in 'De Nekker', Mechelen, Belgium.

THE STRATEGY PLAN

THE DARA WRECK CLEAN-UP PROJECT

FEATURE **HAMIDEH MOOSA – DUBAI VOLUNTARY DIVING TEAM MEMBER**

The Dara has become a historical dive site. Divers, tourists, and those interested in history, archaeology and exploration can visit the dive site through the various programmes issued by the Umm Al Quwain authorities.

ABOUT THE MV DARA

The 120 metre passenger and cargo ship that was owned by the British India Steam Navigation Company was one of three ships built after the Second World War in 1948. The vessel had sailed from Bombay on a round trip to Basra, arriving in Dubai on the 7th of April.

The Dara sank in the Arabian Gulf on the 8th of April, 1961, as a result of a powerful explosion that caused the deaths of 238 of the 819 persons on board, including 19 officers and 113 crew members. Another 565 persons were rescued during an operation by a British Army tank landing craft, a number of ships of the Royal Navy, and several British and foreign merchant ships.

WHY WE CONSIDER THE DARA OUR MOST IMPORTANT CLEAN-UP

The Dara holds a significant place in the hearts of divers due to the tragic accident that took place. We consider it an important monument and commemorate its story each year in honour of Britain, India, the UAE and other countries that suffered missing persons and victims.

Recreational divers requested us to clean the wreck due to the large number of nets on it which caused danger and concern to them and hindered them from practicing safe dives.

THE FIRST CLEAN-UP PLAN

In 2014 we began putting the first plans together in order to inspect and clean the Dara with 15 volunteer divers in coordination with the Emirates Diving Association (EDA). The wreck was indeed examined and we discovered a large amount of fishing nets, ropes and fishing cages covering the vessel which masked its features. Due to our lack of knowledge with which authorities to contact and the limited logistical support we had at the time, we decided to postpone the mission. The mission needed to be broken down into several trips, lifting and recovery equipment was needed, as well as other items we did not yet have access to.

THE SECOND CLEAN-UP PLAN AND ITS SUCCESS

The Dara was not forgotten and we continued to seek the permissions to run the Dara clean-ups. The Dubai Voluntary Dive Team launched its 'Stuck Threads' initiative in 2017 for people to report ghost nets to them in cooperation with the Ministry of Climate Change and Environment, and in the process, we started to receive contacts to renew the clean-up plans for the Dara project.

Another campaign had just been organised by the Sharjah Aquarium to do a clean-up dive on the Dara with 20 volunteer divers, where they successfully retrieved about 300 kg of waste on that day. With our dive and fishing site clean-up experiences however, we knew that the Dara would need several months of follow-up cleans to completely clear it of all the debris.

We took every opportunity we could to meet the concerned marine environment authorities in Umm Al Quwain. We took part in the Dubai International Boat Show in 2019 which led to us meeting with officials from the Emirate of Umm Al Quwain who in turn invited us to participate in the fishing festival. We welcomed the invitation which had been a valuable opportunity to meet the stakeholders to discuss our clean-up plans and the idea to discuss meeting with the fishermen to educate them on preserving the marine environment and inform them about the successes of our 'Stuck Threads' initiative.

We want to thank Sheikh Majid bin Saud Al

Mualla, Head of the Department of Tourism and Archaeology in Umm Al Quwain and his team for that invitation, and for their concern in preserving the marine environment and heritage in the country.

STAGE 1: COORDINATING BETWEEN THE STRATEGIC PARTNERS AND THE DEVELOPMENT PLANS

The Dubai Voluntary Diving Team was contacted by the Department of Tourism and Archaeology in Umm Al Quwain in which a preliminary meeting was held to find out about the status of the Dara, discuss the necessary details to clean the shipwreck, the duration, and matters related to the field work. The Umm Al Quwain Cooperative Society for Fishermen, the Umm Al Quwain Municipality Department, the Police, the Coast Guards and the Zayed International Foundation for the Environment were all present to discuss the issues, exchange ideas and distribute the roles and responsibilities to each governing member. An agreement was made to start the project in October 2019.

The following were agreed and successfully, and efficiently carried out:

- Fishermen were to stay away from the wreck site and not to engage in any fishing activities.
- Facilitate the process of entry and exit for the divers from the fishermen's port in Umm Al Quwain.
- The municipality was to provide logistical support to dispose of the debris collected.

STAGE 2: THE SHIP INSPECTION AND CLEANING STAGES

- **WRECK INSPECTION:** The team made a trip to inspect the wreck in October 2019 and estimated the volume of debris on the ship, the type of debris, and the estimated time needed to complete the job.

- **TEMPORARY BUOY INSTALLATION**: To facilitate the clean-up process and protect the vessel from damage, we suggested installing 3 temporary mooring buoys on the bow, middle and stern of the ship to avoid anchoring on the wreck site. Mooring buoys act as location markers which would speed up pinpointing and accessing the wreck during the project. We started installing the temporary mooring buoys in November 2019 with ropes and chains attaching them to 3 strong points that could hold one or more boats tied to them.

- **CLEAN-UP DIVES:** We began the clean-up dives a week after the mooring buoys were successfully installed. The team were not without challenges. They experienced the 2 drastic climate changes during the project, from the cold waters of the UAE's winter season and the extremely hot water and air of the summer months. With the amount of nets and the complexity of their removal, the dive teams were split into 3 groups allowing each team to do approximately 7 to 9 dives per day by using NITROX of 32%, 36% and 38%, allowing them a longer bottom time and a shorter surface interval.

THE 3 TYPES OF NET AND OTHER DEBRIS FOUND ON THE WRECK

1. The very dense hanging nets which had accumulated covered the features of the ship and its large entry and exit points. Most of these nets had not lost their durability and these particular nets have a commercial lifespan of 4 or less years. They were incredibly heavy nets and extra care was needed to not cause any damage to the Dara. Their recovery took 4 months to complete from November 2019 to February 2020.

2. Nets attached to the hull of the ship on the seabed were full of dead oysters, fish, snails, and flora. Most of these nets were worn out (50%) and they have a commercial lifespan of 4 years and above. This category of nets covered large areas of the boat's hull – to put it into perspective, the Dara is 120 metres in length. These nets were recovered in March 2020 to June 2020 as all trips had been suspended from March 23 to May 28 due to the precautionary instructions of the corona pandemic.

3. The hidden nets and ropes found under the top layer of debris, date back to the 1990s or before. These broken up nets were buried in the seabed and were a delicate and difficult task to collect due to their brittle state.

4. We also found fishing cages and plastic waste. The fishing cages were left as they were and their doors were opened and removed, but the plastic materials were retrieved to properly dispose of them.

STAGE 3: POST CLEAN-UP

Strict measures are now taken in order to maintain a clean environment on the wreck and keep it free of fishing gear, organised by the Department of Tourism and Archaeology in Umm Al Quwain, in coordination with the strategic partners.

The steps and measures taken are:

1. Installation of permanent mooring buoys with high-quality specifications that can withstand climatic conditions for divers and dive boats.
2. Installation of permanent demarcation buoys to indicate the allowable wreck approach and boundaries, with international specifications that can withstand climatic conditions at the site.
3. Fishermen are not permitted to practice any kind of fishing activities on the site, and warning signs are to be placed on the buoys as a reminder.
4. Scuba divers and other seagoers are to communicate with the authorities in the case of finding any violations or abnormalities on the site.
5. Continuous monitoring will be done by the authorities to ensure that all divers, fishermen and other seafarers abide the Dara's historical site warnings, protecting the marine environment and the condition of the mooring buoys.

STAGE 4: THE OFFICIAL LAUNCH

The Dara has become a historical dive site. Divers, tourists, and those interested in history, archaeology and exploration can visit the dive site through the various programmes issued by the Umm Al Quwain authorities.

We extend our sincere appreciation to the organiser and owner of this strategic project, the Department of Tourism and Archaeology in the Emirate of Umm Al Quwain and hold a special thanks to Sheikh Majid bin Saud Al Mualla, Head of the Department of Tourism and Archaeology for his dedication to the Dara, as well as his team.

We would also like to thank the Zayed International Foundation for the Environment represented by His Excellency Major General Mohd Ahmed bin Fahd and his team for their support to cover the materials and field costs of the project, and for their interest and eagerness to support our volunteering work. Thank you for preserving the marine environment in several other projects in addition to the Dara.

We thank all the authorities who coordinated and contributed in the success of the project:

- Umm Al Quwain Municipality
- Umm Al Quwain Police
- Critical Infrastructure & Coastal Protection Authority (Third Squadron)
- Fishery Association of Umm Al Quwain
- Ministry of Climate Change and Environment

Another big thank you to the team's sponsors throughout the year:

- P&O Marinas
- EDA
- Al Tayar Team
- Suzuki Autosport
- Bermuda Diving Center

Last, but not least, we also want to thank the most important group of the project who are our team volunteers for their efforts, providing their valuable time and their determination. They accomplished the tasks in the harshest climatic conditions and overcame all the difficulties.

GENERAL INFORMATION

Total Volunteering Hours: 15,134
Number of Trips: 17
Distance Covered: 1,352 km
Fishing Nets Collected: 7,720 kg
Accidents/Injuries: 0

THE ENVIRONMENT AND PROTECTED AREAS AUTHORITY RESEARCHERS INVESTIGATE THREATS OF TRADITIONAL BAITED BASKET FISHING TRAPS ON GREEN SEA TURTLES

FEATURE **FADI YAGHMOUR – SCIENTIFIC RESEARCHER (EPAA)**

The needless suffering and death of marine turtles and other marine species can be drastically reduced around the world with the responsible use and proper disposal of all types of fishing gear.

ABOVE: A juvenile green sea turtle being removed from inside a gargoor. **BELOW L-R:** An adult female green sea turtle trapped inside a gargoor; Loggerhead sea turtle that ingested gargoor fragments; Gargoors.

The waters of the United Arab Emirates (UAE) comprise a wide diversity of local and migratory fish which have facilitated the achievement of food security for the nation. The fisheries in the UAE are primarily artisanal and the two main types of vessels that are utilised in local fisheries are the "tarad" and the "dhow". The tarad is a fibreglass vessel around 8-10 m long, powered by outboard motors. The dhow is a larger traditional wooden vessel around 15 m long. Local fishermen apply a variety of methods to harvest fish including fixed and floating gill nets, beach seins, hook-and-line and hadrah (barrier traps). However, the most popular fishing equipment used in the region, is a baited basket fishing trap known locally as "gargoor".

Gargoors are hemispherical dome-shaped basket traps. They have a funnel-like entrance for fish to enter, a circular ancillary base to support the trap and some models also have a back door for the collection of the catch. Gargoors are deployed from tarads and, at a larger scale, from dhows mostly in and around rocky reefs and coral reefs where they would target various fish, such as Sheri (emperors), Safi (rabbit fish), Sultan Ibrahim (goat fish) and Hamour (grouper). Traditionally, the gargoor was made by weaving date fronds but currently they are manufactured from galvanized steel.
Over the past decades, catch rates of local fisheries, including gargoor, have suffered significant declines. This has resulted in the increase in the number of gargoors deployed. Unfortunately, as do all fishing gear, the gargoor presents multiple unintended environmental hazards. The use of gargoors may result in the by-catch of non-target species. The deployment of gargoors on coral reefs can be lucrative for fishermen in the short-term, but will result in long-term declines in local fish stocks as a result of the destruction of reef corals that are crushed under the weight of gargoors. Also, when a gargoor is lost, discarded or abandoned, it will continue fishing indiscriminately until it naturally decays; a process known as ghost fishing. In 2018 the Environment and Protected Areas Authority of Sharjah (EPAA) conducted the first ever investigation into the harmful effects of gargoor interactions on sea turtles.

The study, published in the Marine Pollution Bulletin, reports the investigation of two cases of green sea turtle mortality from the city of Kalba. The first case reports a juvenile green sea turtle trapped and drowned inside an abandoned gargoor. It is believed that this hazard was made possible by the partial decay of the gargoor which caused the funnel-like entrance to partially dislodge and swing in. This allowed for the turtle to enter the gargoor but, as the funnel does not swing out, it also obstructed its ability to exit the trap.

The second case reports another green sea turtle that was found dead on the beach but appeared to have no external injuries. The turtle was transported to the EPAA laboratory for further exploration. During the post-mortem examination performed by

ABOVE: EPAA researchers performing a green turtle post-mortem. **BELOW L-R:** Injuries sustained by a green turtle after ingesting metallic fragments of gargoor (blackish nodules occurring where the intestine was punctured).

EPAA researchers and Breeding Centre of Endangered Arabian Wildlife veterinary staff, it was observed that the turtle had ingested sharp metallic fragments that had punctured several areas of its gastrointestinal tract. Overall, 32 fragments had pierced the mouth, esophagus, stomach and intestine of the turtle. Comparative microscopic examination of the fragments revealed that they are fragments of a rusty gargoor. The examining researchers speculate that the gargoor was abandoned or lost resulting with its gradual decay and rust while simultaneously being colonized by macro-algae. It is well known that green sea turtles are herbivorous and they will opportunistically feed on algae growing on any surface. In this case, as the gargoor was rusty and brittle, fragments of the gargoor broke off and were presumably consumed along with the algae.

Unfortunately, since the publication of this study, the Environment and Protected Areas Authority has recorded an additional four cases of marine turtle mortalities resulting from gargoor interactions: two cases of green sea turtles ingesting gargoor fragments, one case of a loggerhead sea turtle ingesting gargoor fragments and one case of an adult green sea turtle drowning in an abandoned gargoor. In all six cases, the gargoors were heavily decayed, most likely as a result of being lost or discarded.

A newer and functional gargoor would have an intact funnel-like entrance that is too narrow for most turtles to enter, and would also not be prone to fracture as marine turtles feed off its surface. Though there is little empirical data on the prevalence of derelict gargoors or other abandoned fishing gear locally, anecdotal accounts of divers in the region suggest that there are increasing numbers of abandoned gargoors in the local marine environment. The needless suffering and death of marine turtles and other marine species can be drastically reduced around the world with the responsible use and proper disposal of all types of fishing gear.

هيئة البيئة والمحميات الطبيعية
Environment & Protected Areas Authority
SHARJAH الشارقة

ABOUT THE EPAA:

In line with the vision of His Highness Sheikh Dr. Sultan bin Mohammed Al Qasimi, Supreme Council Member and Ruler of Sharjah, the Environment and Protected Areas Authority, under the leadership of Her Excellency Hana Saif Al Suwaidi, aims to protect Sharjah's natural environment and conserve its rich biodiversity. This is achieved through data driven policies and increased public awareness and participation in supporting the principle of sustainable development to preserve natural and environmental capital to the benefit of present and future generations.

WEBSITE: www.epaashj.ae/

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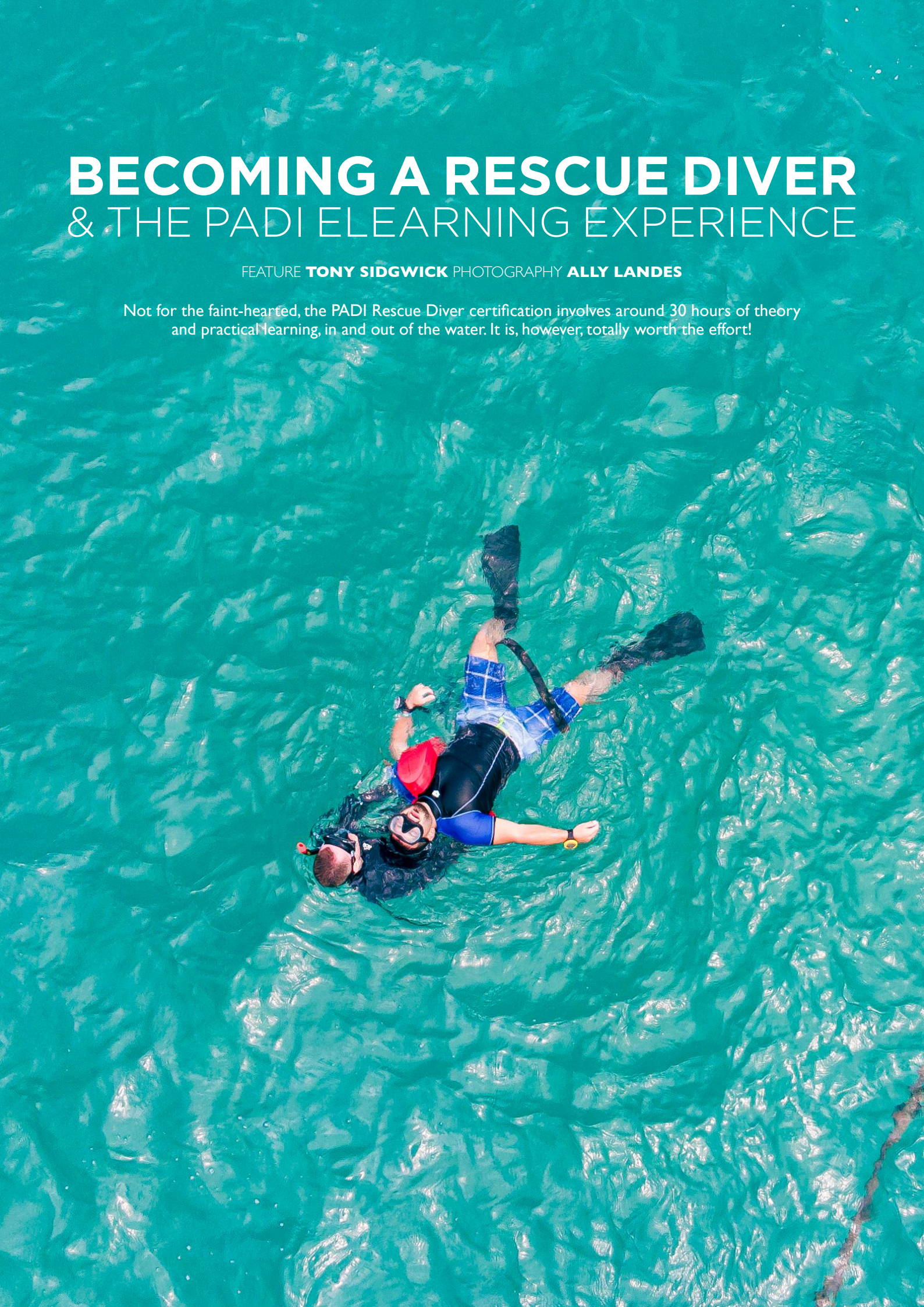
BECOMING A RESCUE DIVER
& THE PADI ELEARNING EXPERIENCE

FEATURE **TONY SIDGWICK** PHOTOGRAPHY **ALLY LANDES**

Not for the faint-hearted, the PADI Rescue Diver certification involves around 30 hours of theory and practical learning, in and out of the water. It is, however, totally worth the effort!




PADI
DiversDown
UAE

EFR TRAINING: The Emergency First Response (EFR) course takes about 8 hours to complete and was done in the classroom at Dive Garage in Dubai Investment Park.

From the PADI eLearning experience through to the practical training courtesy of the fantastic instructors at Divers Down, we walk you through the whole process of earning your Rescue Diver certification, as experienced first-hand by this writer.

Not just for divers who want to progress to their Divemaster, Instructor and Master Diver certifications, the PADI Rescue Diver course is a highly beneficial experience for any diver who wants to increase their confidence, competence and situational awareness.

But casual recreational divers be warned: the PADI Rescue Diver course is a considerable commitment, in terms of both time and effort. Our experience comprised 10+ hours of online lessons on the PADI eLearning portal, an 8-hour Emergency First Response course, and then around 12 hours of practical training at the Divers Down dive centre at the Miramar Al Aqah Beach Resort in Fujairah.

It is a mentally and physically demanding course; you'll have to absorb a LOT of information, and you'll be tested by instructors playing 'panicked divers' in the water trying to climb on top of you, or 'unresponsive divers' you'll have to physically haul to safety, amongst other nerve-wracking scenarios. Therefore, the PADI Rescue Diver certification might not be desirable for those who only dive once every year or two in tranquil waters on a tropical holiday somewhere, although the knowledge never hurts, as accidents can happen anytime.

However, it is also an extremely rewarding course that increases your confidence and skills, and your ability to respond to emergency situations, so anyone who considers diving a serious pastime and dives frequently both at home and abroad, should consider the PADI Rescue Diver certification as essential learning.

The PADI Rescue Diver is also a necessary certification if you're shooting for your Divemaster or any Instructor certifications, so anyone planning to dive professionally will become a PADI Rescue Diver at some stage on their path.

There are three elements to achieving your PADI Rescue Diver certification:

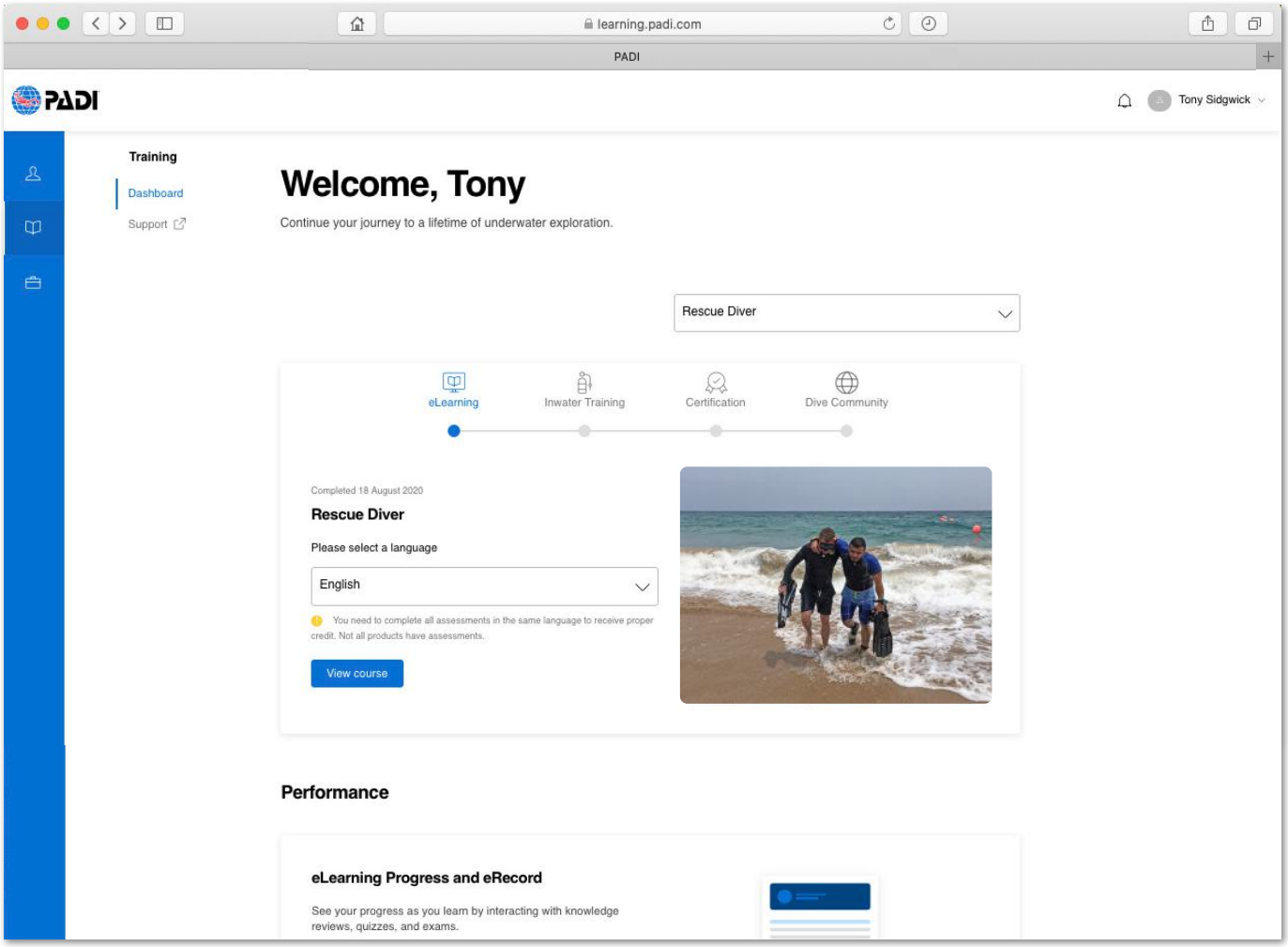
- The Emergency First Response (EFR) course, which you'll need to have completed before starting your in-water training.
- The PADI eLearning Rescue Diver course, which provides all the theoretical knowledge you'll need to complete the certification (this portion can be completed with live lessons at a dive centre, but in this experience, we completed the section online).
- The In-water Rescue Diver Training, which provides all the practical knowledge required to achieve your PADI Rescue Diver certification.

EMERGENCY FIRST RESPONSE

Strangely enough, this first part has almost nothing to do with diving, and will be completed entirely from the dry comforts of a classroom, in our case at the Divers Down equipment shop and warehouse in Dubai Investment Park, Dive Garage.

Emergency First Response is one of the world's most widely recognised CPR, AED and first aid training courses for non-medical professionals. Emergency First Response Instructors help communities prepare for disasters by training people to respond to medical emergencies when emergency services are delayed or unavailable.

The first element is Primary Care, which covers the steps and techniques for handling life-threatening emergencies. You'll practice the skills for aiding patients who aren't breathing, have no heartbeat, may be in shock or who may have serious bleeding or a spinal injury. You'll learn how to perform Cardio-Pulmonary Resuscitation (CPR), use an Automated External Defibrillator (AED) and continue to monitor the patient, so that you provide every possible chance of survival while waiting for



ELEARNING: PADI's eLearning platform welcomes you on your learning journey. There are about 10+ hours of clear, smooth and easy to use online lessons.

emergency medical services to arrive.

The second part is Secondary Care, or first aid, where you'll learn to deal with non-life-threatening emergencies and provide care that eases pain and reduces the risk of further harm. You'll learn to assess a variety of injuries and illnesses and practice bandaging and splinting.

The techniques learned in the Emergency First Response course apply to all emergency scenarios, from car accidents to diving emergencies, and are therefore an important first step in becoming a Rescue Diver. Perhaps the most important thing the course teaches you, which also applies to dive-related emergencies too, is to stop, think, assess the situation, and then act. It doesn't do anyone any good to rush into a situation without thinking and potentially put yourself in danger as well.

Overall, the course takes a full day, from 9am to around 4pm, depending on your rate of progression. Alongside the course you'll have to purchase the EFR guidebook, but this is an extremely handy reference tool that can be used anytime going forward. Just taken alone, the EFR course is a highly useful certification that is recognised by professional and recreational organisations all over the world.

Throughout the PADI Rescue Diver eLearning course, the material references EFR techniques, so we recommend that you complete your EFR training before starting the eLearning course. However, this is not essential, as you can finish the entire eLearning course perfectly well without having completed the EFR course beforehand.

Which leads us on to the…

PADI RESCUE DIVER ELEARNING COURSE

Having done my PADI Open Water and Open Water Advanced eLearning courses a couple of years ago, I have to confess to being very unimpressed with the experience. I found the user interfaces clumsy and unintuitive, and sometimes just downright difficult to use.

However, I'm happy to report that nowadays PADI have really sorted out these issues, and I had no such problems this time round. The new interface was clear, smooth and easy to use, although some pages do pause for a few seconds to load as you scroll down.

One thing I have never found fault with during any of the PADI courses so far, is the content. As usual it was clear, thorough and easy to read and understand. Some parts, which summarise content you've already read either in text or video, may feel repetitive, but this is simply a proven teaching technique for re-enforcing what has already been learned so it sticks in the mind.

It is therefore advisable to go through every piece of content, even if you're tempted to skip it, as it's all designed to help you absorb a large quantity of information. And there is, indeed, a LOT of information to absorb!

Across an introduction, five different sections and a final exam, you'll cover topics such as 'The Psychology of Rescue', modules 1 to 5, 'Being Prepared for a Diver Emergency' 1 to 5, 'Accident Management', and much, much more.

As with the EFR course, the PADI Rescue Diver eLearning course stresses the most important responses to any emergency situation: Stop, assess, think and then act. Do you NEED to dive into the water to rescue a struggling diver near a boat or shoreline, or can you throw them a line or a floatation device? Do you have the right equipment or capabilities to safely perform the rescue? As always, the rescuer's safety comes first, as you can't save anyone if you become a victim yourself!

Each section has a knowledge review at the end to make sure it's all sinking in, and then you'll have to pass with at least 75% on the

RESCUE DIVER TRAINING: There are about 12 hours of practical training at the Divers Down dive centre at the Miramar Al Aqah Beach Resort in Fujairah.

final exam, or you won't be able to progress to the practical training.

The PADI Rescue Diver eLearning course will take you 10 or more hours to complete, and we recommend that you don't rush through it, as you'll need the knowledge it provides to complete the certification.

Given the amount of information that you have to take in, we feel it's a bit of a shame that PADI don't include a handy quick reference guide to download with the course, listing processes and procedures, and so on. As they don't, we strongly recommend that you take notes as you go. These can also come in handy later on if you want to refresh your knowledge. You can also refer back to the course material online anytime you wish through your PADI eLearning account.

Once you've completed the eLearning course and passed your exam, it's time for…

PADI RESCUE DIVER IN-WATER TRAINING

So I've done the studying, and passed the exams, and now we reach the fun part, or so I thought… On our trip to the Divers Down dive centre in Fujairah for the first day's learning, the weather turned a bit feisty on us, and mild chop in the morning turned into large swells with strong currents, heavy surf and powerful surge in the afternoon.

While this certainly added to the physical demands of the day, it was rewarding to complete the course in challenging conditions, as emergency situations often happen under these circumstances.

Here's where you'll put all your theory learning to practical use, and learn some new techniques for rescuing both divers and swimmers from the water.

You'll practice approaching and responding to a diver on the surface who is either tired, panicked or unresponsive, with another instructor playing the 'victim', who will respond to your rescue efforts in a variety of ways. They might just be tired or have a cramp, or they might be in full-blown panic mode and attempt to climb on top of you to save themselves.

You'll also practice an underwater missing diver search, using search patterns such as the 'expanding square' or the 'U-shaped' pattern, which is extremely challenging when you have a powerful surge shoving you backwards and forwards across the sea bed!

You will then practice responding to an unresponsive, stressed or panicked diver underwater, each of which requires their own specific set of techniques.

As in every scenario, you'll have to respond in a way that ensures your safety and the best possible outcome for the victim.

All your theory learning is put to practical use and you'll learn some new techniques for rescuing both divers and swimmers from the water.

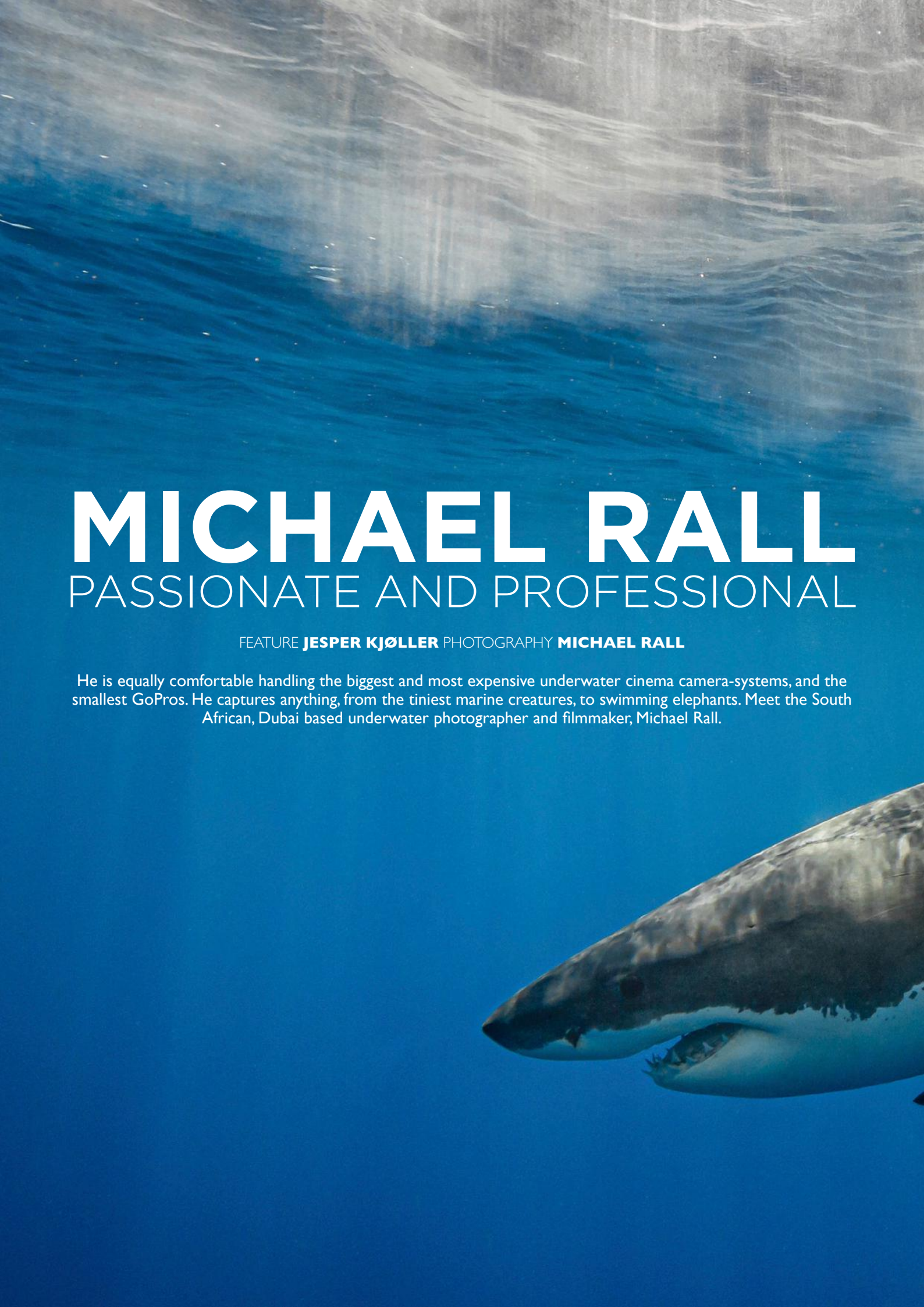
And finally, you'll practice rescues from shore, swimming out to struggling or unresponsive swimmers and assisting them back to shore. You really learn the limits of your endurance swimming 100 m out through heavy surf to rescue an unresponsive swimmer, and then dragging his weight back through it all to shore, four times over!

And this is a vital part of the PADI Rescue Diver course – learning your limits, so that you don't get yourself into trouble as well. I came pretty close to mine that day. I also learned that anyone considering this course should be a strong swimmer who is completely confident in the water, as you'll be put into situations that require you to keep your cool and make decisions in some physically challenging scenarios.

The next day saw the final exercises of the course, where you combine all the different techniques you've learned into a series of practical rescue scenarios from a boat out in the water, reacting just as you would in a real emergency situation. It is a real thrill to feel all your training come into focus as you 'rescue' a struggling diver from the water, and you know that you'd feel confident coming to someone's aid if they needed your help.

All in all, the PADI Rescue Diver Certification is an extremely rewarding experience, as you learn not just how to respond to emergencies, but to anticipate them and, in the best-case scenario, avoid them completely through hazard perception, training and awareness.

It will significantly improve your confidence and competence as a diver and, should the unthinkable happen, you may just be able to drastically improve someone's chances of survival. As the course teaches you, if a victim is already not breathing or in cardiac arrest, you can't make things any worse!



MICHAEL RALL
PASSIONATE AND PROFESSIONAL

FEATURE **JESPER KJØLLER** PHOTOGRAPHY **MICHAEL RALL**

He is equally comfortable handling the biggest and most expensive underwater cinema camera-systems, and the smallest GoPros. He captures anything, from the tiniest marine creatures, to swimming elephants. Meet the South African, Dubai based underwater photographer and filmmaker, Michael Rall.

COVER: Great White Shark, Guadalupe. **ABOVE:** Sardine Run, South Africa. Photo by Joel Schaeffer. **OPPOSITE PAGE:** Cenotes, Mexico.

He is equally comfortable handling the biggest and most expensive underwater cinema camera-systems, and the smallest GoPros. He captures anything, from the tiniest marine creatures, to swimming elephants. Meet the South African, Dubai based underwater photographer and filmmaker, Michael Rall.

Michael was raised in Durban, South Africa. Durban is right on the coast, so he grew up around the ocean and he spent his childhood swimming, bodyboarding, and spearfishing. His family was not particularly interested in the ocean, but they always supported him in his passion.

"After school and on the weekends, we would catch buses and go to the beach to surf", Michael remembers.

"I don't really know what attracted me to the ocean. It was something powerful and mystical, I guess. I could stare at crashing waves for hours", he adds.

The young Michael used to love to watch National Geographic documentaries with his grandfather, and he soon developed his curiosity for marine life.

"Before I began scuba diving, I kept aquariums – that was my passion. I would freedive and catch the fish, and set up the ecosystems myself. When I finished high school, I did not really know what I wanted to do, but I knew it had to be related to the ocean and marine biology. I contemplated studying ichthyology or aquaculture, but I never really went further or made any definite career choices", he says.

Michael learned to scuba dive in 2003 in Durban. The course was a gift from his parents for finishing high school. He loved the diving course and he quickly expanded his education as a diver by taking more courses. There were loads of dive centres and dive clubs in the area, and he soon landed his first job employed as a bartender in a local dive club. He was the barman, he looked after their marine aquarium, and on the weekends, when the bar was closed, he would go diving and take more courses.

"I can still remember telling my instructor during my PADI Open Water course that I also wanted to become an instructor myself one day. But it took me a long time to get there", Michael recalls.

"After high school, I went to the UK to study in London for two and a half years. I got a job managing the largest private collection of marine fish and invertebrates in Europe at the time. I also did my PADI Divemaster training while I was there. I did it in the famous inland training site of Stoney Cove in Leicestershire".

NO PLAN

When Michael eventually went back to South Africa, he still had no clear career plan. After a year back in Durban, he had spent almost all the money he had saved. He managed to get a skipper's license, and one day a friend called him and invited him to come to Dubai to work as a captain on a yacht.

"The position that I was promised actually never happened, but I was lucky to get a job interview with a company that managed a fleet of yachts in Dubai. I was very fortunate to be the right man at the right time and place – pretty much the same story for everything I've done! I have been very lucky that way", Michael says with a smile.

He eventually got a job on M/Y Dubai Shadow, the support vessel for the superyacht M/Y Dubai. He worked with superyachts for four years as a dive guide, watersports instructor, and tender engineer. He would arrange diving and spearfishing trips for the VIP clients on board. During this time, Michael also got to finally fulfil his goal and he did his PADI Instructor course.

"I was spending so much time underwater

LEFT: Nautilus and jellyfish, Philippines. **ABOVE:** Mobula Ray, Azores.

that I began shooting images with simple point-and-shoot cameras. It was more of a hobby at this point – something to do while I was scuba diving. My interest in marine life is quite obvious when I look at my first pictures today – they were merely identification images documenting a species and not really very well composed", says Michael with a laugh.

LUCKY AGAIN

In 2012, he had had enough. He was done with yachting. He had polished enough stainless steel and scrubbed enough decks. But again, he was lucky. He got the offer to manage a private dive team.

He improved the team's capacity to be able to handle freediving, scuba diving, underwater photography and filming, as well as special marine projects. During this time, he was asked to go and do location scouting for an underwater sequence that was to be shot around Socotra Island, outside Yemen. The underwater scenes would eventually be included in a very ambitious feature documentary project called Awaken. This documentary was shot over a five-year period in more than 35 countries and explores humanity's relationship with technology and the natural world. It is directed by Tom Lowe, executively produced by cinema pioneers Terrence Mallick and Godfrey Reggio, and narrated by Liv Tyler.

At first, Michael supported the underwater scenes at Socotra Island with logistics. However, he was also asked to operate the underwater cinema cameras, even though he only had experience with still photography.

"At this point in my career, I had zero experience with cinema cameras, but I must have done all right because the director later approached me and asked me if I would like to join the film crew as they had planned many more underwater sequences around the world. Since I already had experience with still photography underwater and had a good eye for shots and framing, they realised that it would be easier to teach me as a diver to operate a movie camera, than to teach a camera operator to dive to my level", Michael recalls.

TRUE PASSION

Awaken was produced by Dubai Film. All the specialised underwater equipment purchased for the project were added to Dubai Films arsenal of movie-making tools, and Michael was brought in to organise the underwater filming equipment.

"It was really exciting to be involved in Awaken as it gave me an opportunity to travel the world, see amazing things, and learn new skills simultaneously. In the beginning, filming was secondary for me, but through travelling and all these experiences, I discovered my true passion", Michael recalls.

"My true passion is capturing life underwater. Whether it is still or video, that is what I want to do. As a career, underwater filming is great, and I love doing it, but underwater photography is what I do in my spare time as a hobby. When I dive with a camera today, the diving part is just second nature – it is on autopilot, I don't have to think about it at all".

LEARNING ON THE JOB

Today Michael still splits his time between managing the dive team and doing underwater filming projects. The proportion of the work varies with the season and with the different projects – quite often, managing the dive team and working with underwater film shoots overlaps as there is filming needs in the dive team, and diving needs in the film work.

"I have still not done any formal training as a camera operator – I have been looking for courses, but they don't really exist. Instead, I have been lucky to learn on the job and to be around very talented people. When I find something I'm truly passionate about, I immerse myself in it and try to learn as much as I can from any source".

Michael's background in marine aquariums has been a huge advantage in working as an underwater photographer and a camera operator.

"A deep understanding of marine biology,

ABOVE: Rajan the Elephant, India. **BELOW L-R:** Cuttlefish, Philippines; Bluefin Tuna, Malta; Michael filming a Great White in Guadalupe, by Joel Schaeffer; Riley (Daughter), Dubai.

including behaviour, habitats, and physiology, makes it easier to predict how the animals will behave and anticipate what the fish are going to do next", says Michael.

"I almost never dive without a camera in my hand. I am always diving to capture something, to tell a story, and to share it with people.

NO HANDS

His future plans are to expand his network in the film industry and get sought after for his craft. He will create more special projects, and he would love to be involved in more underwater filming for the BBC and do more with the Discovery Channel for projects like the Blue Planet or Shark Week as a camera operator or underwater unit director.

"One thing I enjoy is filming while freediving. First of all because it is challenging. Obviously, you are on a single breath, so you really need to relax and focus to be able to get the shot. You can't run out of breath in the middle of a sequence. When you are freediving, your temperament is different, and your body-language is altered, so the animals respond differently, almost like you're one of them. I'm fortunate to be able to do hands-free equalisation. That technique allows me to relax and have both hands on the camera while diving down".

Michael also has an interest in technical diving. As anyone with a passion for scuba diving, there is a natural inclination to expand limitations and to go deeper.

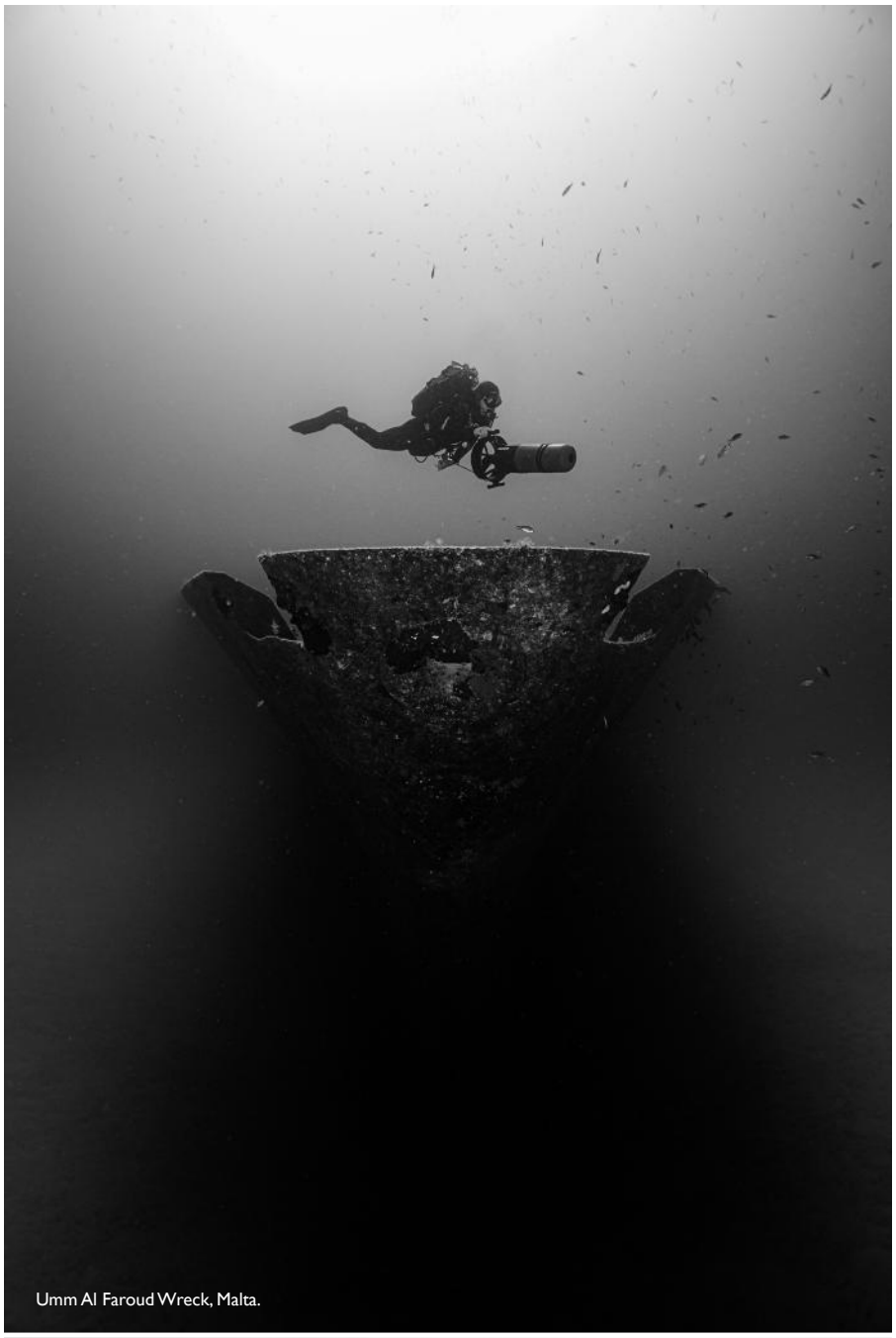
"I think I began in 2012 with the first courses in technical diving. To be able to do deep dives and long decompression dives gives creditability in the film industry. The more you can do and the fewer limitations you have, the more attractive you will be", Michael says.

Michael also wants to expand his rebreather diving skills as closed-circuit diving has many advantages from a logistical point of view. It is easier to get close to marine life. Economical gas usage allows for longer dive times. With the price of helium going up, the rebreather is a more cost-effective alternative to traditional open-circuit scuba.

THE ELEPHANT IN THE ROOM

"Among my absolute favourite dives are the caves and cenotes in Mexico. There is something special about cave diving. Just to capture the light. For me, it is not so much the exploration – I haven't gone very far into the caves. Staying close to the entrances is where you get that magical feeling and the beautiful light and shadows. I love that. I could spend so much more time there.

Among other favourite diving and travelling experiences is of course diving with Rajan, the swimming elephant in the Andaman Islands, while filming for Awaken".



Umm Al Faroud Wreck, Malta.

A Dubai Turtle Rehabilitation Project release.

FACT FILE

- Michael Rall lives in Dubai with his wife and daughter.
- 5,000+ dives.
- Trimix certified.
- Instructor in scuba, freediving, uw-photography and uw-videography.
- Overall Winner to EDA's Digital Online competition 2020.
- 2nd place Wide Angle category to EDA's Digital Online competition 2019.
- 3rd place Black & White category to EDA's Digital Online competition 2018.

EQUIPMENT

STILL PHOTO

Michael uses a Nikon D850 in a Nauticam housing with Inon Z330 strobes and an Orcatorch 910V focus light.

"I like this setup because it is ergonomic, and the D850 is an amazing still camera. I like to shoot both macro and wide angle, but with the visibility in Dubai, it is usually macro".

CINEMA

Michael has experience with many different underwater camera systems, but he always uses Gates Underwater Housings.

"They are extremely well designed and tough. You can always rely on them. The cinema cameras I usually use underwater are RED, Arri, Phantom Flex, and a few others. The Phantom Flex shoots super slow-mo at 1,000 frames per second at 4K resolution creating dreamy super slow-motion footage".

PROJECTS

Nike Women of Arabia TVC, Etihad Special Olympics TVC and various XDubai stunt videos. Discovery Channel Tanked in Dubai, Bollywood film Tiger Zinda Hai.

LOCATIONS

- **PORT ST. JOHNS, SOUTH AFRICA**
  24 days on the water filming the sardine run in the middle of winter.
- **AUSTRIA**
  Cold water diving in a flooded green lake of 4°C.
- **GUADALUPE, MEXICO**
  Diving with great white sharks.
- **CRYSTAL RIVER, FLORIDA, USA**
  Filming a mother manatee and her calf.
- **CHANNEL ISLANDS, USA**
  Freediving in the kelp forest, filming 1,000 frames per second slow-mo sequences.

WEB AND SOCIAL MEDIA

www.michaelrall.com

INSTAGRAM: @mike_rall
FACEBOOK: @michaelralldeepimagery

ESCAPING SUMMER TO AUSTRALIAN WINTER DIVING

IN BYRON BAY

FEATURE AND PHOTOGRAPHY **SIMONE CAPRODOSSI**

Byron Bay is one of the most popular Australian seaside hotspots, known for its world class surfing, stunning uncluttered beaches and bohemian lifestyle, but not everyone knows that under its waters lies one of the best dive sites in the world.

Byron Bay is one of the most popular Australian seaside hotspots, known for its world class surfing, stunning uncluttered beaches and bohemian lifestyle, but not everyone knows that under its waters lies one of the best dive sites in the world.

Julian Rocks, a volcanic island just a few minutes by boat from Byron Bay's main beach, it was established as a marine reserve in 1982 and thanks to the over 35 years of protected status it is surrounded by thriving marine life. It recently made it to the National Geographic list of the top 20 dives sites in the world and was named amongst the top 3 snorkelling spots in Australia.

Just off the most easterly point of Australia, Julian Rocks has dramatic seasonal changes with water temperatures ranging from 18-20 degrees Celsius in Australian winters and spring (June to November) and reaches up to 26-27 degrees Celsius in the peak of Australian summers in February/March. This creates a unique level of biodiversity year round with over a thousand cold and warm water species found at the site.

Byron Bay gets packed with tourists and divers in the Australian summers to enjoy the lovely weather, gorgeous beaches and warm waters. Julian Rocks thrives with marine life featuring one of the largest aggregations of leopard sharks in the world and frequent visits from iconic warm water species such as the manta rays.

Australian winters coincide with the unbearably hot Middle Eastern summers, so in absence of global pandemic travel restrictions, Byron Bay can offer an amazing downunder escape from the heat, and very few divers outside the local community know how good the diving is in this season.

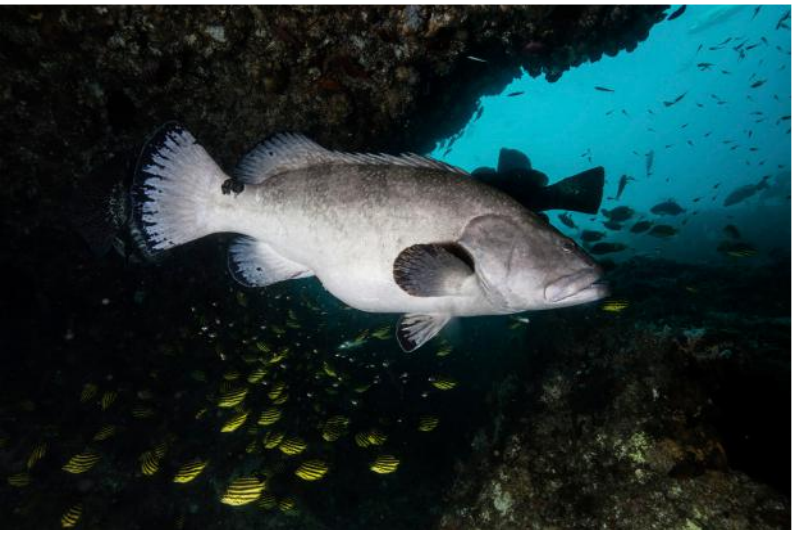
The water is cool but a 5 mm wetsuit with an extra warm layer is all it takes to be perfectly comfortable underwater at around 20°C with no thermoclines. Air temperatures are never too cold in Byron's mild winter, and the ride to the rock is just under 10 minutes so it's a quick way out and back to a cup of hot coffee.

Daring the mildly colder waters will reward divers with some breathtaking underwater encounters. In winter, large numbers of grey nurse sharks (*Charcarias taurus*) come up to Julian Rocks from further south. Ferocious looking with their irregular pointy teeth, they are actually extraordinarily placid and harmless animals, and they are very chilled around divers.

Great encounters with grey nurse sharks are possible in many dive sites along the NSW coast but usually require diving deeper or in strong currents in more exposed locations. At Julian Rocks, they'll be swimming placidly in shallower waters of no more than 15 metres.

While grey nurse sharks are the winter stars of the show, many other sharks and rays call Julian Rocks home year round.

Three different species of wobbegongs live here in large numbers and are extra active in the autumn and winter months. The spotted wobbegong (*Orectolobus maculatus*) is the most common and can be seen everywhere swimming around or laying camouflaged on rocky outcrops. The Hale's wobbegong (*Orectolobus halei*) is probably the most impressive with beautiful coloured patterns and an imposing size, reaching up to 3 metres



in length. The smaller ornated wobbegong (*Orectolobus ornatus*) is actually more rare and endemic to New South Wales. At Julian Rocks, they are so many that they are often piled on top of each other.

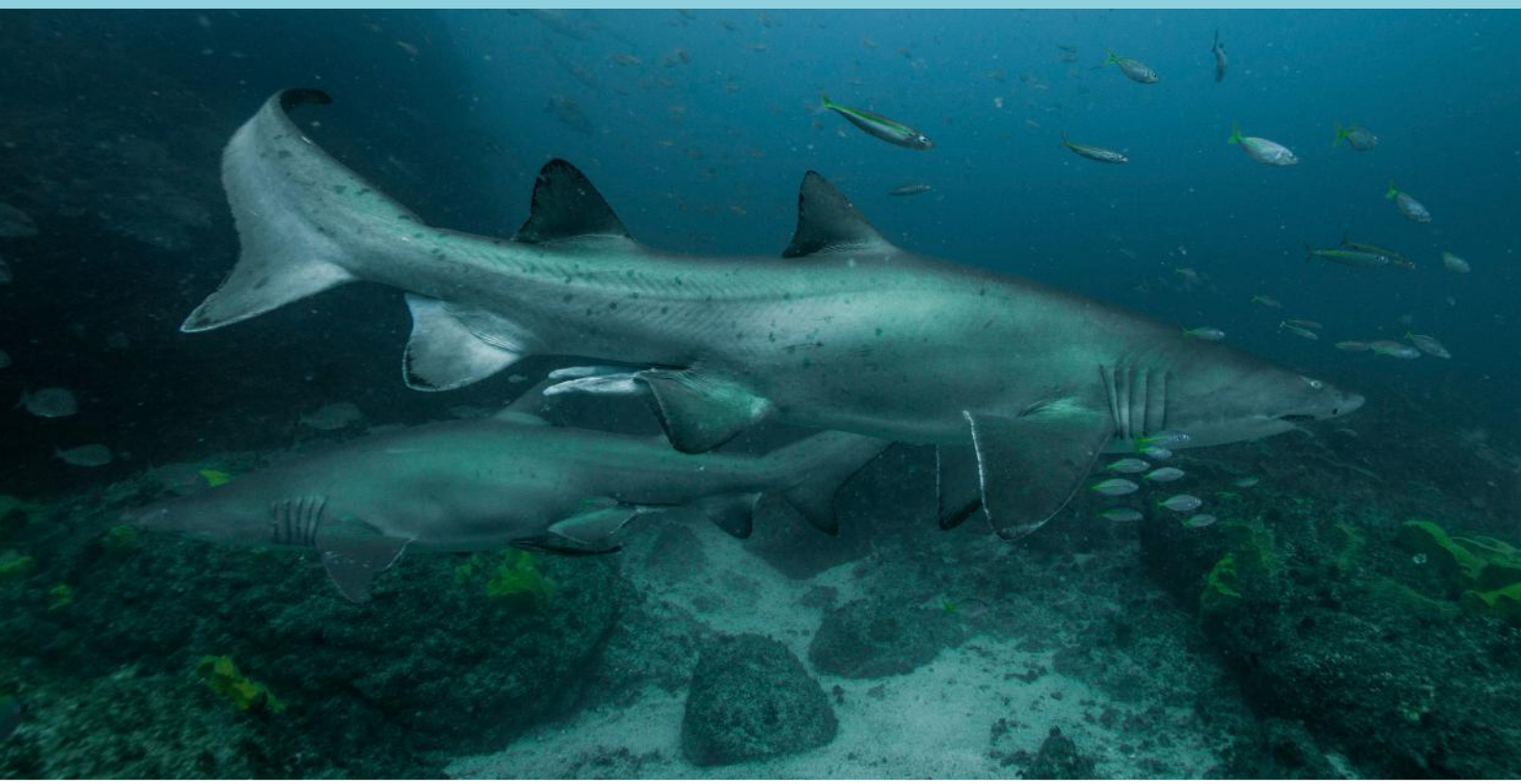
Resident elasmobranchs also include the beautiful white spotted guitarfish and small very rare sharks like the Colclough's shark, as well as many of the majestic eagle rays, huge bull rays and small blue spotted rays.

The other iconic year-round residents are three species of sea turtles. Young green turtles (*Chelonia mydas*) hang in the shallows close to the top of the rocks. Confident hawksbills (*Eretmochelys imbricata*) are found a bit deeper around the coral bommies. Then there are a few substantial resident loggerheads (*Caretta caretta*) that call the rock home. One of them, known to the locals as "Terrible Ted" very often comes to greet the divers and likes to nibble at fins and BCDs, he also loves to engage with his reflection in big camera dome ports offering a very detailed view of his tongue and mouth.

To access Julian Rocks, the dive boats launch from The Pass, one of Byron's surfing hotspots at the end of main beach. The ride to the rock takes less than 10 minutes and different dive sites open up around the base of the 'Rocks', each with its unique characteristics.

As the wind often comes from the south/southeast in winter, one of the best dive sites at Julian Rocks, Cod Hole is almost always accessible.

The Cod Hole is a large swim-through at the eastern edge of the island facing the open ocean, ranging from 15 to 20 metre depths. It is always absolutely packed with marine life and in this season it is surrounded by huge schools of fish, including big jewfish and kingfish. Massive Queensland groupers and black cods patrol the waters around the deeper side and sometimes block the entrance to the Cod Hole. The sand trenches around the cave are the main grey nurse sharks' playground. On a good day, you could just lay motionless at 15 metres on the



sandy trenches on the north side of the rock for a whole dive and watch a train of grey nurse sharks swim past you nonstop until 45 minutes have past and it's time to get out.

This year the grey nurse shark numbers have been higher than usual and the mass aggregation started early, in mid-June. That, paired with extremely good visibility and blue water for several weeks offered incredible diving conditions with many local divers calling out their best dive at Julian Rocks in the last 30 years. The sharks were so numerous that they even took over the Nursery, Julian Rocks' shallowest dive site, where Try Scuba experiences and snorkelling take place.

The Nursery is always a great experience for novice divers with many turtles, corals and extremely diverse fish life, but during this season, tens of sharks moved around the sandy trenches around 10 metres deep just down the mooring lines surrounding novice divers for a dive to remember, forever. The action was so packed that even experienced divers heading to the Cod Hole ended up spending the whole dive in the shallows, mesmerized by the shark action and schools of eagle rays and cownose rays swimming above.

Diving past the Cod Hole and resisting from stopping there too long, the dive site opens up to its deeper side turning in to the north eastern corner. Here a big arena of bright white sand stretches out into the blue sloping down from about 20 metres towards open sea.

In early July this year, the grey nurse sharks stacked up around the pinnacles on the edge of the arena and moved around crossing through schools of fish. Big spotted guitarfish moved across the sandy bottom towards the deeper end and eagle rays swam above, with their shadows gliding on the white sand.

Swimming around a few big rock formations with the right guide, you will then find the Cray Cave, a much smaller swim through tapered with soft coral and sponges and filled with small fish and hunting lionfish. Ornate ghost pipefish often hide in some big black coral branches just behind the cave.

When the wind blows from the north and creates strong current conditions around the island, both the divers and most of the marine life move to the south side to find shelter in

Hugo's Trench. The trench is a canyon formed into the cut between the walls of the two large rocky outcrops that form Julian Rocks. The grey nurse sharks sometimes fill the trench with heavy shark traffic, swimming back and forth along its length while tens of wobbegongs carpet the sandy bottom piled onto each other. Looking up, green turtles swim in the surge near the surface and eagle rays fly past. The walls of the trench are also literally covered in nudibranchs, corals, sponges, sea stars and all sorts of small marine life if one ever has the time to pay attention.

July to September is also peak humpback whale migration time as all the whales have to swim past the edge of Cape Byron, both on their way up, and on their way down. It is very common to enjoy whale sightings while getting to the rock and gearing up. At the end of August and into September when the whales come back down heading towards Antarctica, young calves often delight us with close breaches by the boats and on a few lucky occasions, come for a friendly inspection of the funny humans underwater. But the magical experience is the sound of the whales singing that often accompanies the whole dive, and gets closer and closer as you ascend to the surface, making you feel the invisible presence of these giants.

Snorkelling is also extraordinary at Julian Rocks, with many of the younger turtles patrolling the shallows, and the sharks also being easy to spot from the surface. In winter, the snorkellers get the most of the whale action that is happening at the surface.

Sundive
www.sundive.com.au

SUNDIVE BYRON BAY

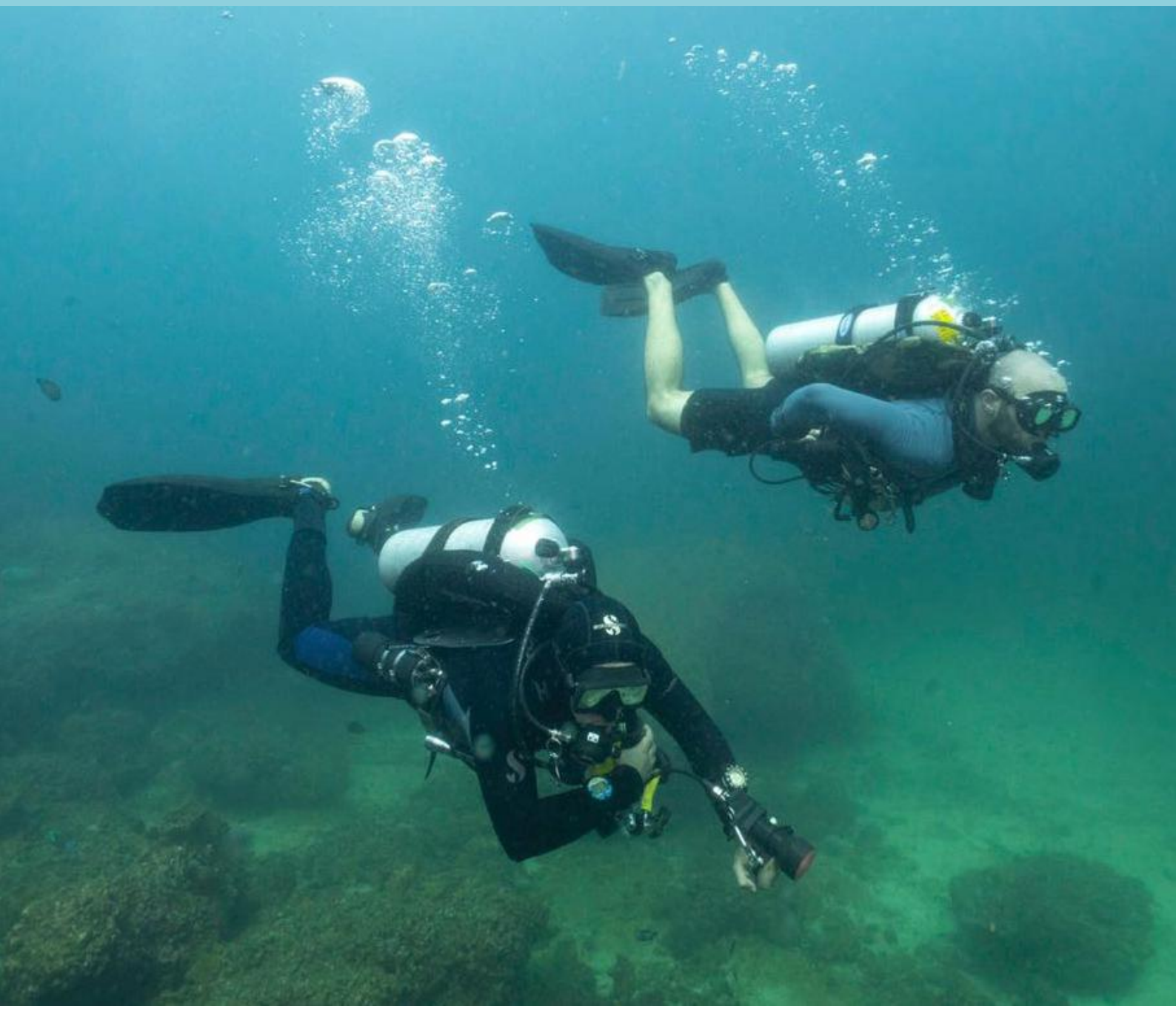
If you would like to experience Julian Rocks, Sundive Byron Bay is a Padi 5 Star Dive Centre located in the centre of Byron and has been in operation for over 30 years.

They offer daily diving and snorkelling trips, as well as Try Scuba experiences for non-divers. For more information, visit: **www.sundive.com.au**

THE ADVENTURES OF A UAE DIVER IN THE UAE

FEATURE **SARAH MESSER** PHOTOGRAPHY **KHALID BIN BREIK**

Whichever corner of the UAE you're locked down in, there is PLENTY of choices for keeping your dive numbers up. And the Emirates offer something for everyone, whether you're an open water, advanced, or technical diver.



COVER PAGE: A beautiful green turtle (*Chelonia mydas*) in Khorfakkan is listed as an Endangered species. **ABOVE:** Tec divers enjoying a leisurely dive.

When I was a little girl my grandma would often say, "When life gives you lemons, you should make lemonade". In other words, be positive and make the best of what you have in front of you at all times. If you have oranges, there's not much point in trying to make lemonade…

And so, since the UAE quarantine movement restrictions were eased back in May, this addicted diver was wondering how to get her diving fix while the GCC borders were closed and international travel grounded. All those diving destinations I was missing out on, BOOHOO.

On second thoughts, what's to be sad about? We have all the UAE coastline and many reefs to explore. When life stops you diving overseas, dive at home (and let's be honest, we're very lucky to have this as an option)! My UAE buddies from the Dubai Divers Team were all in the same position as well, so a great time to plan some local trips and share our stories of diving across the Emirates. Here are some of the recent dive trips we have done in the last couple of months.

DUBAI

The active dive centres operating from the Dubai coast have been few and far between – there seems to not be a demand here from either the residents or the tourists. Frankly, the stories I had heard of silt filled murky waters and sandy bottoms did not fill me with the motivation to find a way to get out to the local dive sites. But, life has given me lemons. Around the same time as we were able to move outside more freely at weekends, my buddy Khalid told me about the Dubai based dive centre he had just found, Scuba Shade. So we found the next available free day and took our first dive trip into Dubai waters together to the Moon Island dive site.

At 70 kms distance from shore, it is quite a way from Scuba Shade's base in the Habtoor Grand Hotel and took around one and a half hours in the speedboat to reach. Moon Island is a small man-made island in the shape of the crescent moon, inhabited only by a warden of the island's beaches. The reef around the island is shallow and is as good for snorkellers as it is for divers. Visibility was good – the reef was formed of many medium sized rocks where some coral had grown and marine life had made its home. The sea life here is not abundant but it's a pleasant enough dive, and you will definitely see some critters and nudi's wriggling around the rocks. We stayed on one side of the island for the first dive, and went to the other side for the second.

One of other main Dubai dive sites that Scuba Shade goes to is the Zeinab wreck, a 40 mins boat ride from shore. The Zeinab was built in 1969 and sank in 2001; today she sits at 30 m

ABOVE: A hawksbill turtle (*Eretmochelys imbricata*) which is a Critically Endangered species, is seen casually looking on at the divers passing by in Khorfakkan.

on the port side and 20 m from the top and retains some of the original features. Similar to Moon Island, this is a large dive site and can be done in 2 dives. On the day my buddy Rami visited, he said the visibility was the best he had ever seen at that site. Perhaps one of the positives for our watery world to come from this lockdown is better vis in the water and more marine life to see.

FUJAIRAH

Every UAE based diver knows and goes diving in Fujairah with its trademark green waters, and in May and July I combined our Eid days off with a hotel staycation and some weekend diving. Divers Down is a dive centre with a solid reputation across all types of divers, operating from the Iberotel Miramar Al Aqah Beach Resort. The hotel itself is fantastic, with a large pool, private beach, and excellent on-site restaurants, and with Divers Down on the edge of the complex it's a perfect getaway to both relax and indulge in our favourite hobby. There are plenty of dive sites to choose from and most are not far from the shore (approx. 20 mins speedboat ride). There are several small wrecks called Inchcape – #10 being the largest and most popular.

Inchcape 10 was deliberately sunk in 2003 to create a new coral reef and with great success. The hard coral that has now grown over it is great to look at as well as hosting a variety of large and small marine life. You'll always find several nudi's, sweetlips, morays, crocodile fish, occasional stingrays or blue spotted rays. It's not really a wreck for penetrating but certainly one you can visit time and time again, and every visit will turn up something new.

Go further down the coast to Khorfakkan and you'll find Barracuda Diving Center, offering some of the same dive sites and some new ones – Ruby Reef, Artificial Reef, Deep Reef, plus others. Barracuda are a dive center I visit often because they're that bit closer to Dubai (about a 30 mins difference to Al Aqah) which at 6 am on your average Friday morning makes all the difference. They also have a lovely wooden dhow if you have a bigger group of divers, and their prices are highly competitive.

One of my Dubai Divers Team buddies, Karim, went with Freestyle Divers to a dive site I have never been to before, Gunter's. There seems to be several stories circulating as to how the site got its name, one being that Gunter was the name of the not-so-pleasant man who took out a barge full of waste material and dumped it there. Other stories say that Gunter is the name of one of the resident sea horses. Who knows! Either way, according to Karim it's a dive site well worth a visit if only for the sea horses – these beautiful creatures are not easy to find and spot generally. On the

Barracuda Diving Center dhow heading out for some diving.

sea bed are a number of concrete pipes, truck tires, and bicycles, and over them a beautiful reef has now grown.

Fujairah has several excellent dive centres, and with the new socially distanced diving restrictions in place, that means fewer people per boat, look around and you'll find a centre with space for you. Plus, each centre tends to have a different itinerary so you can repeatedly go to your favourite sites, or go to new sites.

Fujairah will always offer some varied sea life, if you're lucky a turtle or two, and given the plankton rich waters, the occasional passing whale (as seen by my buddy Lara in June – species unidentified).

RAS AL KHAIMAH

Our Dubai Divers Team founder, Alain, along with a few of our buddies, are GUE (Global Underwater Explorer) tec divers, diving on multiple tanks and mixed gases. Their story of diving on Alia Wreck with Al Jazeera Diving & Swimming Center – the only centre in RAK – is interesting as it is so different to the recreational diving we would normally do in the other Emirates.




Little seems to be known about why the wreck is there or how she came to be sunk. She is very large – in fact one of the largest you can dive in UAE waters – at around 100 m long and 30 m wide. Alain recommends only doing the dive site with a scooter in order to see it fully.

It's also not a site that can be done on air. The shallowest part of the wreck is 28 metres and goes down to 38 metres. 28% nitrox or a gas mix is the only way to ensure you get to actually see something. This is also one of the few wrecks in the UAE that you can fully penetrate, so definitely one for a wreck certification or tec diver. There are also often strong currents so the timing of your dive is critical. This is definitely a dive site to plan carefully and get all the information you need from Al Jazeera Diving & Swimming Center before setting off.

CHOICES, CHOICES, CHOICES!

So as it turns out, whichever corner of the UAE you're locked down in, there is PLENTY of choices for keeping your dive numbers up. And the Emirates offer something for everyone, whether you're an open water, advanced, or technical diver. The more I explore, the more I discover. I mention only a few dive sites here but there are many, many more to find, and new ones being found reasonably regularly.

DIVING SAFELY IN THE TIME OF CORONA

A final note on diving safely in these strange times. Hats off to all the dive centres I and my buddies have been to. They have adapted to the new safety requirements very well and quickly. Most dive centres are running limited numbers on their boats. Diver safety was always the priority underwater, and now it is above water too. The best advice I can give you, is to listen carefully to the dive centre rules and follow them – each one will have protocols that are specific to their environment:

- Disinfect and sterilise all your equipment, especially if you are using the dive centres kit, both before and after your dive.
- Wear your face mask at all times when around other divers.
- Ensure you are socially distancing on the speedboats and in the dive centres.

With some signs of international travel starting to open up, maybe the next EDA Magazine issue will be after a tropical dive trip. But if not, hey UAE diving is keeping this addicted diver happy. Happy diving everyone, stay safe!

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SAFETY IS AN ATTITUDE

FEATURE **GUY THOMAS**

We take diving safety very seriously, and our actions and research since the start of DAN Europe back in 1983, made it possible to book great results.

We increase diving safety by doing, promoting or providing:

- Diving Medical Assistance
- Scientific Research
- First Aid Courses
- Safety Campaigns
- Safety Projects
- Safety Resources

As a result, DAN has become a synonym for Diving Safety, on a global level.

WHAT YOU DON'T KNOW, CAN HURT YOU

However, our efforts would mean nothing if we had not shared our knowledge with divers so they could apply this knowledge and become safer divers. Although diving is a safe sport, there is also a negative side to this feeling of safety. When something is seen as safe, there is a risk that safety principles aren't any longer respected. The "nothing will happen" attitude kicks in and we start making exceptions to the rules. It might start with, "50 BAR left in my cylinder? OK, another 10 minutes at 5 metres will do me no harm", but it can also end with an emergency. There is nothing strange about it, and it is not only limited to diving. We do it with many things in life: not respecting a speed limit, not wearing a motorcycle helmet, or not using personal protective equipment at work. You know that when we feel safe, we start lowering our alertness. And this is the moment where risks start increasing again, or things can get dangerous.

Let us also remember the importance of experience. Doing a course or a speciality doesn't make you an expert, but it does provide you with a solid base to start from. Experience will come over time, but not after 10 or 20 dives. Your confidence will grow with your experience, until such a moment, you get confident, and you might start lowering your safety standards again. You shouldn't respect standards just because you are not yet experienced enough or because you don't feel confident or safe, but you should recognise them always. This requires a certain attitude – "a safety attitude."

Over the last couple of years, I have been talking with a lot of divers about our "Don't get lost" safety campaign, and what has always amazed me when talking about the use of safety materials or procedures, was that many experienced divers replied it would never happen to them, they don't need extra materials or rules, or that they have been doing fine without those safety materials or procedures in the past. It was also interesting to hear that some of those who carried an SMB were convinced that a small SMB would resolve all their problems, and never even considered other materials. Several even carried an SMB "because they had to," not because they understood the real need. It takes half a minute to show the limits of the SMB and to have them start thinking about alternatives.

Another example, funny and sad at the same time, were the justifications of divers on why they don't perform buddy checks. Divers can come up with the weirdest stories to explain why they are not doing them, but the most common reason is that they know what they are doing or checking themselves is the same. It's a human error to not be considered anymore. What I also noticed was that those who were involved in an emergency, either as the victim or a bystander, looked at these things from a different angle and, to be better prepared in case an emergency happened again, paid more attention to details. But one shouldn't wait for an accident/emergency to occur before he/she changes his/her attitude towards diving safety.

IS IT A DIVE CENTRE'S, OR A PERSONAL RESPONSIBILITY?

Without a doubt, dive centres should adopt safe diving principles and do all that is possible to avoid accidents in and outside the water. You should expect the dive operator or pro to do all that is possible to provide you with a safe diving environment and offer you a dive at your level of experience. But divers also have responsibilities.

Being aware of the risks, knowing your limits, building experience, seeking continuous education, proper gear maintenance, proper dive planning, and respecting safety standards is all part of the safety culture and the right attitude good divers should have.

Having a good physical condition is also not to be underestimated. In the most recent dive accident and fatality statistics from DAN America, you can see that health problems were the primary trigger for diving fatalities, followed by "low on air" situations and panic. This made drowning the leading cause of death, and the leading disabling injury that led to death was heart problems. The vast majority of victims were 40 years of age or older, and a significant majority were 50 years or older. Time doesn't stop, not even for experienced divers and although there is no actual "biological" age limit, it is recommended that from the age of 40, the diving medical examination should be more thorough and even more so after the age of 55. But we shouldn't concentrate on generation only.

Being physically fit is as important, as well as for the younger divers. Divers should have enough aerobic capacity and physical strength to perform a surface swim, to help a fellow diver, or to swim against a current. The last thing you want is to get out of breath, which can lead to stress and panic, with all the negative consequences that can follow.

BECOMING A SAFER DIVER

DAN Europe will continue to make diving safety information available, but the right safety attitude has to come from the diver itself. Therefore, the new DAN safety campaigns and projects are focused on the safety attitude divers (recreational and pros) should adopt to make diving ever safer and avoid accidents from happening.

DAN | AlertDiver

WHEN THINGS GO WRONG

FEATURE **FRANÇOIS BURMAN**

Photo by MarcelloDiFrancesco.com

EMERGENCY ACTION PLANS

History teaches us that accidents are always possible; thus, we should have plans in place to mitigate them. Clients as well as staff, bystanders, dive professionals and the dive business itself are subject to risk.

Emergency action plans (EAPs) are essential tools for dive professionals and dive businesses. These plans typically provide information needed in case a dive accident occurs, although this consideration is usually limited to traditional diving activities or expected problems. Comprehensive EAPs must address a variety of risk areas, and few people understand what goes into identifying, compiling, reviewing and qualifying a truly effective EAP.

This article will cover the essentials of planning an effective and practical emergency procedure to help mitigate dive-industry-related incidents. First we'll consider where emergencies are likely to occur.

The risks vary by dive centre, dive professional and area of operation, so we need a careful analysis to identify the real issues. Here is at least a partial list of possible risks to help identify areas of concern.

- **AT THE DIVE CENTRE:** fires; explosions of high-pressure cylinders, gas tanks or containers of hazardous fluids; contact with chemicals or other hazardous materials; injuries from electrocution; social unrest or other involvement with aggressive people.

- **AT THE POOL AND TRAINING AREAS:** exposure to hazardous substances (such as chlorine); medical emergencies (including from preexisting health problems); injuries (from slipping, diving, falling or lifting heavy objects); drowning.

- **WHILE DIVING:** traumatic injuries from propellers, ladders, slipping, diving or heavy objects, for example; encounters with hazardous marine life; lost divers; drowning; medical emergencies due to health conditions; entry and exit hazards associated with rocky shores or difficult-to-access caves or pools.

- **DURING TRANSPORTATION (on land or on the water):** fire; inclement weather; capsizing; loss or incapacitation of people; launch accidents; road accidents; hijacking of a vessel or vehicle.

Beyond the most readily identifiable risks are others that, though unlikely, warrant consideration and preparedness. These may be present in any of the areas listed previously or elsewhere:

- a lost, abducted or wounded guest
- unacceptable or aggressive behaviour by a guest, staff member or visitor
- sudden ill health or a medical emergency
- criminal activity or arrest, death or homicide involving a guest or staff member.

An important location-specific aspect of emergency planning that should be addressed for all areas considered in an EAP is the availability and reliability of local emergency medical and law-enforcement services.

By illustrating these hazards and their potential locations, we hope to inspire dive businesses and self-employed dive professionals to think through their EAPs in greater depth.

There will always be risks, but with better knowledge, understanding and preparedness we can reduce uncertainty and better contain the consequences of the hazards we will eventually face.

DAN | AlertDiver

UPCOMING EVENTS

EDA MOVIE NIGHT

DOCUMENTARY TBC | Location TBC
Wednesday 4th November 2020

In light of the pandemic, we are unfortunately not yet able to provide information on what the next screening will be until closer to the time. We apologise to our members for this. We will keep you updated.

CLEANUP ARABIA 2020 CAMPAIGN

DIVE AND BEACH CLEAN-UPS | DATE & LOCATIONS TBC
November 2020 (EDA Members and Partners Only)

The campaign is made up of EDA members and stakeholders that participate in dive site and coastal clean-ups which help shape their consciousness concerning marine litter and saying no to single-use plastics. Inspiring change to make a difference together.

DIVE MENA EXPO

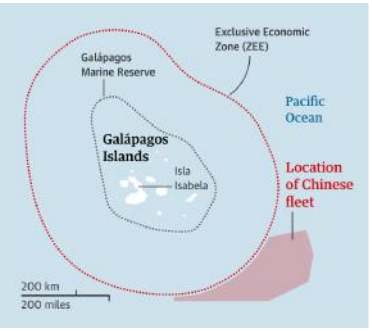
DUBAI INTERNATIONAL BOAT SHOW
Dubai Harbour | 24-28 November 2020 | 10:00-19:00

The Dubai International Boat Show is the largest and most established boat show in the UAE, GCC and Middle East. Whether you want to buy a boat, discover luxury yachts and super yachts, explore the latest diving and aquatic innovations or ride the sparkling waves, it's the definitive event for luxury and lifestyle. Co-located with the Dive MENA Expo, the only dedicated show for the UAE and GCC diving community.

DID YOU KNOW?

OUR MARINE LIFE NEEDS OUR ATTENTION

Due to the global COVID-19 pandemic, the world has been distracted and our wildlife is suffering. Our important and incredibly delicate marine ecosystems need our help now, more than ever!



1. **SOS GALÁPAGOS:** There are 250+ Chinese fishing vessels at the edge of the economic exclusion zone around the Galápagos islands with an estimated 26 million hooks hanging overboard. The site where they are based is a major migration route for endangered species. They are decimating these species and plastic waste is thrown overboard, polluting the shores of Darwin's Galápagos islands. Satellite images pinpoint the vessels to span 300 miles, almost double the length of the Galápagos archipelago itself. And it's all legal!

   FOR UPDATES & TO SIGN THE PETITIONS: https://www.instagram.com/sosgalapagos

2. **FINSPIRE CHANGE UK:** Shark fins are being imported into the UK via a loophole. Each person is permitted to bring 20 kg over the border. To sign the petition to stop this, you must be a British citizen or UK resident, but you can help by sharing this with those who can sign. 100,000 signatures are needed by the 11th of September 2020 in order for this petition to be considered for debate in Parliament.

   SIGN & SHARE THIS PETITION: https://petition.parliament.uk/petitions/300535

3. **MAURITIUS ENVIRONMENTAL EMERGENCY:** The Indian Ocean island of Mauritius declared a "state of environmental emergency" after a Japanese-owned ship ran aground offshore and began spilling tons of its fuel near the delicate and sensitive environmental areas with its endemic and endangered species. The ship was carrying nearly 4,000 tons of fuel and cracks appeared in the hull. Tons of diesel and oil are now leaking into the water putting thousands of species at risk of drowning in a sea of pollution, which also affects Mauritius' economy, food security and health.

   FUNDRAISER BY KARMAGAWA: https://bit.ly/33Qgbbl

In partnership with

UNITED ARAB EMIRATES
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EDA
جمعية الإمارات للغوص
Emirates Diving Association

INSPIRING CHANGE TO MAKE A DIFFERENCE TOGETHER

CLEANUP ARABIA 2020 | THE UAE'S ANNUAL CLEAN-UP CAMPAIGN!

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

Like our group page on **www.facebook.com/emiratesdivingassociation** Follow us on **www.twitter.com/emiratesdivingassociation** Follow us on **www.instagram.com/emiratesdivingassociation**