Inspiring People to Care About our Oceans Since 1995

DIVERS FOR THE ENVIRONMENT

WWW.EMIRATESDIVING.COM | MAGAZINE | MARCH 2021 | VOLUME 17 | ISSUE 1

DIVE WITH PURPOSE

• WATSON • **PADI AMBASSADIVERS** • RESCUED WHALE SHARK • **MARINE DEBRIS** • THE ALLEN CORAL ATLAS • **CORAL BLEACHING** • ENTER DIGITAL ONLINE 2021 • **OVERFISHING**

In partnership with

UNITED ARAB EMIRATES
MINISTRY OF CLIMATE CHANGE
& ENVIRONMENT

EDA
جمعية الإمارات للغوص
Emirates Diving Association

INSPIRING CHANGE TO MAKE A DIFFERENCE TOGETHER

CLEANUP ARABIA 2021 | THE UAE'S CLEAN-UP CAMPAIGN!

Tel: +971 4 393 9390 | **Email:** projects@emiratesdiving.com | **Website:** www.emiratesdiving.com

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

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EDA
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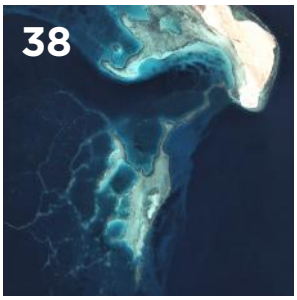
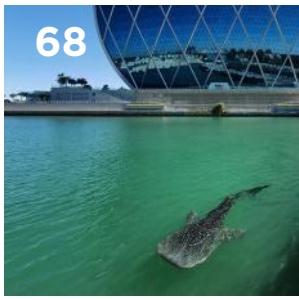




REGULARS

NEWS

KIDS CORNER

REEF CHECK

FEATURES

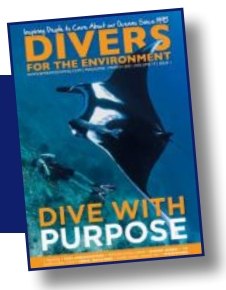
UW PHOTOGRAPHY

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 June 2021. Send all articles, feedback or comments to: **magazine@emiratesdiving.com**

COVER

PHOTO BY ANDREA MARSHALL
Co-Founder | Marine Megafauna Foundation
www.marinemegafauna.org



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.

COVER STORY

THE MARINE MEGAFAUNA FOUNDATION
MMF's vision is to live in a world where marine life and humans thrive together. Their team of dedicated ocean ambassadors work in marine megafauna hotspots around the world. With your help, MMF can save ocean giants from extinction. See what steps they take to achieve this and contribute to their efforts. **www.marinemegafauna.org**

THE QUARTERLY CONTRIBUTORS

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

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**

FERNANDO REIS
Conservationist, environmentalist, shark expert, specialised in shark diver training and in shark advocation. Fernando Reis is the Founder and Executive Director of the Sharks Educational Institute which he set up in 2016. **www.sharksinstitute.org**

WINSTON COWIE
Winston Cowie is an award winning environmental policy manager and New Zealand author, based in Abu Dhabi where he works as the Marine Policy Manager for the Environment Agency – Abu Dhabi. A fellow of the Royal Geographical Society, he has an interest in history having written the New Zealand Land Wars historical fiction series, and recently 'Conquistador Puzzle Trail' that proposes that the Portuguese and Spanish voyaged to Australia and New Zealand pre-Tasman. **www.winstoncowie.com**

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**.

Photo by Elitza Germanov, PhD, Marine Megafauna Foundation's Senior Scientist.

THE NEXT 50 YEARS!

IBRAHIM AL-ZU'BI
EDA's Co-Founder

I would like to welcome you all to the March issue of 'Divers for the Environment'. We are celebrating the UAE's Golden Jubilee. The UAE turns 50 years old this year. That marks 50 years of building and investing in our nation, and 50 years of innovation, tolerance, giving, and even reaching Mars in outer space .

These last 50 years were only the start, the next 50 will be about boosting the country's competitiveness and speed up development for the next half-century. Our leaders started from the desert of our land, to the desert of Mars, just as HH Sheikh Mohammed Bin Rashid Al Maktoum said.

The UAE's diligence in planning for the future is commendable. The UAE's sustainable development will make the country one of the world's most agile and adaptive nations.

Earlier this year, EDA officially became a non-profit non-governmental organisation registered under the UAE 's Ministry of Community Development in which I have the honour of being a co-founder.

I am so excited for the UAE's and EDA's next 50 years. We will champion with the support of partners, staff, and members of the marine conservation community in our country. I am confident that the next 50 years will hold even more achievements that we can be proud of.

I am also looking forward to this year's Digital Online Underwater Photography and Film Competition, the region's first and only underwater competition of its kind. We look forward to seeing all of our members' new underwater photography and film entries from wherever they may have ventured. I want to thank the members of the jury and wish them the best of luck in their difficult job of judging these amazing images which is soon coming up. I am looking forward to the awards ceremony this year.

I want to take this opportunity to thank all our EDA members who despite the COVID-19 pandemic still share their insightful diving experiences and underwater pictures with us. Your insights and articles are imperative in recommending when and where to go diving, as well as what to look out for on your trips. We hope your passion and enthusiasm continues.

I do hope you enjoy reading this issue. We have a busy year ahead of activities and events planned. The EDA team works tirelessly towards another successful year. We look forward to seeing you all at the upcoming EDA events.

Here is to the next 50 years. Happy reading and DIVE SAFE!

Ibrahim Al-Zu'bi

Ibrahim N. Al-Zu'bi

A VIRTUAL EDA MOVIE SCREENING
WATSON

We hope that everyone who registered to watch our first EDA Movie Screening of 2021 was able to find the time to watch Watson on our online Vimeo portal from the 11-15 of February.

Our EDA Online Movie Screenings are only accessible to our current EDA members and their families. Our screenings have limited viewing access and registration to join them is necessary in order to receive the special link to view the films. In order to join our online screenings, EDA membership can be acquired or renewed on our website: **www.emiratesdiving.com/membership-form**.

We want to thank those who took the time to send us these messages:

"A fascinating story and some wonderful film of whales. I had never heard of Watson or Sea Shepherd but was so impressed by his fearlessness and determination. The footage of the latest destructive methods for mass fishing was upsetting." DAVID RIDDLE

"Thank you so much for the opportunity to see this documentary, it was quite something. I had vaguely heard of Sea Shepherd, and now feel ashamed of my ignorance. A remarkable film altogether, at different levels, with a lot of beauty and emotion as well as very challenging and thought-provoking stuff, both about the oceans and human cruelty and exploitation, and also about what makes for effective campaigning." JAMES RAMSAY

"It is almost beyond belief how little respect some nations have for our wildlife and of course David Attenborough has been telling us this for a long time. The scenes in the film of seal bashing, brutal whaling and the removal of fins from living sharks so that they just die because they can no longer navigate are appalling. Also the questions of overfishing and water dragging. Watson and his colleagues must be admired for their courage in taking these extraordinary risks to protect our environment. We must all understand the potential consequences of the damage to our planet before it really is too late to recover." MIKE GREEN

"I learnt a lot of extra stuff about Sea Shepherd & Watson… I've been donating for a while now!" JAMES LAVER

SYNOPSIS

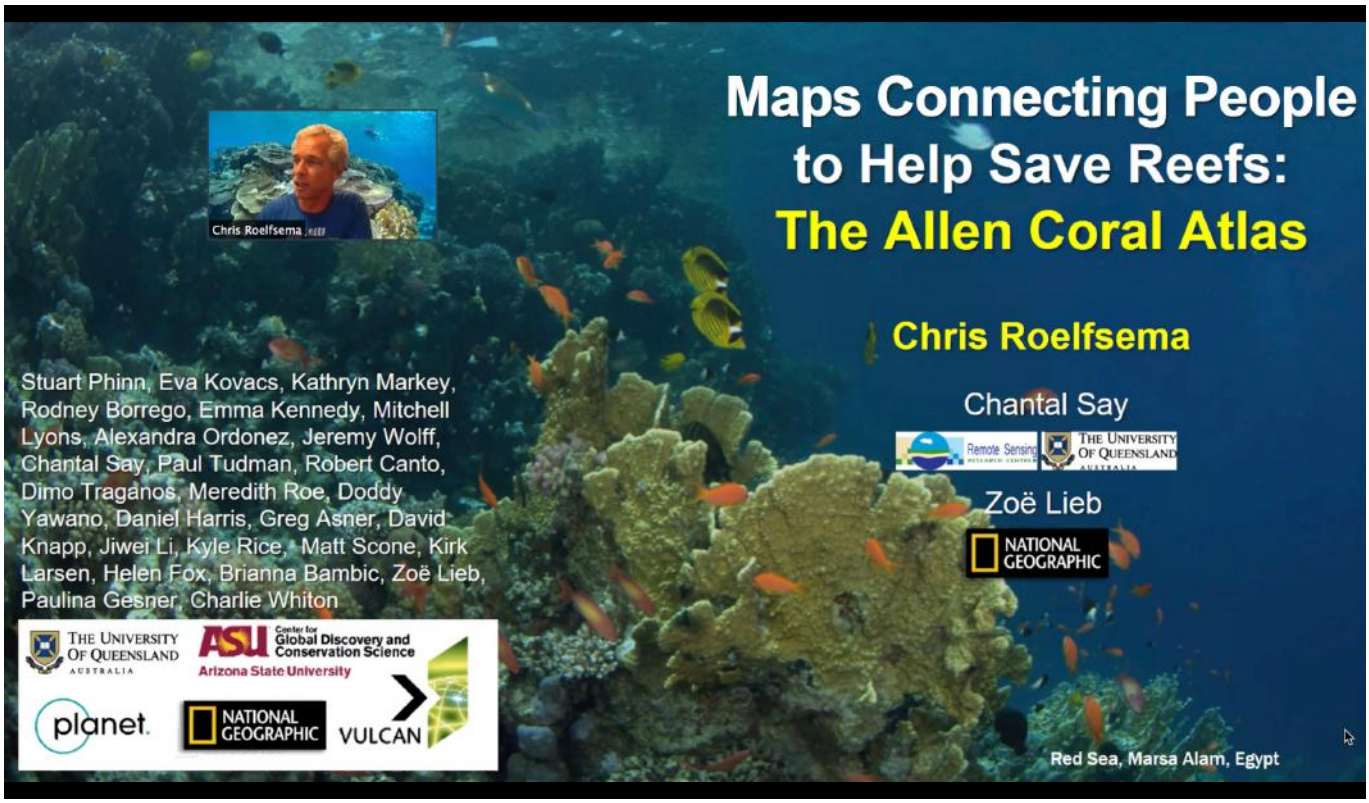
Like a crime-fighting superhero of the high seas, Sea Shepherd founder Paul Watson has spent his life sailing the globe to keep our oceans and their inhabitants safe.

A daring ship's captain with no fear of danger, Watson and his crews have confronted illegal whaling vessels from Europe to the Southern Ocean, seal hunters in Canada, and shark finners in Central America. Impervious to threats, with more than one nation issuing warrants for his arrest, Watson continues to intervene on behalf of his "clients": the ocean creatures endangered by over fishing and illegal activities on the high seas.

As a teenager in the 1960s, Watson left an abusive home and shipped out as a deck hand on a merchant vessel. Upon his return he helped found Greenpeace, putting himself in harm's way to protect marine mammals. But in 1977, when his bold interventions got him kicked off of Greenpeace's board of directors, he launched Sea Shepherd with a ragtag crew and a single ship. Four decades later, the direct-action group has chapters around the world and an international fleet of 13 ships, the world's largest private navy.

Blending revealing contemporary interviews with Watson, archival clips of Sea Shepherd's dramatic encounters, and spectacular underwater nature footage, award-winning documentarian Lesley Chilcott (An Inconvenient Truth, Waiting for "Superman") paints a fascinating portrait of a man willing to put his own life and liberty at risk in a relentless quest to protect the oceans and the marine life within.

EDA & NAUTICA'S ONLINE ZOOM WEBINAR
INTRODUCING THE ALLEN CORAL ATLAS



ONLINE EVENT WEBINAR

On the of 28th of January, EDA teamed up with NAUTICA Environmental Associates LLC in Abu Dhabi to host an online Zoom Webinar by Dr Chris Roelfsema, a senior researcher at the University of Queensland in Australia about the Allen Coral Atlas – a project designed to help save the world's coral reefs. The invitation was extended to local scientists, environmental professionals, local marine conservation organisations and EDA Members. For all of those who took part in the webinar and those who would like to know more, you can read this issue's feature story: The Allen Coral Atlas: Getting a Clear Picture of the Coral Reefs Around the World on pages 38-43.

MAPS CONNECTING PEOPLE TO HELP SAVE REEFS: THE ALLEN CORAL ATLAS

Dr Chris Roelfsema presented a global effort to map and monitor coral reefs worldwide through the Allen Coral Atlas partnership. The project uses high-resolution satellite imagery, machine learning and field data to map and monitor the world's coral reefs, thus improving conservation results and access to spatial data. With close to 70% of reefs now having been mapped globally, field data are consistently provided by research teams, government agencies and citizen scientists such as volunteer divers. The presentation explained what is being done and why, and how volunteers can assist with taking care of the world's reefs.

www.allencoralatlas.org

ALLEN CORAL ATLAS™

[NEWLY MAPPED REGIONS]

The Allen Coral Atlas announces two newly mapped regions: Southeast Asian Archipelago (including all of Indonesia) and the Coral Sea. This brings us to over 311,000 km^2 mapped, and counting!

FOR MORE INFO ON THESE AREAS:

Southeast Asian Archipelago: www.bit.ly/3u3Wrfh

The Coral Sea: www.bit.ly/3qr4PDt

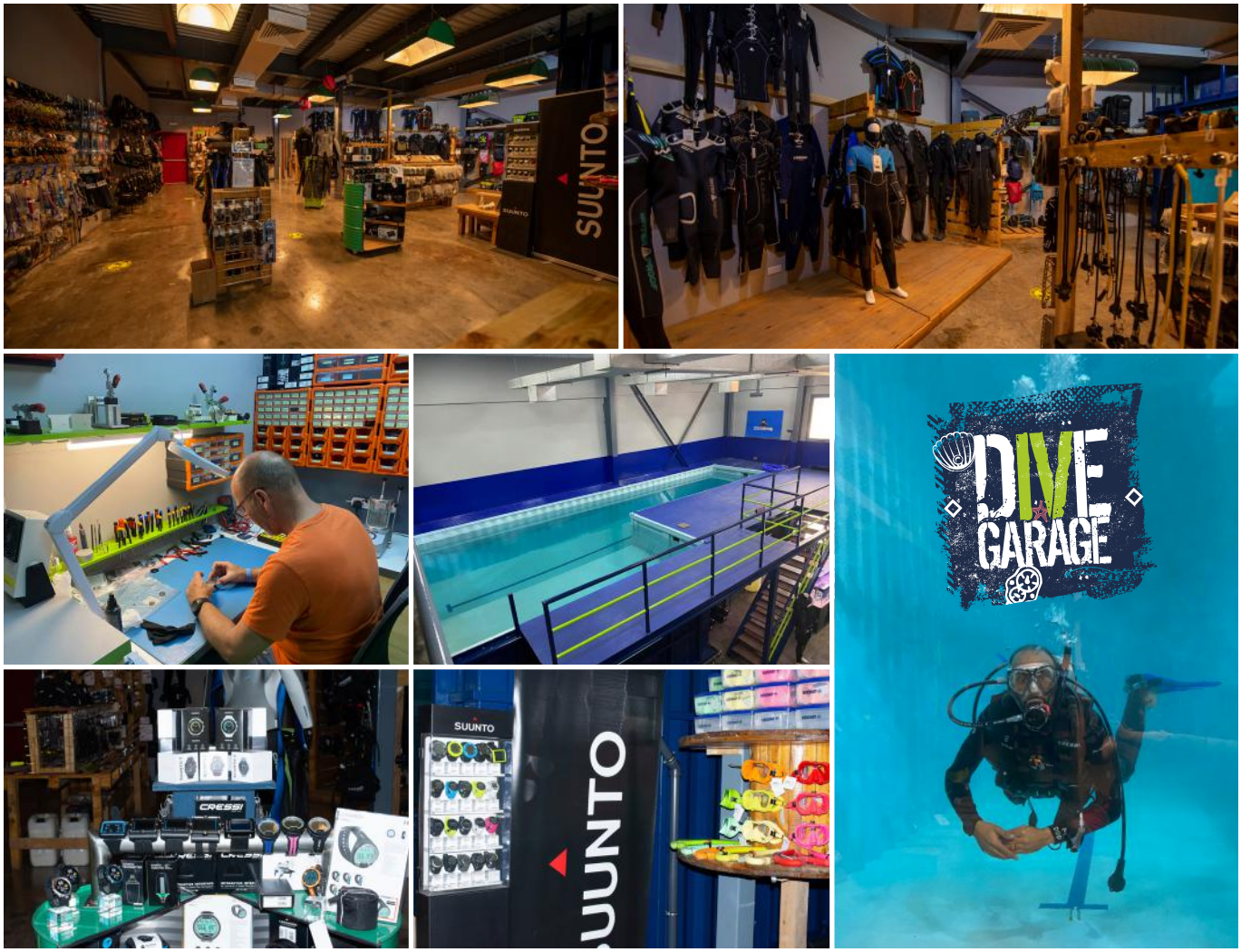
[NEW COURSE AVAILABLE]

The Allen Coral Atlas and The Nature Conservancy offer a 4-part live mentored course covering three online lessons of Remote Sensing and Mapping for Coral Reef Conservation during the month of March! This will include a weekly instructive webinar series to provide guidance on the course, supplemental material, and a participant questions forum.

Create a free login and register here: www.bit.ly/37fhaD5

The Course: www.bit.ly/3be08GI

DIVE GARAGE EXPANDS ITS HORIZONS



Dive Garage successfully launched three years ago in Dubai Investments Parks with the aim of offering the country's diving community an unrivalled selection of diving equipment and customer service.

Since then, Dive Garage has expanded to include an online store to deliver quality merchandise to divers across the GCC.

Due to this rapid expansion, Dive Garage – the retail branch of the Divers Down diving centre in Fujairah – has started 2021 with even grander ambitions.

They have moved to a flagship store in Al Quoz Industrial Area 4, which features a bespoke fresh-water fully treated training pool, built from two modified shipping containers, complete with plexiglass windows. The pool was designed, engineered and built specifically for the needs of PADI training courses.

The dual-level pool will allow on-site instructors to teach people – from their first breaths underwater, to professional level courses.

The shallower ledge has a depth of 1.4 metres and a length of 6 m, and there is a deeper section at 2.75 m depth with a length of 12 m.

Dive Garage director Dave Griffiths said the pool would help further the company's reputation for customer service and training.

"We wanted to expand our services offered to the dive community in the UAE and surrounding countries. Dive Garage can take you from your very first experience underwater in our bespoke training pool as well as supplying all your equipment, whether it's your first mask, a regulator or specific tec equipment. The company also ensures that your equipment keeps working perfectly, through our service centre. Your one stop shop for all your scuba needs."

Dive Garage is the distributer and dealer for many of the leading suppliers in the diving industry, including Cressi, Dive Rite, Waterproof, TUSA, Shearwater, Suunto, Bonex, Geckobrands and many more. Also on site at Dive Garage is a purpose-built servicing workshop offering equipment maintenance and repair – from regulators to drysuits. Dive Garage is also an authorised Suunto Level 2 service centre for the Finnish company's underwater and outdoor performance range.

Dive Garage is at Unit 23 and 24, Al Wasl Warehouse Complex, Al Quoz Industrial Area 4 and can easily be found on Google Maps.

NEW 2021 PADI AMBASSADIVERS ANNOUNCED
TO INSPIRE PEOPLE EVERYWHERE TO CONNECT WITH THE OCEAN


Paris Norriss

PADI® announces new AmbassaDivers on the 2021 team. In their unique ways, these individuals are sharing their love for diving, acting to safeguard ocean health and exciting others to pursue their own passions. Together, they are a motivating force in their communities and across the globe, leading and encouraging others to seek adventure and save the ocean.

PADI launched the AmbassaDiver programme in 2015 to help amplify the stories of divers who inspire others to love and care for our ocean planet. PADI AmbassaDivers are part of a team committed to elevating diving, bringing awareness to social or environmental issues and encouraging more people to explore, protect and experience the underwater world. PADI welcomes the following individuals to the 2021 AmbassaDiver roster:

PARIS NORRISS: Paris is an outdoor enthusiast and host of the adventure travel show Guy in Dubai – with scuba diving and freediving playing central roles in his adventures throughout the show. To date, more than 15 million people tune in annually on Amazon Prime, OSN, and inflight entertainment systems on Emirates and British Airways. Originally from the UK, now based out of Dubai, Paris aims to inspire people to discover the world (above and below the surface), and to take action to follow their passions.

TAYLOR WALSTON: Originally from California, USA, Taylor now lives on the island of Oahu in Hawaii, where freediving has powerfully changed her life. As a professional photographer and an ambassador with One Ocean Diving, she works to spread awareness about the importance of shark conservation and ocean preservation. In 2020, Taylor encountered more than 10 different species of sharks while exploring the underwater world, and reached a three-minute static breath hold.

DOUDOU: Doudou is an adventurer, diver, filmmaker and conservationist with more than 1 million followers on social media in China. As a child she was scared of the water, and it wasn't until she came across diving in 2009 that she actually overcame her fears and discovered the beauty of the sea. Since then, she has become a certified freediver and has launched an incredible career in underwater photography and filmmaking. Doudou is the first female National Geographic Explorer from China, having worked on projects like Planet or Plastic and Extreme China.

YUKIE HIGASHINITA: Based in Japan, Yukie became obsessed with the charm of the ocean the very first time she went diving in Guam at the age of 20. Since then, she dives as often as possible, with her favourite experience diving with a massive school of hammerhead sharks off Mikomoto Island. Yukie earned her PADI Rescue Diver certification at the age of 24, and hopes to share the charm of the ocean with as many people as possible.

MIRANDA KRESTOVNIKOFF: Miranda has been travelling and diving the world for more than 20 years as a TV and radio wildlife presenter for networks like FOX and BBC. When she learned to dive while studying zoology at Bristol University, she had no idea that diving would become such a major part of her career. When she's not travelling, Miranda is a mother of two and loves diving the chilly waters around the UK. Through her work on and off screen, she hopes to connect people with nature and the need for conservation.

FRANCISCO DELGADO: Born and raised in Patagonia, Francisco is a lover of all outdoor sports and has worked in theatre, radio and TV throughout his career. After winning the TV show Big Brother in Argentina in 2015, he toured the Riviera Maya and dedicated himself to studying marine conservation. He currently resides in Cozumel, Mexico, with his two children, where he works as a PADI Instructor and an adventure lifestyle social media influencer for brands in Latin America. Francisco's mission is to introduce younger generations to the underwater world and teach them how to respect and protect it.

TOM PARK: Tom is a photographer and filmmaker with a passion for creating underwater films and marketing materials for tourism boards and ocean-focused businesses. His work has been featured in an array of international magazines and galleries. He also regularly works with marine biologists to help safeguard his local Sydney waterways, and volunteers his time to support non-profit ocean-conservation groups. Tom continuously aims to inspire others to protect the ocean, and hopefully experience the underwater world for themselves.

MARTYNA SKURA: Born and raised in Poland, Martyna has spent the last 10 years travelling and working overseas. Thailand is where she found her passion for diving and ocean conservation, and since then she's become a PADI IDC Staff Instructor and EFR Instructor Trainer. She's now living in the Maldives, and is working toward becoming a PADI Master Scuba Instructor. Martyna's mission is to share her love of diving, the beauty of the oceans and the importance of protecting them with others.

KAORUKO INOU: Kaoruko has created a profession of her own: underwater reporter. After graduating from university in Japan in 2010, she has travelled around the world to report on and share her underwater explorations, and has appeared on many popular Japanese TV programmes. In 2019, Kaoruko became the first female Japanese certified whale swim guide in the Kingdom of Tonga.

"This esteemed group epitomizes what it means to seek adventure and save the ocean," says Kristin Valette-Wirth, Chief Brand and Membership Officer for PADI Worldwide. "They are true torchbearers, dedicated to exploring and protecting the underwater world. And we are committed to amplifying these AmbassaDivers' stories to inspire more people around the globe to deepen their connection with our water planet."

Learn more about the PADI AmbassaDiver team here: **www.bit.ly/3b8xnvg**. Follow PADI on Facebook, Instagram and Twitter to keep up to date on their ongoing projects, dive adventures and conservation efforts throughout the year.

RESCUED 'AL BAHIYAH' WHALE SHARK
SUCCESSFULLY RETURNED TO THE ARABIAN GULF

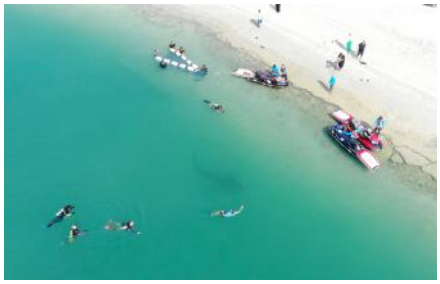
Abu Dhabi, 6 December 2020: The successful joint rescue mission between The Environment Agency – Abu Dhabi (EAD) and The National Aquarium (TNA) relocated a trapped whale shark back to open sea in the Arabian Gulf. The 6 m shark was noticed circling inside a man-made lagoon in the Al Bahiyah area. After close monitoring by EAD's scientists it was clear that the animal was trapped and unable to feed or avoid unwanted human interactions.

After the assessment, the Environment Agency Abu Dhabi initiated the rescue mission, supported by the National Aquarium team's expertise and equipment. TNA's team was a key component in the implementation of the rescue plan commenced by the joint effort of both teams. Using a soft plastic through-water transport bag developed specifically by The National Aquarium, the team of divers carefully captured the animal under EAD's supervision. The first of its kind transport bag was able to move through water faster than the sharks normal swimming speed. Jet ski operators from Abu Dhabi Marine Club towed the transport bag carefully for 20 km out into the Arabian Gulf whilst the rescue team monitored its vital signs by staging divers along the shark's path.

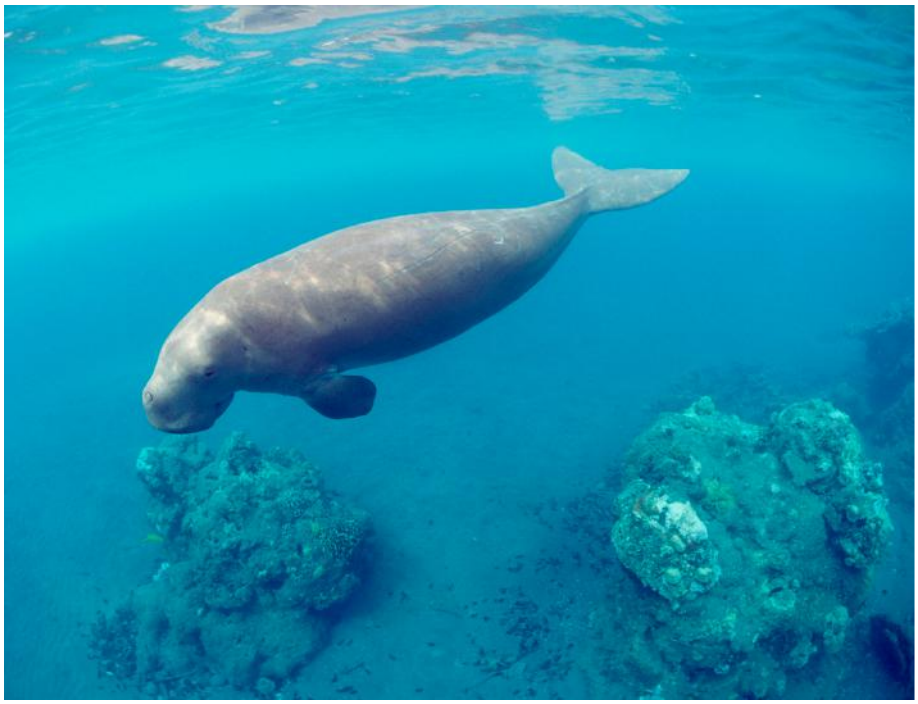
Before release, a satellite tag provided by King Fahd University in Saudi Arabia was fitted to the whale shark. In the first five days after the release, the animal travelled 232 km into the Arabian Gulf which is a good indication of a healthy shark. The whale shark is now being continuously tracked as it makes its way to join other whale sharks in the Arabian Gulf migration.

Thanks to the teamwork and collaboration from the many parties involved, including Abu Dhabi Police, Abu Dhabi Maritime, Abu Dhabi Ports, Department of Municipalities and Transport, Abu Dhabi Marine, Critical Infrastructure & Coastal Protection Authority, and Aldar Properties, this majestic creature was saved and a new method for whale shark in water transportation proved to be a great success.

EAD called on the community to report injured wildlife or environmental emergencies, through the Abu Dhabi Government Contact Centre at 800555.



ENVIRONMENT AGENCY – ABU DHABI WINS
OUTSTANDING CONTRIBUTION TO BIODIVERSITY GLOBAL 2020 AWARD



Abu Dhabi, 27 December 2020: After decades of successful work and a plethora of significant initiatives, the Environment Agency – Abu Dhabi (EAD) has won the Outstanding Contribution to Biodiversity Global 2020 Award, by Capital Finance International.

EAD, the region's largest environmental regulator was recognised for the role it has played in championing the conservation of biodiversity in the Emirate of Abu Dhabi.

Examples of EAD's efforts in preserving biodiversity include continuing the legacy of the late Sheikh Zayed bin Sultan Al Nahyan, the Founding Father of the UAE. Known as the First Environmentalist, Sheikh Zayed bin Sultan Al Nahyan expanded the network of protected areas to 19 areas, 13 of which are terrestrial, representing 16.9% and 6 marine areas representing 13.9% of the terrestrial and marine ecosystems, respectively.

EAD's most notable achievement is the world's largest mammal reintroduction programme of the Arabian Oryx, which was on the brink of extinction. Today, the population in Abu Dhabi has reached 5,000 heads – making it the largest herd in the world.

Consequently, EAD biodiversity projects go beyond the borders of the UAE and among the most recognised of joint initiatives was the successful resettlement of Scimitar horned Oryx in its native country, Chad. This species had been completely extinct in the wild and now the total number of Scimitar horned Oryx in Chad has reached to be more than 200.

Moreover, EAD signed a Memorandum of Understanding with the Jordanian Royal Society for the Conservation of Nature, (RSCN) to release 60 Arabian Oryx in the Shumari Wildlife Reserve over the next two years.

Also within Abu Dhabi, today the population of Dugongs in the capital city is the world's second largest, amounting to 3,000, which is the highest density per square metre in the Arabian Gulf.

Additionally, more than 700 dolphins, most of which live in marine protected areas in the Emirate of Abu Dhabi have been registered, including the largest group in the world of the Indian Ocean Humpback dolphins, and 37 endangered finless Porpoises and 268 Indo-Pacific Bottlenose dolphins.

HE Dr. Shaikha Salem Al Dhaheri, Secretary General of EAD said, "One of our main strategic priorities and mandates is the conservation of biodiversity in Abu Dhabi and we have worked laboriously since the inception of EAD 25 years ago towards achieving this goal. We have been more than successful in protecting biodiversity and we are honoured to be recognised by an international publication such as Capital Finance International for all the hard work that has been done by the EAD team."

HE Al Dhaheri added, "This award serves as a reminder to us that we are on the right path and it will inspire and encourage us to do more to ensure that we are creating a sustainable future for all, so that the younger generations live with an abundance of biodiversity in Abu Dhabi. We will also aspire towards empowering the future generations to continue to walk in our footsteps and nurture a generation of youth to make the conservation of the environment one of their main goals."

Other EAD success stories regarding biodiversity include the registration of Al Wathba Wetland Reserve as the first protected area in the GCC to make the International Union for Conservation of Nature (IUCN) Green list. It is also one of the 40 sites in the world that has been considered for the Convention of Biological Diversity as an Ecologically or Biologically Significant Area (EBSA). The reserve is home to thousands of migratory flamingoes.

Also, the Abu Dhabi Emirate has approximately 3,800 recorded species and less than two percent are classified as "threatened" on the Red List categories of the IUCN.

Furthermore, Jebel Hafit National Park in Abu Dhabi is the only location where the Dwarf Palm can be found. The Arabian Caracal was recently sighted in the area for the first time in 35 years. The park also hosts globally threatened species, and the only concentration of the globally threatened Egyptian Vulture in the UAE.

CAPITAL FINANCE INTERNATIONAL

Capital Finance International (**www.cfi.co**) is a print journal and online resource reporting on business, economics and finance. Every year through its award programme, CFI identifies and rewards excellence in the hope to inspire others to further improve their own performance.

PRODUCED BY THE ENVIRONMENT AGENCY – ABU DHABI
WILD ABU DHABI: THE TURTLES OF AL DHAFRA DOCUMENTARY

Abu Dhabi, 26 January 2020: The Environment Agency – Abu Dhabi (EAD) has produced a new feature documentary entitled 'Wild Abu Dhabi: The Turtles of Al Dhafra', which was screened for the first time on January 26th at VOX Cinemas at Yas Mall.

The film showcases the ground breaking work of the EAD team who are dedicated to studying turtles in the hottest sea in the world, the Arabian Gulf, also known as the world's natural climate change laboratory. The insightful documentary took two years to film.

Abu Dhabi is home to two of the seven species of turtles found on the planet – both of which are threatened – the critically endangered Hawksbills, and the endangered giant Green turtles. EAD has been working on the protection of sea turtles since its establishment 25 years ago as part of its mandate which is dedicated to the conservation of biodiversity and endangered species of all kinds in Abu Dhabi.

Abu Dhabi has a stable population of around 5,500 sea turtles, including 1,500 critically endangered Hawksbill turtles, which nest on offshore islands in the waters of Al Dhafra. It also has 3,500 endangered Green turtles, which forage on Abu Dhabi's seagrass rich waters, including in a core area of the Marawah Protected Area.

The monitoring efforts undertaken by the agency indicate that there are more than 150 nests per year for the Hawksbill turtles on the islands and the main coast of the Emirate. Most of the nests are located in the six marine reserves that are part of the Zayed Protected Areas Network, which includes 19 terrestrial and marine protected areas.

By collaborating with the Emirates Nature-WWF, EAD has succeeded in placing tracking devices on 36 green turtles that do not nest in the Emirate's waters, to discover their nesting areas. This study revealed the path of their journey from feeding areas on Bu Tinah Island in Abu Dhabi to nesting areas in the Sultanate of Oman. The turtles then return back to their natural habitat on Bu Tinah Island.

EAD named two of the turtles after the late Sheikh Zayed's values: "Wisdom" and "Respect" who crossed more than 10,000 km from the waters of the Emirate of Abu Dhabi, passing through two countries (Pakistan and Iran) before reaching the Sultanate of Oman to nest. Following this they returned back to Bu Tina again.

Since 2005, EAD, together with its partners, began rescuing and rehabilitating sea turtles. More than 700 turtles have been rescued in the waters of the Emirate of Abu Dhabi and returned back to the sea.

Turtles are among the most highly migratory animals on Earth and they are great indicators for the condition of marine environments. This is why EAD and its partners have been studying and monitoring these endangered species since 1999. The research compiled by EAD has helped the Agency to identify important foraging areas for conservation. The making of the documentary is a step towards gathering crucial data which will serve as a major foundation to develop projects and initiatives designed to preserve these endangered turtles.

The documentary will take viewers on an incredible and insightful journey where they will experience how the EAD Team Turtle monitor both Hawksbills and Green turtles. As Hawksbills mainly nest on offshore islands the team head there during the nesting season from March to June. Once the turtles have nested during the night, the team then mark their nests. Six weeks later, once the eggs have hatched, the EAD Team Turtle monitor the size and weight of each hatchling and support them on their journey down the beach and towards the sea. Once the nesting season is over, the team returns to the islands to count how many eggs have hatched in each nest.

The documentary will follow the team as they island hop through beautiful Al Dhafra, conducting challenging scientific research including mapping the movement of Green turtles for the first time in the region The film outlines how EAD is responding to the key threats to turtles – namely climate change, plastics and abandoned fishing gear. The documentary also communicates how the public can be part of the solution.

Her Excellency Dr. Shaikha Salem Al Dhaheri, Secretary General of EAD said, "Despite being a challenging feat, with some parts filmed during the height of summer, the creation of Wild Abu Dhabi: The Turtles of Al Dhafra was an extremely memorable experience and one that has enabled us to present to the public how our team researches the turtles that reside in Abu Dhabi waters. The data gathered during the making of the film will help propel our efforts forward, especially in preserving these endangered species – which is at the forefront of what EAD strives to achieve as part of its integrated strategy to preserve and manage biodiversity in a sustainable manner. This is put into action by setting up conservation programmes for endangered terrestrial and marine species, management of protected areas and preserving natural habitats."

She added, "With our experienced and highly dedicated team of environmental conservationists we are pleased to be able to show our turtles in their natural environment – from when eggs are laid, to when they hatch and how our new hatchlings travel down the beach for the first time to when they are full grown adults. We are really excited and proud to share this film with everyone."

Her Excellency Al Dhaheri stressed, "The creation of this documentary has allowed us to present some of the key threats facing our turtles including the impacts of climate change, single use plastics and abandoned fishing gear, and demonstrates why as a society our behavioural change is necessary – to give our turtles their best chance of surviving into the future. This includes limiting the amount of single use plastic and rubbish entering the environment which can cause harm to our turtles. Our work with the turtles and mitigating these challenges is just the beginning of what we plan to do in the future. We want these beautiful animals to continue breeding in Abu Dhabi, so that in the future they are no longer considered an endangered species."

OTHER FILMS BY EAD

This is the fourth film that EAD has produced in the past four years – which include the award winning Zayed's Antarctic Lights, which chronicles the adventures of the agencies Team Zayed to Antarctica in the Year of Zayed. Other films include Back to the Wild – which tells the story of the world first reintroduction of the extinct (in the wild) Scimitar Horned Oryx to their homeland in Chad; and Our Sea Our Heritage which tells the story of the UAE's fishery and recovery plan.

ENVIRONMENT AGENCY – ABU DHABI AND ADNOC
CELEBRATE ONE YEAR FILLED WITH ENVIRONMENTAL COLLABORATION ACHIEVEMENTS

Abu Dhabi, 10 February 2021: After the establishment of a plethora of successful projects, the Environment Agency – Abu Dhabi (EAD) and Abu Dhabi National Oil Company (ADNOC) celebrated a year of achievements on February 4th.

Last year ADNOC, the Ministry of Climate Change and Environment (MOCCAE), and EAD signed a framework agreement on the same day to explore opportunities for greater collaboration in environmental protection and conservation. As a result of the Memorandum of Understanding, all parties have witnessed a long list of initiatives which took place across significant topics such as air quality, marine water, climate change, waste management and environmental permitting and assessments.

Her Excellency Shaikha Al Hosani, Executive Director of the Environmental Quality Sector at EAD said, "At EAD we understand that one of the main paths to success is through relevant collaborations and partnerships, with both government and private sector organisations. After only one year of signing an agreement with ADNOC we have witnessed great success on all fronts. The MOU strengthened the cooperation between EAD and ADNOC and facilitated implementation of a series of fruitful projects which are focused on air quality, waste management, climate change and marine water quality, to name a few. ADNOC have proven to be an extremely committed partner who are consistently placing the environment at the top of their agenda and continuously integrate it into their main projects and plans for the benefit of Abu Dhabi."

Al Hosani added, "The oil and gas sector is crucial to the development and expansion of Abu Dhabi and it is also one of the main contributors affecting air and marine water quality. Our partnership is vital to the conservation of the environment and serves as a benchmark for best practices observed between significant industries and EAD. We will always work closely with ADNOC to ensure that all necessary processes, assessments, permits and the execution of projects are facilitated and endorsed for their success and the success of the emirate of Abu Dhabi."

Abdulmunim Saif Al Kindy, Executive Director for ADNOC Group's People, Technology and Corporate Support Directorate, said, "Thanks to the foresight and vision of our Founding Father Sheikh Zayed, ADNOC has long maintained an unwavering commitment to environmental stewardship. Since the start of our transformation, ADNOC has increased investments in a wide range of measures to mitigate local operational impact and lower the Group's carbon footprint. Such progress has been made possible through partnerships

with critical Abu Dhabi stakeholders, including EAD, through many years of collaboration. We look forward to further building upon this fruitful and long-standing relationship and exploring opportunities for both organisations to work more closely together going forward."

EAD collaborated with ADNOC on over 40 ADNOC environmental assessment projects. The careful assessment of environmental impacts of alternative design and the implementation of mitigation measures and best environmental practices, in some of ADNOC's Marine projects, has helped save over 175 square kilometres of critical habitats.

With a focus on air quality, EAD and ADNOC electronically linked ADNOC's ambient air quality monitoring network with EAD's central air quality database. This project ensured the exchange of data between the two entities which served the interest of Abu Dhabi and the UAE at large. The partnership brought together 10 stations belonging to ADNOC and 20 stations belonging to EAD, to form a total of 30 fixed stations which were distributed over various regions of Abu Dhabi, measuring a total of 17 pollutants and sensors continuously. This initiative will provide accurate data and technical analysis about the status of air quality for decision-makers to develop appropriate mitigation plans and to help manage pollution emissions in the capital.

Additionally, the initiation of a pilot project to e-link ADNOC's Sour Gas Plant CEM System to EAD's monitoring system in 2020, was another successful air quality achievement. Currently all 141 parameters and its units are correctly configured as per EAD e-linking technical requirements. There are over 400+ emission sources or stacks in ADNOC Group across all operating assets. The results of this pilot study will direct the future work and steps taken between EAD and ADNOC to enhance preparedness for environmental emergency incidents.

EAD and ADNOC also partnered on the Abu Dhabi Air Emissions Inventory, which is part of EAD's comprehensive programme for air quality management in the emirate of Abu Dhabi. The report gives a detailed description on all the key man-made emission sources and provides an update to the inventory. In 2018, ADNOC and all concerned entities in the emirate supported EAD's efforts in collecting data and information about the sources, amounts, and types of pollutants from different sectors in the emirate for the inventory.

The results of this inventory produced over 50 high-definition sectors and pollutant-specific emission maps which identify the location and intensity of each emission source in Abu Dhabi for the very first time. ADNOC provided detailed data and insights from all oil and gas activities in the emirate, covering exploration, production, to processing and refining. This continuous partnership will set the foundation for air quality modelling and provide essential information for designing science-based measures to mitigate and manage emissions effectively.

In the field of climate change, EAD, in cooperation with its partners from all sectors, worked on updating the fourth cycle of the Greenhouse Gas (GHG) Inventory and emission projections for Abu Dhabi. ADNOC helped EAD implement this important project by providing information and data on the oil and gas sector, which was included in the report to help calculate the percentage of this key sector's contribution. This was also used to compare oil and gas to other sectors as well.

The results showed a reduction in the oil and gas sector emissions by 27% in comparison to levels in 2016. Moreover, EAD's analysis of GHG mitigation policies showed that ADNOC policies for flaring mitigation and efficiency improvement will significantly contribute to stabilisation of the emirate's future emissions, by reducing the oil and gas sector emissions to 53% of its business-as-usual emissions by 2030.

For marine water and sediment quality, ADNOC was a member of the technical committee for the enhancement of marine water quality, which was led by the EAD team. Both entities worked on several projects and studies for protection and sustainability. ADNOC also supported EAD in the development of new marine water quality regulatory instruments such as the Marine Water Quality Executive Decree and the Marine Water Quality Discharge Standards and Limits. Additionally, EAD and ADNOC explored a proposal to clean Abu Dhabi seas using a Seabin.

THE ENVIRONMENT & PROTECTED AREAS AUTHORITY
RECORDS THE UAE'S FIRST OLIVE RIDLEY SEA TURTLE NEST

BY **FADI YAGHMOUR – SCIENTIFIC RESEARCHER (EPAA)** PHOTOS **CHRISTOPHER SHORTEN**

Five of the world's seven sea turtle species occur in the waters of the United Arab Emirates. These include hawksbill, green, loggerhead, olive ridley and leatherback sea turtles. While the hawksbill, green and loggerhead sea turtles are commonly observed, the leatherback and olive ridley sea turtles are only considered rare visitors to the UAE. Nesting activities are mainly confined to the western coast along the Arabian Gulf. There, hawksbill sea turtles are the primary nesting species and green sea turtle nests are occasionally recorded. On the eastern coast of the UAE, along the Gulf of Oman, only two contemporary records of sea turtle nests exist: a single green sea turtle nest in 2014 and a single hawksbill sea turtle nest in 2015, both from the Alqurm Wa Lehheffaiiah Protected Area, Kalba, UAE. The third nesting event reported here is the third registered nest from the Gulf of Oman coast of the UAE.

On the 2nd of May 2020 at 7:51 am, a sea turtle hatchling was observed crawling towards the ocean from the beach of Kalba Kingfisher Lodge in Khor Kalba in the Emirate of Sharjah. The observation was reported by Kingfisher Lodge guest Christopher Shorten. This was of great interest to the Environment and Protected Areas Authority (EPAA) researchers because sea turtle nesting is very rarely recorded on the eastern coast of the United Arab Emirates.

Unfortunately due to guest occupancy of the lodge, investigation of the site had to be delayed to the 4th of May. On that day, several tracks confirmed that numerous hatchlings have emerged from the nest and started their life at sea. Using photographs provided by Christopher Shorten and Kingfisher Lodge staff, EPAA researchers were able to review the morphology of the hatchling. These images conclusively show that the nest belonged to an olive ridley sea turtle. This specie can be distinguished from other species due to its dark pigmentation, one claw on each flipper and five or more lateral scutes on its carapace (shell). This observation is the first report of an Olive Ridley Turtle nesting in the UAE.

هيئة البيئة والمحميات الطبيعية
Environment & Protected Areas Authority
SHARJAH الشارقة

ABOUT 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/

SOCIAL MEDIA PLATFORMS:
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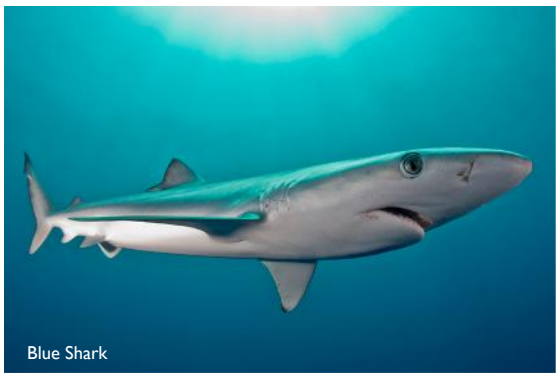
END OF THE LINE:
OCEANIC SHARKS AND RAYS IN 50-YEAR DECLINE


Blue Shark


Giant Manta


Great White


Mobulas


Hammerhead


Reef Manta


Thresher Sharks


Manta

A devastating new study, published today in the eminent journal Nature, documents an alarming decline of oceanic shark and ray populations – 71% over the past 50 years – primarily due to overfishing. The study confirms fears that high levels of decline in pelagic sharks and rays are happening on a worldwide scale.

Led by the Global Shark Trends Project (GSTP), a collaboration of the Union for Conservation of Nature (IUCN) Shark Specialist Group, Simon Fraser University, James Cook University, and the Georgia Aquarium established with support from the Shark Conservation Fund, the paper analyses research from across the globe to assess the extinction risk for oceanic sharks and rays.

Their risk of extinction not only jeopardises the health of ocean ecosystems, it also impacts food security for all of us who depend on the sea for sustenance. According to the study, fishing pressure has doubled and catches have tripled, amounting to an 18-fold increase in Relative Fishing Pressure (exploitation relative to the number of fish left).

For all 31 oceanic shark and ray species assessed in the study, the risk of extinction has increased substantially since 1980. 75% of these iconic species now qualify as threatened with extinction under the IUCN Red List criteria. Even more alarmingly, half (16 of 31) of the oceanic shark and ray species assessed are considered Critically Endangered.

Contributing author Dr Andrea Marshall provided critical data from the Marine Megafauna Foundation's (MMF) 20-year research programme in southern Mozambique which shows a steep decline in manta and devil ray sightings in Mozambique (greater than 90% decline from 2003 to 2016).

Dr Marshall spearheaded the first manta ray research programme in Africa and has been studying the population in Mozambique for half of her life. The southern Mozambican population, which is the largest population to be identified on the continent to date, has been decimated over the last decade and a half, with the biggest threat coming from direct and indirect fishing pressure.

"As a conservation biologist, watching the decline in mobula rays (manta rays and devil rays) in Mozambique has been a living nightmare. It happened quicker than we could have ever imagined and it demonstrated to us that we need to take immediate action to curb threats to these animals, particularly within their most critical habitats." Dr Andrea Marshall, MMF principal scientist.

Dr Andrea Marshall, who is also one of the co-founders of MMF, calls for strict, enforceable regulations in all oceans:

"Oceanic sharks and rays often suffer most severely from anthropogenic threats. Their preferred pelagic habitat is out of sight and out of mind. Unregulated or unsustainable fishing pressure is difficult to control in international waters, so it is no surprise that their populations are crashing globally. To reverse these trends we will need to figure out how to create strict and enforceable regulations in all oceans. We quite literally have run out of time; we must act now if we are to save remaining populations."

KEY FINDINGS:

- The global abundance of oceanic sharks and rays has declined by nearly three-quarters (71%) over the last 50 years primarily due to overfishing.
- The decline coincides with a doubling of fishing pressure and a tripling of catches, amounting to an 18-fold increase in Relative Fishing Pressure.
- Three-quarters (75%) of sharks and rays now qualify as threatened with extinction under the International Union for Conservation of Nature (IUCN) Red List criteria.
- The UN Sustainable Development Goals and specific Aichi Biodiversity Targets (to reverse population declines and use marine resources sustainably) for the year 2020 were not met for these species.

www.marinemegafauna.org
All photos courtesy of MMF.

MARINE MEGAFAUNA FOUNDATION

STAR CERTIFICATION

STORY BY PATRICK VAN HOESERLANDE ILLUSTRATION PETER BOSTEELS

Today was one of the young diver's birthdays. There were 14 candles on the cake in the shape of a shark fin.

Everyone gathered in a circle to get a tasty looking slice of cake. Nella said that after some years of fun in the pool and some nice open water dives, it would soon be time for the birthday boy to switch to adult diving when he turns 15. That did not sound like good news to Skubba. Could you not always stay a youth diver?

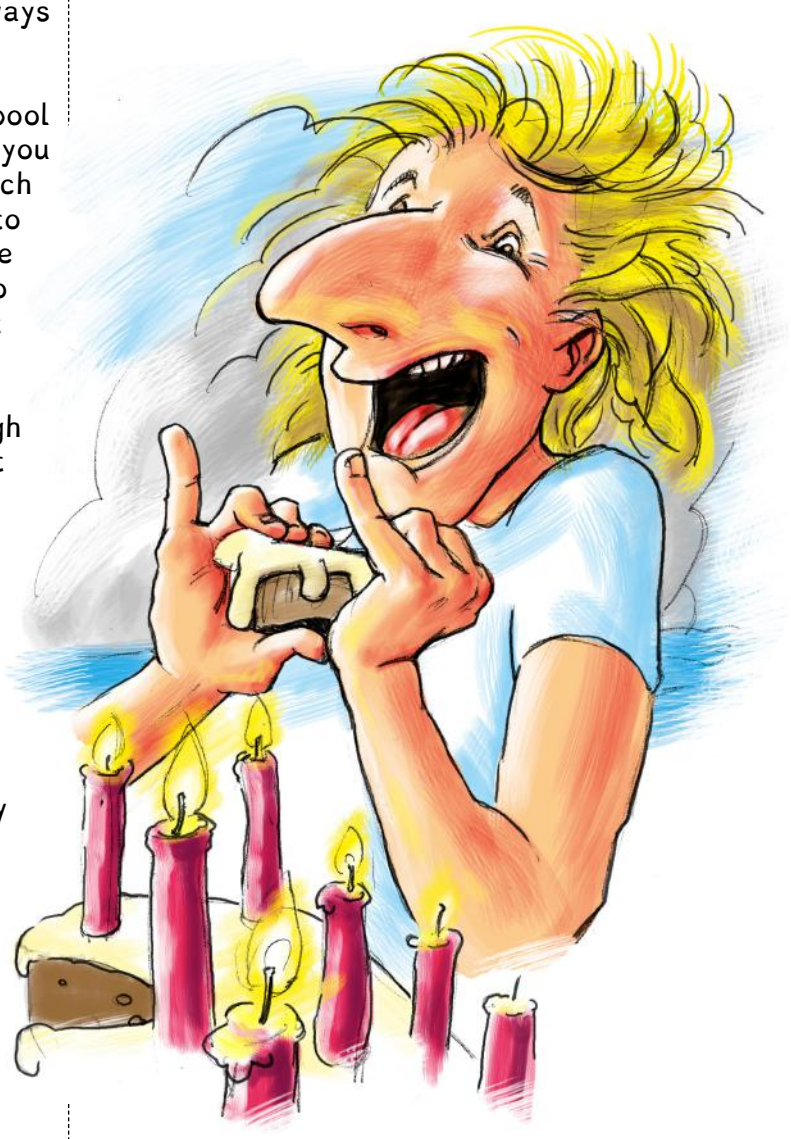
"You will still see your friends during pool training sessions and as an adult diver you are going to be allowed to do so much more", she said. He would be allowed to dive deeper and longer underwater. And he will be allowed to dive on wrecks, and do night dives, which youth divers are not yet allowed to do.

"Certifications would be earned through exams very much like the ones done at school, and tests will be done in the pool and open water. The certifications will no longer be called Dolphins, but awarded by Stars. The courses begin with one-star and go up to a four-star diver certification. If he wanted to and did his best, he could, after some years, become an instructor himself. And who knows, he could start teaching the next youth divers and be their buddy on their first dives in the water."

The birthday boy liked the sound of that, and so did his friends.

He would also no longer have to dive with a youth dive leader. He would be able to meet and buddy up with other adult divers for his dives. Of course, this did not mean that he could no longer dive with Nella or the other instructors, but he would no longer be obliged to do so.

If he made the decision to switch over straight away as he was now allowed to do, Nella would take him through some things about adult diving. After a bit of explaining, she would exchange his Golden Dolphin into a One-Star dive certification for adults. Youth Divers are very much real divers and their dolphins have the same value of a one-star. Their logged dives are valid just the same as dives for adults. Adult divers only use another type of logbook. The one-star certificate would just be his first 'big' diving cert! This step was the beginning to new diving experiences and adventures.



Skubba started smiling again. He understood that this was not a farewell to this great group of friends, but one step further into the sport they all loved so much: diving. However, for now, he would dive with them and eat cake on his special day.

DOES FRED DIVE?

STORY BY PATRICK VAN HOESERLANDE ILLUSTRATION PETER BOSTEELS

The lovely summer weather allowed our young divers to do what they liked the most, and that was to dive. Even if they were not out diving underwater, Skubba and Fred spent most of their time on the water. They were the best of days.

Sadly though, with the passing of the summer months, the diving season was coming to an end. The weather began to gradually worsen and the water became gradually colder. Soon they would no longer be able to dive in the cold open water and only get to dive in the swimming pool. Skubba felt a little sad. Diving in the pool was fun, but there was much more to explore in open water.

Fred, on the other hand, remained very busy and would go missing for hours at a time. Skubba would sometimes find himself sat alone in the water and his friend was nowhere to be seen. That was not very usual of Fred. When Fred finally did show up and Skubba asked him where he had been, he replied each time with, "Nowhere special."

Normally, he would have told Skubba about what he was working on, or that he had had to look something up, but not this time. What was wrong with Fred?

Then, the last open water dive of the year came. The last one before it got too cold. Skubba was not looking forward to this moment. Why could they not dive every month of the year? They could put on a thicker suit, couldn't they? He would have to ask Nella about that. He slowly got his equipment together and packed it into the car to get to his last dive of the season, but this time, without his trusted friend at his side.

When Skubba arrived at the dive location, he saw that Fred was already there. He was so happy to see him there for his last dive of the season. He liked Fred being around when he dived.

But why did Fred look so nervous? He never got this way usually. What was he up to?

Fred went to talk to Nella and they pointed to Skubba. Fred listened to the briefing more attentively than usual, and then Skubba heard Fred's name being called out as Nella's buddy. What? Did Fred dive? Skubba did not believe it. Fred was afraid of water. Fred knew everything about diving, but never dived himself.

While Skubba got kitted up, he watched Fred step over to the water's edge fully equipped. Would he be diving today?

Nella and Fred did a buddy check as divers always do, and after they each gave the final OK, they walked down the steps together.

Skubba also walked over to the steps, he did not want to miss this moment. The moment Fred was going to take his first dive underwater!

Nella and Fred put on their fins. Nella jumped into the water first. When she emerged, she turned to face Fred. She gave him the OK sign. Fred replied back that he was ready. Mask on, mouthpiece in, one last check. Before stepping out, he hesitated.

Would he go through with it?

He raised his fin and...

2020 YEAR IN REVIEW

BY **REEF CHECK EXECUTIVE DIRECTOR, JAN FREIWALD**

This has been by no means an ordinary year! Despite all the uncertainty and complications of bringing people together, we are proud of what we have been able to achieve this year here in California and with our teams around the world.

We could not have done this work without the help of our volunteers and supporters. Please help us to continue our work into the future by ending 2020 with a donation to Reef Check. Your generous contributions make our work possible.

Below, we share a few of our successes with you. Some creativity – including surveys by kayak and long surface swims – was required!

SOME HIGHLIGHTS FROM 2020:

KELP RESTORATION PROJECT

We began work on the restoration of kelp forests that were lost along California's northern coast. The goal of this collaborative project is to ultimately catalyse a phase shift from urchin barren to kelp forest and understand how human intervention can help bring back this vital ecosystem.

MARINE PROTECTED AREA SURVEYS IN CALIFORNIA

We completed over 100 surveys to monitor California's Marine Protected Area network this year. Despite not being able to train any new volunteers this year, we still completed almost all the surveys we had set out to do in the beginning of the year.

A NEW LOOK FOR REEF CHECK

We unveiled a new logo and website to offer a more cohesive representation of what Reef Check stands for: leading citizen scientists to promote stewardship of sustainable reef communities worldwide.

REEF CHECK AUSTRALIA'S SURVEY SEASON

Reef Check Australia conducted over 125 surveys during the year and joined in on more than 15 clean-up activities, pulling in more than 2200 lbs of debris from above and below the water.

MALAYSIA'S TIOMAN MARINE CONSERVATION GROUP

On Tioman Island, Reef Check Malaysia has created a real success story out of involving the local community in co-management of marine resources. The Tioman Marine Conservation Group has taken on numerous tasks for the conservation of their local marine environment by reducing threats to marine life and by managing the Island's Marine Park.

REEF CHECK DATA USED TO PREDICT EFFECTS OF CLIMATE CHANGE

Several scientific publications used Reef Check's global data to predict the effects of climate change on reefs and highlight ways in which thoughtful management strategies can help mitigate local impacts.

MAKE A DONATION

Please help us to continue our work into the future with a donation to Reef Check. Your generous contributions make our work possible.

www.reefcheck.org/donate/

CALIFORNIA'S CHANGING OCEAN: CURIOUS OBSERVATIONS IN 2020

BY **MAXWELL SEALE** – REEF CHECK CALIFORNIA'S CENTRAL COAST VOLUNTEER COORDINATOR

The Sun Star *Solaster stimpsoni* with two white blotches which could indicate sea star wasting syndrome disease.

This year, Reef Check divers made several important observations beyond the data that they collected during over 100 surveys along the coast. Together these are a sign of how California's coastal ecosystems are changing. At the beginning of this survey season, Reef Check Volunteer Melanie Moreno reported the first-ever evidence of *Sargassum horneri* in the Monterey Bay. *Sargassum horneri*, also known as Devil Weed, is an invasive species of seaweed native to the coasts of Japan and Korea. It was first found in Southern California in 2003, and a northward expansion of this algae could spell dire straits for Central California's kelp forests already under heavy pressure from growing urchin barrens and increasing ocean temperatures. A new urchin barren was reported in the Point Buchon State Marine Reserve, in the shallows of Montana De Oro.

In addition to Sargassum, another continued range expansion was documented this year. Several crowned urchins were observed in a number of locations along the Monterey Peninsula where we reported the first known observation of *Centrostephanus coronatus* north of the Northern Channel Islands in 2016. Continuous sightings of this urchin could indicate the Central Coast is undergoing "Tropicalization." This process describes a poleward shift of the distributions of species as the temperature of the ocean is rising due to climate change.

Further evidence that the Central Coast is undergoing Tropicalization is the continued observation of the Finescale Triggerfish, *Balistes polylepis*. Reef Check Volunteer Claes Nordahl observed this Triggerfish hiding in an urchin barren along the Monterey Peninsula. Rarely observed along the Central Coast, this species has a wide range but is generally associated with warmer waters.

The Central Coast is not the only place where evidence for Tropicalization is growing. In Southern California, divers have also reported large schools of this Triggerfish in abundances greater than previously observed. This year on surveys around Catalina Island, Reef Check divers observed four sea turtles over just a single week! In recent years, the Eastern Pacific Green Sea Turtle, a species common off the coast of Mexico, has expanded its range into San Diego and the Channel Islands. In the same week, the team also observed massive schools of Pacific Barracuda, Sphyraena argentea. This historically overfished stock is now abundant in the Santa Barbara Channel again.

Beyond changing oceanographic conditions, many species are still struggling to survive a variety of ecosystem pressures. Tristin McHugh, North Coast Regional Manager along with Kelp Forest Restoration Program Staff Morgan Murphy-Cannella and Ian Norton documented the continued persistence of the sea star wasting disease occurring on a large, predatory Sun Star *Solaster stimpsoni*. The team observed this star in the Van Damme State Marine Conservation Area (SMCA) with the same disease that brought the largest sea star in the world, *Pycnopodia helianthoides*, to the brink of extinction. The now critically endangered Sunflower Star has been added to the IUCN Red List this month and Reef Check divers have not seen any individuals of this once abundant species along the California coast in recent years.

All these sightings add to the growing body of observations that indicate the impacts of a changing climate on California's kelp forests and the need to protect and conserve our coastal ecosystems.

REEF CHECK IN JAMAICA:
A LONG-TERM MANAGEMENT SUCCESS STORY

BY **THE NATIONAL ENVIRONMENT AND PLANNING AGENCY (NEPA)**

Reef Check monitoring began in Jamaica in 2001 with the establishment of four long-term monitoring sites within the boundaries of Negril Marine Park. Over the years the location of the sites have been expanded and surveys conducted at several sites island-wide in an effort to fill existing gaps in information and provide a more comprehensive view of the current status of Jamaican reefs.

Jamaica conducted its first Reef Check training in Negril, Westmoreland in 2003 with the training of 17 volunteers. The training was in response to a need for a simple and systematic method of data collection that can be done by persons with limited or no scientific background. Following the training, the Jamaica Coral Reef Monitoring Network (JCRMN) was formed. This consisted of a group of volunteer divers who through their efforts increased the knowledge of the island's reefs, especially those on the south coast. Extensive assessments were conducted on the reefs of the Portland Bight Protected Area; this was a year-long assessment which resulted in the survey of 13 reef sites. The reefs of the Port Royal Cays; Navy Island, Portland; and Boscobel, St. Mary were also assessed. The data collected has been used to inform the development of sustainable management programmes.

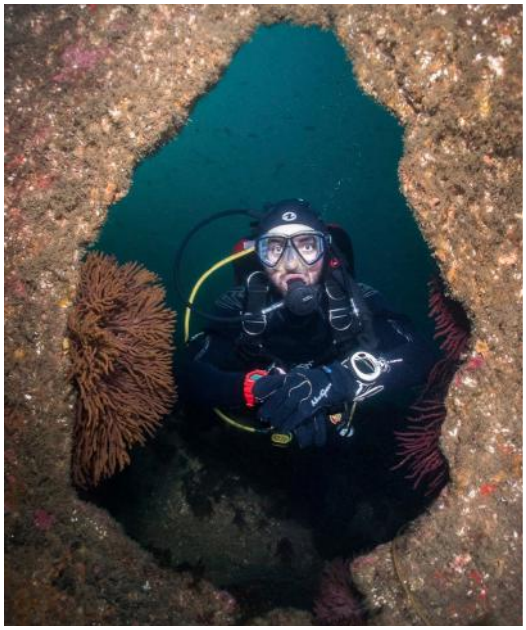
In 2007, the National Environment and Planning Agency (NEPA) institutionalised Reef Check and has since partnered with various organisations such as JCRMN to conduct coral reef monitoring at various sites across the island. NEPA primarily focused its monitoring activities in marine protected areas including special fishery conservation areas (more commonly known as fish sanctuaries). The monitoring protocol employed in the annual assessment of Jamaica's coral reefs characterises coral reef community structure and health. At this time, the JCRMN was comprised of members involved in coral reef monitoring activities across the island including NGOs, dive clubs, MPA managers and the University of the West Indies. The Network suffered from the attrition of its volunteers and monitoring responsibilities was then primarily driven by NEPA.

In an aim to revitalise the monitoring network and increase the national reef monitoring capacity, NEPA staged a training to certify 12 volunteers as EcoDivers in 2015. The cadre of trainees consisted of sanctuary managers and game wardens/conservation officers from NGOs, marine protected areas and special fishery conservation areas. The training of persons involved in MPA management island-wide to become EcoDivers expanded the network of persons with a grasp of the status of reefs within their respective areas, as well as other sites and reporting to the Agency as the central repository. They have continued to assist in the collection of data annually within their respected protected areas. The most recent training session in Jamaica was held in August 2020 where nine members of staff of NEPA were trained to enable the continuation of reef monitoring activities.

Jamaica has used the Reef Check methodology in conjunction with a modified version of the Atlantic and Gulf Rapid Reef Assessment (AGRRA) methodology (used to collect data on fish biomass) for the generation of a Coral Reef Health Index (CRHI) Report. The index measures the resilience of a reef by examining the ability of the reef community to maintain or restore structure and function and remain in an equivalent 'phase' as before events such as coral mortality. The reef index is determined by the integration of four key indicators: coral cover, macro-algal cover, herbivorous fish abundance and commercially important fish abundance. The reef health index has become a method of effectively tracking reef status and the health status of reef systems within various marine protected areas that have been repeatedly monitored. This data collected has been used to inform the implementation of adaptive management strategies for effective coral reef management.

REFLECTIONS FROM A VOLUNTEER COORDINATOR: MY FIRST FIELD SEASON WITH REEF CHECK

BY **DILLON DOLINAR** – REEF CHECK SOUTHERN CALIFORNIA VOLUNTEER COORDINATOR



Photos by Timothy McClure.

As I think back on my first year as the Southern California Volunteer Coordinator, it is safe to say that this field season didn't start how I envisioned it. My first weeks with Reef Check were spent adapting to a rapidly changing world brought on by the threat of the novel Coronavirus. Instead of spending spring at the annual Instructors' retreat and training our newest batch of eager divers, we were forced to spend the time creating new safety protocols in an unsteady world and catching up on three years of data entry.

This ultimately proved extremely valuable for me as a newbie to Reef Check. Entering data from sites across the state made me become intimately familiar with not only the structure of data sheets, but also the quality of data as well. As someone who had never personally sized a fish before, it proved remarkably helpful to get to know the common size ranges of the different fish species before I was tasked with sizing them myself. I was also able to familiarise myself with the ecology of each site and see which sites had the greatest biodiversity and number of indicator species. This time also served as a helpful reminder that more of a marine ecologist's time is spent in front of their computer than actually in the water!

Thankfully, the Southern California region was able to resume surveying in mid-July, due to the tireless efforts of all of the Reef Check staff members who created protocols to allow us to survey safely. We began by surveying reefs in San Diego, which was a great way for me to get comfortable with Reef Check diving because I am from San Diego and have dived many of the sites before. These sites were followed by surveys in Orange County, which I thoroughly enjoyed despite some serious hiking in our gear at Little Corona Del Mar. The reefs had beautiful pinnacles that shot upwards next to towering Giant Kelp plants.

After one more weekend of surveying in San Diego, it came time to venture to the Northern Channel Islands to survey Anacapa, Santa Cruz and Santa Rosa Islands. I had never visited these islands, so I was ecstatic to begin surveying. During the first two days of the trip, Mother Nature did not cooperate, and we were only able to survey two sites. Thankfully, on our third and final day, the weather cleared up for us, and we were able to successfully survey four sites in one day! This really speaks volumes about our Reef Check volunteers. They were willing to battle through two days of rough seas in order to help us collect valuable data.

Anacapa Island is the smallest island that we monitor within the Northern Channel Islands, but what I saw there had the biggest impact on me of any area that we surveyed all year. The front side of Anacapa is a marine protected area (MPA) while the backside is open to fishing, and I immediately noticed the difference. Just along this five-mile long island, we saw two completely different reefs. The reefs within the MPA had a pristine kelp forest full of biodiversity and an abundance of organisms, but the reef on the other, the unprotected side of the island (just a mile boat ride away) had areas that were being transformed into urchin barrens. We even had a fish transect where we did not record any fish. It was profound how noticeably healthier the ecosystem was within the protected area. This was my first time seeing such a drastic difference firsthand, and the images from that dive will continue to stay with me and motivate me to advocate for sustainable fishery management.

Following the Channel Islands trip, we had a successful weekend of surveying in Palos Verdes aboard the Bottom Scratcher. This led straight into a massive push to survey 17 sites in six days throughout Malibu and around Catalina Island. Although I had witnessed the incredible work ethic, grit, and determination of our volunteers at many other points throughout the field season, it was during this six-day period where they shined the brightest. As someone who has worked with a good number of marine ecologists, I can say with confidence that not all of them would have been able to keep up with our incredible volunteers during that trip! I was inspired by their willingness to tackle any task that needed to be done, and I was immensely proud of each and every one of them.

Now that I have completed my first field season with Reef Check California, I can't help but think about how thankful I am to be working with one of the global leaders in citizen science. During this trying year, it has been rejuvenating to see people with no formal scientific background be so passionate and play such an important and active role in scientific research. I am eager to see what next year has in store and can't wait to dive with our Reef Check family again soon.

FEATURE CREATURE

SANDBAR SHARK (*CARCHARHINUS PLUMBEUS*)

FEATURE **IUCN RED LIST 2009** PHOTOGRAPHY **ANDY MURCH**

RED LIST CATEGORY & CRITERIA: VULNERABLE

Scientific Name: *Carcharhinus plumbeus*
Synonym(s): *Carcharhinus japonicus* (Temminck & Schlegel, 1850)
Carcharhinus milberti (Müller & Henle, 1839)
Carcharias ceruleus (DeKay, 1842)
Carcharias milberti (Müller & Henle, 1839)
Carcharias obtusirostris (Moreau, 1881)
Carcharias stevensi (Ogilby, 1911)
Carcharias japonicus (Temminck & Schlegel, 1850)
Carcharias latistomus (Fang & Wang, 1932)
Carcharinus latistomus (Fang & Wang, 1932)
Eulamia milberti (Müller & Henle, 1839)
Galeolamna dorsalis (Whitley, 1944)
Galeolamna stevensi (Ogilby, 1911)
Lamna caudata (DeKay, 1842)
Squalus caecchia (Nardo, 1847)
Squalus plumbeus (Nardo, 1827)
Common Name: Sandbar Shark

JUSTIFICATION

This large coastal species is widespread in subtropical and warm temperate waters around the world. Tagging, age and growth studies show that Sandbar Sharks are long-lived, with low fecundity and are consequently very vulnerable to over-fishing. This species is an important component of shark fisheries in most areas where it occurs and has been overfished in the northwest and western central Atlantic and Mediterranean Sea. Population declines are suspected to have occurred off southern Brazil and in the northeast Pacific. Off Australia, biomass has also decreased to ~35% of pre-fishery levels as a result of fishing off Western Australia, although management is in place to prevent further declines there. In Hawaiian waters, the species is common and not fished. Given the high intrinsic vulnerability of this species to depletion, significant declines estimated and suspected in several areas of its range and inferred declines in highly fished areas from which data are not available, *C. plumbeus* is assessed as Vulnerable globally.

MEDITERRANEAN

Both coastal and pelagic waters of the Mediterranean Sea have been intensively exploited for many decades. Catches of this species have declined significantly along the Levantine coasts. Sandbar Sharks were previously regularly seen on fish markets of southern Sicily but have not been observed on the same markets in recent years. While the Gulf of Gabès, Tunisia, and an area off Turkey appear to be important nursery grounds for this species, recent records of the species in the Mediterranean outside these areas appear to be rare and there are no recent records of gravid females outside these areas. Given that this region is subject to high levels of continuing fishing pressure, the high biological vulnerability of this species, evidence for declines in the Mediterranean and declines inferred from other areas where it is heavily fished, *C. plumbeus* is assessed as Endangered in the Mediterranean Sea, which unlike the US and Australian stocks is not subject to management.

SOUTHWEST ATLANTIC

This species is taken as both a target and bycatch of coastal and pelagic fisheries in this region. Off southern Brazil, intensive fishing by pair trawl, gillnet and beach seine on pupping and nursery grounds is thought to have caused excessively high juvenile mortality. Fishing with these gears has been intense in this species' habitat during the last 20 years. Records of typical beach seine catches in the early 1980s indicate that 20 individuals could be taken in a single haul. Conversely, no catches of the species were observed during shore fishery monitoring in summer 2003, but neonates of *C. plumbeus* were common during monitoring of coastal fishing at depths of 18-60 m between Tramandaí and Saint Simão in summer 2005. Adults of this species are also caught by domestic and international pelagic fisheries operating off the Atlantic coast of South America. This species is taken, along

with other Carcharhinids in these fisheries. Tuna and swordfish longline fisheries now also target sharks due to increasing demand for shark products and the value of their fins.

NORTHWEST ATLANTIC

Sandbar Sharks are taken in recreational and commercial fisheries along the south Atlantic coast of the USA and in the Gulf of Mexico, which have expanded rapidly during the last >20 years. Sandbar shark stocks were reduced by 85-90% in just 10 years because of over-exploitation and only continued to support a fishery because of the very large size of the original stock. Adult females became very uncommon and the average size of individuals has declined by ~70% of the average size in 1975. Although management was introduced in 1993 and the biomass of the species was reported to have increased by 2002, a recent assessment estimated that the stock is still only 35-47% of virgin biomass and 26-43% of virgin mature abundance in numbers. Newly available analyses of survey data also estimate significant declines (of between 84% and 97% over time periods of 13-41 years). Sandbar Sharks are listed as a prohibited species on the US Fishery Management plan for Atlantic sharks. All this considered, the Night Shark is assessed as Vulnerable globally based on significant population declines throughout its northwest and western central Atlantic range due to target and bycatch exploitation by fisheries, which although now managed in US waters, is not the case elsewhere in the region.

AUSTRALIA

Sandbar Sharks are an important component of the Western Australian shark fishery. Current total biomass is probably at about 35% of its level prior to the start of full-time northern shark fishing. Current management arrangements in the fishery should arrest any further declines in stock biomass, but continued monitoring and assessment will be essential to monitor the stock, and the effectiveness of these measures. All this considered, the species is assessed as Near Threatened throughout Australian waters, close to meeting the criteria for Vulnerable A1bd. Continued monitoring and regular reassessment is recommended.

HAWAII

The species is common and not fished in Hawaiian waters, where the population is presumed stable and therefore assessed as Least Concern.

NORTHWEST PACIFIC

This species is a known catch of longline, trawl and set net fisheries, likely operating throughout large areas of its range in this region. Japanese catch data on Sandbar Sharks are limited, but reported landings in Japan's coastal ports show a sharp decline since 1992, from 126 mt per annum at that time, to 91 mt in 1995, 21 mt in 2000 and 3 mt in 2004. No CPUE data are available, however catches and the average size of individuals off Taiwan, Province of China, have also declined. Given this, the species' limiting life-history characteristics, the declining trends estimated elsewhere and continuing, unregulated fishing pressure in this region, an assessment of at least Near Threatened is considered appropriate. Further research on the species' status in this region is required due to concern that it may meet the criteria for Vulnerable A2d.

GEOGRAPHIC RANGE INFORMATION

This species occurs world-wide in tropical and warm temperate waters.

Western Atlantic: USA from Gulf of Maine, Massachusetts to Yucatan, Mexico, Cuba and Bahamas; possibly to Belize, Honduras, Costa Rica, Panama, Columbia, Trinidad and Tobago and Venezuela; southern population extending from southern Brazil to northern Argentina (Compagno in prep).

Eastern Atlantic: Portugal, possibly Canary Islands, Spain, Morocco, Senegal, Cape Verde Islands, Guinea, Guinea Bissau, Liberia, Ivory Coast, Ghana, Benin, Togo, Nigeria, Cameroon, Equatorial Guinea, Gabon, Congo, Zaire, Sao Tome and Principe (Compagno in prep).

Mediterranean Sea: Corsica, Egypt, Greece, Israel, Italy, Croatia, Slovenia, Lebanon, Libya, Malta, Spain, Syria, Tunisia and Turkey (Compagno in prep.).

Western Indian Ocean: South Africa, Madagascar, Mozambique, Tanzania, Mauritius, Seychelles, Red Sea, Gulf of Oman (Compagno in prep).

Western Pacific: Viet Nam, China (including Taiwan Province), Japan, Indonesia (Aru Island), Australia (Queensland, New South Wales), New Caledonia (Compagno in prep).

Eastern Indian Ocean: Western Australia and the Northern Territory (Compagno in prep).

Also common in the Hawaiian Islands in the Central Pacific (Compagno in prep). Records from Galapagos and Revillagigedo Islands are probably spurious.

HABITAT AND ECOLOGY

The below is mainly taken from Musick (2005), with some information updated.

Carcharhinus plumbeus is a coastal shark, often in shallow waters associated with sandy or muddy flats, bays, estuaries and harbours commonly down to salinities of 20 ppt in some populations (Grubbs et al. 2007a) and also further offshore, particularly on banks, near islands, flat reefs and other topographic features in open waters (Compagno in prep.). This species occurs from the surfline down to 280 m (Compagno in prep.), but typically in waters less than 100 m where it frequently forages near the seabed. In the Mediterranean it is caught down to 200 m (caught at this depth on the bottom in Sicilian waters by trawlers) (Compagno in prep.). Juveniles tend to occur in offshore temperate waters, while larger sharks mainly occur in tropical waters (McAuley et al. 2005).

This species is viviparous with a yolk sac placenta. Gestation has been estimated at 9-12 months in the Northwest and Western Central Atlantic (Springer 1960, Colvocoresses and Musick 1989), 12 months off Brazil (Hazin et al. 2006), 11-12 months off South Africa (Bass et al. 1973, Cliff et al. 1988) and the East China Sea (Taniuchi 1971), 10-12 months off Taiwan (Province of China) (Joung and Chen 1995) and 12 months off Western Australia (McAuley et al. 2007). Females apparently have young only every two or three years. Joung and Chen (1995) noted that about 50% of mature females are pregnant off Taiwan (Province of China), and Cliff et al. (1988) reported the same off KwaZulu-Natal. Conversely Springer (1960) noted that only 17-27% of mature females captured off Florida were pregnant. However, most of the mature females examined in the mid-Atlantic Bight of the US in summer are pregnant or recently have born young (Colvocoresses and Musick 1989). Therefore, the pregnancy rate in the Northwest Atlantic may be near 50%, but it is difficult to obtain a synoptic sample of the entire population of mature females because of their wide geographic distribution and seasonal movements. McAuley et al. (2007) report biennial reproductive periodicity off Western Australia with mating occurring during summer and autumn.

In general, size at maturity, maximum size and litter size decrease from the western Atlantic (Sminkey and Musick 1996) to the western Indian Ocean (Bass et al. 1973, Baranes and Wendling 1981), to Taiwan (Joung and Chen 1995) and Australia (Last and Stevens 1994), to the east China Sea (Taniuchi 1971) to Hawaii (Wass 1973). Size at maturity in females ranges from 129-158 cm total length (TL) and from 123-156 cm TL in males, as summarised by McAuley et al. (2007). Litter size is variable and depends in part on the size of the mother. In the Northwest and Western Central Atlantic litter size averages 8.4-9.3 (range = 1-14). However, in Hawaii mean litter size is only 5.5 (range = 1-8) (Tester 1969). In Western Australia litter size varies from 4-10 with a mean of 6.5 (McAuley et al. 2007). Within a given geographic area litter size is only very weakly correlated with the size of the mother (Cliff et al. 1988, Colvocoresses and Musick 1989, Hoff 1990, Joung and Chen 1995, McAuley et al. 2005).

Size at birth varies slightly by region but does not follow the same geographic pattern. New born pups range from 40-53 cm TL. In the Gulf of Gabes, Mediterranean Sea, Capapé (1984) reported size at birth at 58-65 cm TL. Size at birth in Western Australia is 40-45 cm FL. And 60% of the embryos were female (McAuley et al. 2007).

Sandbar Sharks are slow-growing K-selected species (Hoff 1990, Sminkey and Musick 1995). Although growth and age at maturity may be accelerated under captive conditions (Wass 1973), wild populations grow very slowly and mature at a relatively late age. In the western Atlantic the von Bertalanffy growth coefficient, k, has been estimated to be very low (0.039-0.089) in validated studies using annuli on vertebral centra (Lawler 1976, Casey et al. 1985, Sminkey and Musick 1995). Maturity in these studies was estimated at 13-16 years. However, in another study based on growth rates calculated from tag/recapture data, growth was considerably slower and age at maturity was estimated to be 29 years (Casey and Natanson 1992). Considerable debate has arisen concerning the discrepancy between the two methods including the small tag/recapture sample size and the possible effects of tagging on growth rates (Sminkey 1994). A recent study of age and growth off Taiwan (Joung et al. 2004) based on caudal

vertebrae for which the annual nature of growth bands have not been validated is suspect. Romine et al. (2006) recently defined age and growth of Sandbar Sharks in Hawaii where the population grow faster (k male = 0.12; k female = 0.10) and mature at an earlier age (males at 8 and females at 10 years of age, respectively) than populations in other areas. This study contradicts earlier very rapid growth estimates in captive sandbars (Wass 1973). In Western Australia, the annual periodicity of growth band formation was validated using vertebrae from tagged sharks, which were injected with oxytetracycline and were at liberty for up to 8.1 years. The oldest female was estimated to be 25 years of age and the oldest male was 19 years. The ages at which 50% of female and male sharks were mature was estimated to be 16.2 and 13.8 years, respectively (McAuley et al. 2006). Validated age at maturity estimates are available from McAuley et al. (2006): females reach 50% maturity at 16.2 years of age and males at 13.8 years of age.

Recent publications suggest that for Sandbar Sharks the annual population increase rate can vary from 2.5% to 11.9% (Sminkey 1994, Sminkey and Musick 1996). These low rates of intrinsic increase are probably close to the real situation and reflect the K-selected life history parameters typical of virtually all large sharks. In Western Australia the stock was estimated to have a potential rate of population growth of 2.5% per year, in the absence of fishing (McAuley et al. 2005). The estimated generation and population doubling times of approximately 23 years, indicated a lengthy recovery period for the stock should it be reduced to lower than acceptable levels (McAuley et al. 2005). Regardless, Sandbar Sharks grow slowly and mature late. Longevity is 35-41 years (Musick 2005, McAuley et al. 2006).

Diet: This shark mainly feeds on small bottom fish, as well as molluscs and crustaceans. Compagno (2001) reports that this species' diet includes sardines, shad, menhaden, anchovies, sea catfish, moray and snake eels, pipefish, barracuda, mullets, goatfish, hairtails, spanish mackeral, bonito, mackeral, jacks, groupers, croakers, grunts, porgies, flounders and soles, sea robins, toadfish, cusk eels, porcupine fish, sharpnose sharks (*Rhizoprionodon*), spiny dogfish (*Squalus*), bonnethead sharks, guitarfish, skates, stingrays, cow-nosed rays, squid, cuttlefish, octopi, bivalves and conchs, amphipods, shrimp and crabs. Neonates may consume mostly crabs and other large crustaceans and then eat more fish as they get older (Ellis and Musick 2007). The species does not consume garbage and mammalian carrion as a rule, unlike some other members of its genus.

THREATS

Carcharhinus plumbeus is a significant component of coastal shark fisheries worldwide (Bass et al. 1973, Compagno 1984b, Last and Stevens 1994, Branstetter and Burgess 1995, Joung and Chen 1995, McAuley et al. 2005). This species is caught with longlines, hook-and-line, and set bottom nets and is also fished with rod and reel by sports anglers as a game fish (Compagno in prep.). Sandbar Sharks were found to represent at least 2-3% of the fins auctioned in Hong Kong, the world's largest shark fin trading centre (Clarke et al. 2006a). Their fins are generally considered to be of high value, comparable to dusky shark and hammerhead fins (S. Clarke unpubl. Data). Tagging, age and growth studies show that Sandbar Sharks are a long-lived species with low fecundity and are very vulnerable to over-fishing (Springer 1960, Casey et al. 1985, Sminkey and Musick 1995, 1996; McAuley et al. 2005, 2006). It is an important component of shark fisheries in most areas where it occurs and has been severely overfished in the Northwest and Western Central Atlantic, Mediterranean, Southern Brazil and probably the Northeast Pacific. It has declined from fishing off western Australia and is common but not fished in Hawaiian waters (Romine et al. 2006).

NORTHWEST ATLANTIC

Along the Atlantic coast of the US, Branstetter and Burgess (1995) reported that this species contributed up to 60% of the catch and 80% of the landings in the directed longline fishery. In addition, the Sandbar Shark is second only to the blue shark *Prionace glauca* (a pelagic species) in the US Atlantic recreational shark fishery (Hoff and Musick 1990). During the last 20 years the recreational and commercial fisheries for sharks along the south Atlantic coast of the US and in the Gulf of Mexico have expanded at rapid rates (Anderson 1985, 1990; Casey and Hoey 1985, Hoff and Musick 1990). Recreational catch has been estimated at 2.5 million sharks (c.35,000 t) annually; 20-40% of these are killed (National Marine Fisheries Service 1993).

Driven by increased marketability, the commercial fishery has rapidly expanded since 1985, with landings exceeding 7,100 t in 1989 (National Marine Fisheries Service 1993). In the Northwest and Western Central Atlantic Sandbar Shark stocks were reduced by 85-90% in just 10 years because of over-exploitation. This species continued to support a substantial fishery after such a severe population decline only because of the very large size of the original stock. In addition, the age structure of the population has been shifted dramatically toward younger age classes. Adult females became very uncommon (Musick et al. 1993). Furthermore, the average size of Sandbar Sharks off Virginia in 2005 had declined to 32% of the size in 1975 (Ha 2006).

A Fishery Management Plan was introduced in 1993, on which *C. plumbeus* is managed as a coastal species. Several states (Virginia, North Carolina, Texas and Florida) also enacted laws to regulate shark fishing in their respective regions (14% of commercial and 64% of recreational catches occur in state controlled waters). Although biomass of the species was reported to have increased by 2002 (Cortes et al. 2002), a recent assessment estimated that the stock is still only 35-47% of virgin biomass and 26-43% of virgin mature abundance in numbers (SEDAR 2006). Further evidence of decline comes from newly available analyses of survey data: A shark-targeted longline research survey from the University of North Carolina, conducted annually between 1972 and 2003 off Cape Lookout has caught 310 sandbar sharks. The standardized CPUE time series for this survey indicates significant declines for sandbar shark amounting to an 86% decline, with no recovery in the latter years of the survey (Myers et al. in prep). A second shark-targeted longline survey conducted in South Carolina in 1983-84 and 1993-1995 shows large significant declines in sandbars, amounting to a 97% decline just over this 13 year time period (Myers et al. in prep). Finally, a trawl survey conducted in Delaware Bay by the Delaware Department of Natural Resources and Environmental Control between 1964 and 2004 shows a significant decline rate, that over this 41 year time period amounts to an 84% decline (Myers et al. in prep).

SOUTHWEST ATLANTIC

Intensive fishing by pair trawl, gillnet and beach seine on pupping and nursery grounds is thought to have caused excessively high juvenile mortality to the point of threatening the population of the species in southern Brazil. Fishing with these gears has been intense in this species' habitat during the last 20 years. The company SOPESCA in Rio Grande recorded receipt of 10t of C. plumbeus on 11 February 1983. A record of a typical beach seine catch on 23 February 1983 indicates that 20 individuals of *C. plumbeus* were caught within a single haul, with seven specimens smaller than 80 cm TL (Vooren et al. 2005). No catches of the species were observed during shore fishery monitoring in summer 2003, but neonates of *C. plumbeus* were common during monitoring of a coastal fishing at depths of 18-60 m between Tramandaí and Saint Simão in summer 2005. Neonates of *C. brevipinna*, *C. falciformis* and *C. signatus* were also observed in this area, as well as adults of *Carcharias taurus*, which is Critically Endangered in this region (Vooren et al. 2005). *Carcharhinus plumbeus* is also caught off Uruguay and northern Argentina (A. Domingo pers. comm.).

Adults of this species are also caught by pelagic fisheries operating off the Atlantic coast of South America. A number of countries operate longline fleets targeting tuna and swordfish in the high seas areas of the Southwest Atlantic region. In addition to the coastal nations of the Southwest Atlantic, nations including Taiwan, Korea, Japan, Spain, Bolivia, Cape Verde, United

Kingdom, China and Barbados also operate vessels here. However, with the exception of Taiwan, (and during certain periods of the year, Korea and Spain), the effort of these fleets is minor compared with other areas of the Atlantic (Bonfil 1994). This species is taken, along with other Carcharhinids in these fisheries (Fowler et al. 2005). Tuna and swordfish longline fisheries now also target sharks due to increasing demand for shark products and the value of their fins (Bonfil et al. 2005, Mejuto et al. 2006).

MEDITERRANEAN SEA

Carcharhinus plumbeus is caught with surface and bottom longlines, gillnets and occasionally trawls in the Mediterranean Sea, including in the Sicilian Channel, off Tunisia, Libya and Egypt, Spain, Morocco and Algeria and infrequently elsewhere. There are also anecdotal reports of bycatch of this species in fixed tuna traps (Tonnara) in Sicily. Both coastal and pelagic fishing pressure is high throughout much of the Mediterranean Sea.

This species was common until the 1980s along all the Levantine coasts (Saad et al. 2004), where it was the most dominant species in shark catches (>85%) (Baranes and Ben Tuvia 1978). The Sandbar Shark *C. plumbeus* is still the most important shark species captured in this area, however, there has been a significant decline in captures (M. Bradai pers. obs. 2008).

The Gulf of Gabès, Tunisia, and an area off Turkey appear to be important nursery grounds for this species (Capapé 1984, Saidi et al. 2005; Bradai et al. 2006, STECF 2003). There are no recent records of gravid females of this species in the Mediterranean outside of these areas. Constantini and Affronte (2003) report that the northern Adriatic Sea may also be an important nursery area for the species, based on six neonatal Sandbar Sharks captured with gillnets in this area between 1998 and 2000. The last record of a pregnant female Sandbar Shark from this area was recorded in 1982 (Constantini and Affronte 2003, Travaglini 1982).

This species was previously regularly seen on fish markets of southern Sicily during the summer months but has not been observed on the same markets in recent years (F. Cigala-Fulgosi and M. Vacchi pers. obs. 2003). A similar situation is apparent in the eastern Adriatic sea (Lipej et al. 2000, A. Soldo pers comm.) and therefore recent publications have described *C. plumbeus* as an endangered species in the Adriatic Sea (Lipej et al. 2004). However, in Tunisia, the species is regularly landed and observed in fish markets (Bradai et al. 2006).

In the Gulf of Gabès, juvenile *C. plumbeus* are caught with longlines and trawls and adult females are targeted using specially-designed gillnets (locally known as "kallabia" from "kalb' bhar" (literally sea dog) which means shark in Arabic) during spring and early summer, when they move inshore to pup (Saidi et al. 2005, Bradai et al. 2006). Given the high biological vulnerability of this species to exploitation, the declines observed in other areas of its range where it is taken as a target and bycatch and continuing, unregulated fishing pressure in this area, it is strongly suspected that this stock will also decline.

The species is a known bycatch of pelagic fisheries operating within Mediterranean waters (STECF 2003), but recent records appear to be very rare. While, in the Gulf of Gabès, juvenile *C. plumbeus* represent a major component in total capture of the pelagic fisheries targeting swordfish (Bradai et al. 2006). In a study of incidental catch of pelagic sharks from the swordfish and tuna fisheries operating throughout the Mediterranean Sea from 1998-2000, only two specimens of *C. plumbeus* were recorded in one area (the Straits of Sicily) (Megalofonou et al. 2005). Although Blue Shark, Shortfin Mako and Thresher Sharks make up the bulk of shark catch in the Moroccan pelagic driftnet fisheries in the eastern Mediterranean, Carcharhinid species are also known to be taken and landed by this fleet on an occasional basis. Some boats are known to deploy their nets near to the coast (1-2 miles from the shore) to target pelagic sharks (Tudela et al. 2005). Important catches of Carcharhinids such as *C. plumbeus* are also made in the pelagic longline fishery operating from ports in eastern Algeria (Walker et al. 2005).

Habitat degradation of this species' coastal nursery areas through coastal development and pollution also poses an important threat.

NW & WESTERN CENTRAL PACIFIC

This species is a known catch of longline, trawl and set net fisheries operating throughout large areas of this region. It is a known catch of shark longline and tuna gillnet fisheries operating off Indonesia (White et al. 2006). Japanese data on Sandbar Sharks are limited, but reported landings in Japan's coastal ports show a sharp decline during the period since 1992. At that time landings totalled 126 mt per annum, but this amount decreased to 91 mt in 1995, 21 mt in 2000 and 3 mt in 2004. No CPUE trends are available (Japan Fisheries Agency 2006). In Taiwan, Province of China, catches and sizes have decreased during recent years, particularly in north east waters (Chen et al. 1996).

AUSTRALIA

Sandbar Sharks are an important component of the Western Australian shark fishery. Current total biomass is probably at about 35% of its level prior to the start of full-time northern shark fishing. Current management arrangements in the fishery should arrest any further declines in stock biomass, but continued monitoring and assessment will be essential to monitor the stock, and the effectiveness of these measures. See McAuley et al. (2005) for a summary of the fishery and stock status.

CONSERVATION ACTIONS

Precautionary adaptive collaborative management of target and bycatch fisheries is needed for this biologically vulnerable shark. It is also essential to improve data collection and develop stock assessments for this species. Family Carcharhinidae is listed as highly migratory under the 1995 UN Agreement on the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UNFSA). The Agreement specifically requires coastal and fishing States to cooperate and adopt measures to ensure the conservation of listed species. To date, there has been little progress (see United Nations Convention on the Law of the Sea for further details).

Also of relevance is the FAO International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks) which recommends that Regional Fisheries Organisations (RFOs) carry out regular shark population assessments and that member States cooperate on joint and regional shark management plans. This is of particular importance for species such as Sandbar Sharks whose stocks are exploited by many States on the high seas. Steps are being taken by some RFOs, such as ICCAT, to collect species-specific data on pelagic sharks. To date two RFOs, ICCAT and IATTC, have adopted finning bans, as have several range states (e.g. Canada, USA, EU, Australia, Brazil etc.). More are likely to follow suit.

Canada and the USA have shark management plans (NMFS 1993, Joyce 1999). In US Atlantic waters Sandbar Sharks are a prohibited species (outside of the shark research fishery) on the Fishery Management Plan for Atlantic tunas, swordfish, and sharks. Prohibited species must be released immediately with minimum injury and without removing them from the water.

The species is under a comprehensive management plan in Western Australia (McAuley et al. 2005). Management of the Australian fishery is through input controls implemented as time-gear units. In 2006, the Western Australian Government introduced a number of changes in all commercial fisheries to reduce mortality, particularly Dusky and Sandbar Sharks, including: a maximum size limit for Dusky Sharks; additional controls on the use of longline; and the conversion of monthly gear units to daily gear units (McLoughlin 2008, McAuley et al. 2005).

CITATION

Musick, J.A., Stevens, J.D., Baum, J.K., Bradai, M., Clò, S., Fergusson, I., Grubbs, R.D., Soldo, A., Vacchi, M. & Vooren, C.M. 2009. *Carcharhinus plumbeus*. The IUCN Red List of Threatened Species 2009. **www.iucnredlist.org**

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

IN PARTNERSHIP WITH:

UNITED ARAB EMIRATES
MINISTRY OF CLIMATE CHANGE
& ENVIRONMENT

UMM AL QUWAIN PARTNER:

GOVERNMENT OF UMM ALQUWAIN

دائـــــرة بلديـــــة أم القيويـــن
DEPARTMENT OF UMM AL QUWAIN MUNICIPALITY

EVENT ORGANISER:

EDA
جمعية الإمارات للغوص
Emirates Diving Association

CLEAN-UP PARTNER:

Ocean Conservancy™

GOLD PARTNER:

ماجد الفطيم
MAJID AL FUTTAIM

BCG PERFORM THEIR COMMUNITY SERVICE DAY WITH CLEANUP ARABIA

FEATURE AND PHOTOGRAPHY **ALLY LANDES**

All the rubbish is first collected to fill the burlap sacks donated to EDA by Nightjar Coffee Roasters LLC (www.nightjar.coffee), weighed and then emptied onto a tarpaulin mat ready for counting. We sort all items into categories which are then transferred to rubbish liners and collected and disposed of by the Department of Umm Al Quwain Municipality.

Boston Consulting Group (BCG) did their 4th annual beach clean-up on the 11th of February as part of our Cleanup Arabia campaign and their Community Service Day – collecting a whopping 196.5 kg of rubbish! It's clear to see from the results on the far right that all plastics continue to dominate what is irresponsibly left behind by weekenders using these coastal areas for camp outs. The buildup is an eyesore by it being caught in all the foliage and getting swept to sea. We should be seeing improvements in this day and age but the problem is escalating to no end.

We will continue to perform small independent clean-ups throughout the year with the escalating level of pollution entering our environments since the pandemic's halt of travel. More people are now exploring the outdoors, but with this comes a lack of environmental respect and sadly, more rubbish is left behind on our beaches and in our deserts. It may not be your direct mess, but it sure does become all our responsibility to fix this global problem. We need to make Cleanup Arabia mean more than ever before!

We want to thank the Department of Umm Al Quwain Municipality for their support and partnership for us to continually protect and monitor this area with our members.

BCG MANGROVE UAQ BEACH CLEAN-UP – 11 FEB 2021	
MOST LIKELY TO FIND ITEMS	TOTAL
Cigarette Butts	103
Food Wrappers	84
Plastic Take-out Containers	107
Foam Take-out Containers	36
Plastic Bottle Caps	240
Metal Bottle Caps	8
Plastic Lids	5
Straws/Stirrers	3
Forks/Knives/Spoons	14
Plastic Beverage Bottles	690
Glass Beverage Bottles	266
Beverage Cans	60
Plastic Grocery Bags	17
Other Plastic Bags	320
Paper Bags	5
Paper Cups & Plates	22
Plastic Cups & Plates	27
Foam Cups & Plates	5
FISHING GEAR	
Buoys/Pots/Traps	1
Line (metres)	11
Rope (metres)	12
Mooring/Anchor Rope	1
OTHER TRASH	
Cigarette Lighters	2
PACKAGING MATERIALS	
Other Plastic/Foam Packaging	63
Other Plastic Bottles	5
Strapping Bands	5
Tobacco Packaging/Wrap	5
PERSONAL HYGIENE	
Syringe	1
Face Masks	11
TINY TRASH (< 2.5 cm)	
Foam Pieces	302
Glass Pieces	Multiple
Plastic Pieces	Multiple
EXTRA ITEMS	
BBQ Grill	1
Cloth Pieces	10
Clothing Items	14
Fishing Line Reel	1
Fishing Rod	1
Gloves	3
Hard Hat	1
Large Foam Pieces	23
Shoes	24
Tea Cup	1
Tissue Pieces	210
Car Compartment Box Lid	1
Wood Pieces	2
TOTAL NO. OF ITEMS:	**2,723+**
TOTAL NO. OF BAGS:	**24**
TOTAL WEIGHT (KGS):	**196.5**

VOLUNTEERS REMOVE GHOSTNETS FROM RAS AL KHAIMAH WRECK

FEATURE AND PHOTOGRAPHY **SAAD D BHATTY**

Photo by Dario Trombetta

When a fishing net entangles on a wreck or a reef, most of it is usually abandoned. This is because it is impossible for a fishing vessel to salvage the net (even from a shallow wreck) without diver assistance. The net, made from indestructible synthetic material, immediately starts killing indiscriminately. It takes several years for the net to degrade enough so it no longer poses a hazard to marine life.

After two decades of diving, I have seen my fair share of pointless death at the hands of ghost nets, abandoned fish traps and recreational monofilament fishing line. And it has been three years now since seafood has been banned from my dining table; a silent protest against commercial fishing where up to 40 percent of each day's catch is discarded. Each year, thousands of dolphins, sharks, rays and turtles die for no reason whatsoever.

Earlier this year in January, with benign sea conditions and reports of decent visibility (both a rarity for the shallower RAK wrecks), two students and I visited a seldomly dived tug boat sitting upright in about 20 metres of water. The students were completing their PADI Advanced Open Water and this was their "Wreck Dive". Unfortunately, the wreck was almost entirely covered by fishing net, but this was a hazard they had already been briefed about.

What I had not prepared them for was the sight of countless dead and dying fish, trapped in endless miles of net. The tragedy culminated in the distressing spectacle of a large blacktip reef shark, its final resting place above the tug's pilot house. This wreck was a graveyard.

I surmised the shark had entered the net at a lower level, perhaps somewhere on the main deck and then had been unable to escape. Scratches on its side and snout bore silent witness to its struggle against the wreck's sharp edges and the unyielding net. I wonder for how long it frantically swam around desperately trying to find a way out.

Positioning the shocked students where I could keep an eye on them, I immediately cut away the net around the immediate vicinity of the dead shark. My objective was to create a large exit point which may help the next shark who got trapped. In the short time remaining, we circled the wreck and I cut free various small fish which gratefully swam away. The trickiest bit was freeing a large barracuda which had a hook in its mouth on a steel wire, which in turn was entangled with the net. I think it sensed I was trying to help because it did not once try to bite me, although I was fully aware of the risk I was taking by putting my un-gloved hands so close to a distressed animal's mouth. My trusty EMT shears struggled to cut the strong steel wire, the barracuda thrashing wildly did not help matters, but eventually the shears bit through and the barracuda was free. I would have liked to remove the hook, but the animal was already too stressed. The shears were retired later that day with full military honours.

Back at the dive centre, I reported the wreck's appalling condition to the centre's owner and we immediately decided to launch a net clearing mission the very next day. Given the depth and enormity of the task at hand, plus the real risk of diver entanglement, we opted to restrict ourselves to a small team of six divers already experienced with advanced net clearing. The call went out and within an hour we had all the help we needed (thank you WhatsApp).

Since I had already surveyed the extent of the situation, it was easy to plan the mission. The four single-cylinder divers (including the dive centre owner) would make two dives and focus on the upper deck, the bow area

and the pilot house. This would optimise their NDL time and air consumption. The other two divers (one diver on twinset doubles and myself on a rebreather) would tackle the deeper parts of the wreck. Non-diving crew on the boat would assist with surface recovery.

Based on the earlier day's survey and the assigned missions, each team used a different clearing technique. The shallow team sent up a corner of the larger net (using a lift bag) which was hauled in by the surface crew. The shallow team then worked quickly to keep freeing the net from the wreck as it was hauled out of the water and completed most of their mission without significant cutting. The deep team dealt with an older net which was too entangled to raise in one piece, and also parts of the newer net which had entangled too complexly for easy clearing. My buddy and I spent most of our time cutting and pulling the nets away. We then used the main deck as a staging area to collect all the pieces and secure them in a large ball which was then sent to the surface with a lift bag.

We were too late to save this beautiful shark, but I am certain our intervention helped saved many other innocent lives. In addition to the shark, we also found pieces of turtle shell and other large skeletons which suggest that the older net had been actively killing for quite some time.

A huge debt of gratitude is due to the diving volunteers, the surface crew, and most of all to Al Jazeera Diving Centre for their help and support with this noble cause. The fishing net season will be over soon, and we plan to conduct survey dives to ensure all the RAK wrecks are clear of nets.

Photo by Dario Trombetta

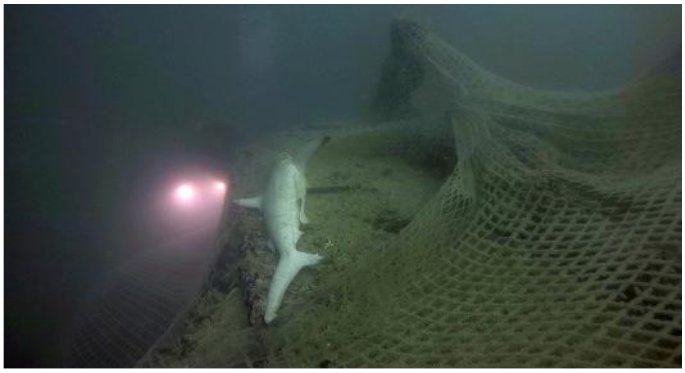

Photo by Dario Trombetta

Photo by Dario Trombetta

SOOTY GULLS
FOUND ON SIR BU NA'IR ISLAND USING MARINE DEBRIS TO BUILD THEIR NESTS

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

The number of species that are known to have suffered from interactions with marine debris has more than doubled since the late 1990s. This includes 100% of sea turtle species, 79% of marine mammal species, and 80% of seabird species. We report the first record of sooty gulls using marine debris in building their nests.

Marine debris incorporated to this sooty gull's nest.

The proliferation of plastics and other marine debris throughout the world's oceans currently inflicts a confluence of grave and wide-reaching socioeconomic, human health and environmental hazards. Marine debris is defined as any manufactured solid waste product that is discarded, abandoned or lost into the marine environment. These materials include a wide diversity of items ranging from subtle particles to large jetsam. Researchers across the world have found that as the magnitude of anthropogenic marine debris increases, marine organisms become more and more vulnerable and have both injurious and deadly interactions with them. The number of species that are known to have suffered from interactions with marine debris has more than doubled since the late 1990s. This includes 100% of sea turtle species, 79% of marine mammal species, and 80% of seabird species. The susceptibility of marine life to interactions like debris ingestion or entanglement has received a great deal of attention by researchers; while other interactions such as the incorporation of marine debris into the nests of seabirds, which can lead to the entanglement or ingestion of marine debris by both parents or hatchlings, is still poorly understood.

Sooty gulls are known to breed in large colonies from April to October exclusively on islands of the northwest Indian Ocean. In the United Arab Emirates, sooty gulls are known to nest on coral islands including Dinah Island, Jarnein Island and Sir Bu Na'ir Island. Sir Bu Na'ir Island is on the UNESCO World Heritage Tentative list, a part of the Indian Ocean South East Asian Marine Turtle Memorandum of Understanding, a Wetland of international Importance by The Convention on Wetlands of International Importance and, since the year 2000, a protected area under the management of the Environment & Protected Areas Authority (EPAA) of Sharjah. In 2019, EPAA researchers investigated 258 sooty gull nests to evaluate the use of anthropogenic debris by sooty gulls in building their nests on Sir Bu Na'ir Island, Sharjah, United Arab Emirates.

With 11% of investigated nests consisting of marine debris, it was determined that sooty gulls frequently use anthropogenic debris as nesting materials in Sir Bu Na'ir Island. Researchers also compared the types of marine debris in the nests and on adjacent beaches to determine if the birds were selecting specific types of debris for nest building. As 80% of beach litter consisted of plastics, while conversely, 76% of nest debris consisted of non-plastic rubbish, it was determined that sooty gulls were strongly selecting non-plastic rubbish such as glass fragments, fabric and cans in constructing their nests. This was an interesting and unique finding because in other studies marine birds were revealed to mostly utilise plastics. This might be because seabirds from other studies mostly utilise vegetation in nest building which they may fail to discriminate with elongated thread-like plastic marine debris. Sooty gulls also use vegetation in nest building, which seems to result with them using debris such as ropes and fishing lines. However, sooty gulls mostly use rocks and minerals in nest building which seems to result with them mostly using debris such as glass fragments, used ammunitions and beverage cans in constructing their nests.

Though the level of marine debris in sooty gull nests is relatively low when compared to the nests reported in others studies, the reported levels are still shockingly high when they occur in an uninhabited remote area like Sir Bu Na'ir Island. This does come to show how marine debris has become an ubiquitous menace in the marine environment and a pervasive and lingering threat that shadows seabirds from cradle to grave.

Sooty gulls at the nesting colony.

Marine debris collected from individual sooty gull nests.

هيئة البيئة والمحميات الطبيعية
Environment & Protected Areas Authority
SHARJAH الشارقة

ABOUT 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/

SOCIAL MEDIA PLATFORMS:
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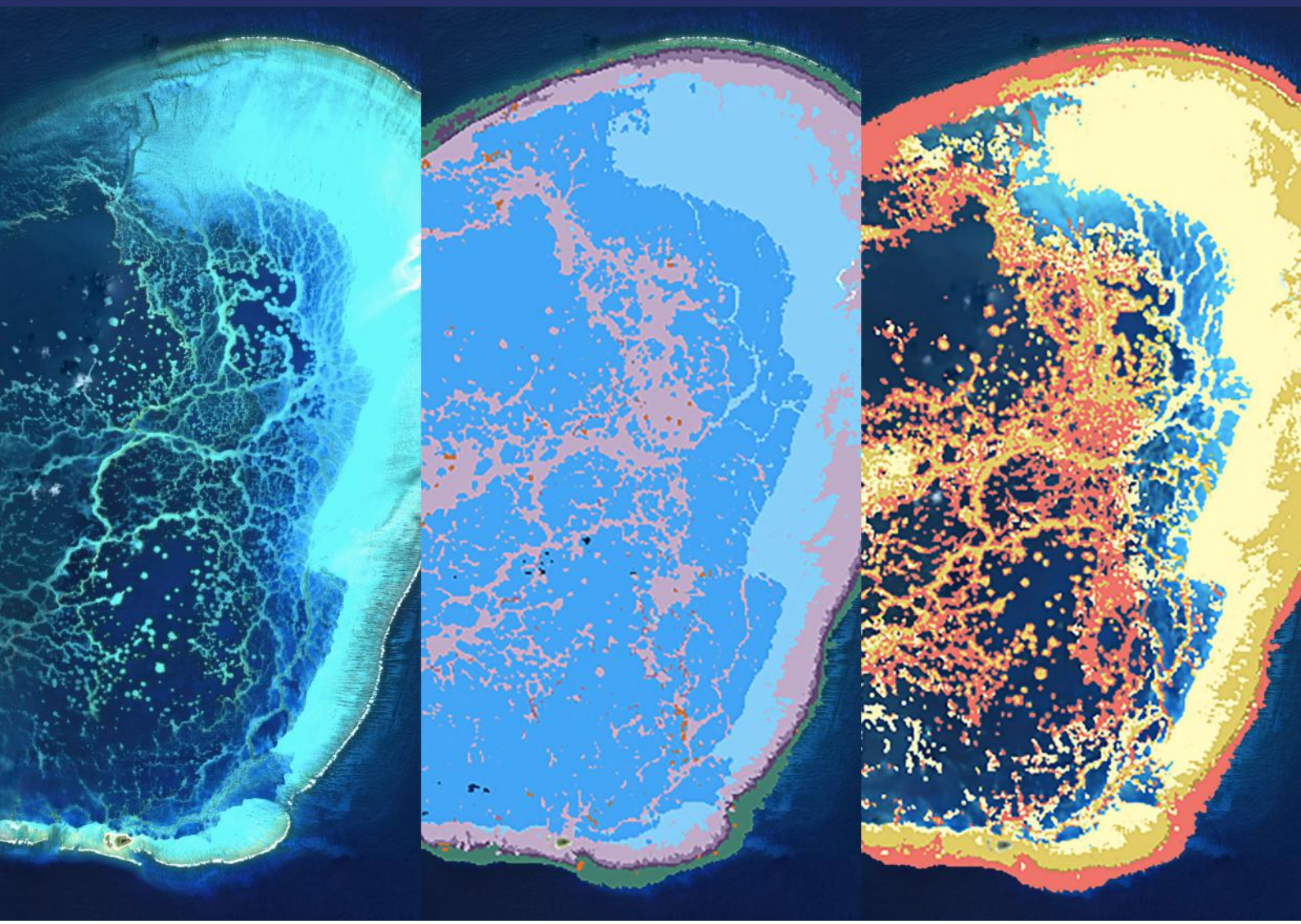
THE ALLEN CORAL ATLAS: GETTING A CLEAR PICTURE OF CORAL REEFS AROUND THE WORLD

FEATURE **CHANTEL SAY**

With your help, the Allen Coral Atlas can support, inform and inspire critical action to protect and preserve the world's coral reefs. *"As long as we work together, with both urgency and determination, there are no limits to what we can achieve."* – Paul Allen

This is a Planet Dove satellite image of a reef in the Red Sea, extracted and downloaded from the Allen Coral Atlas.



ABOVE: High resolution satellite image of a remote Hawaiian atoll (left), and its corresponding geomorphic (middle) and benthic habitat (right) maps produced by the Allen Coral Atlas. **OPPOSITE PAGE:** Dr Chris Roelfsema expressing our overall goal for the Allen Coral Atlas – "Maps connecting people to help save reefs". Photo by Dr Emma Kennedy.

Whether you are gaining a bird's eye view from above, or immersing yourself beneath the water, it is easy to be transfixed by the beauty and biodiversity of coral reef ecosystems. With advances in technology, it is now not only possible to admire coral reefs from these two different perspectives, but also use these two approaches to help protect and preserve the future of these natural wonders. The Allen Coral Atlas is using high resolution satellite imagery and field observation data to produce a freely available global mosaic view of both the geomorphic and benthic habitat for all shallow-water tropical coral reefs around the world. This powerful new tool is the first of its kind, having the potential to support, inform and inspire critical action to protect and preserve coral reefs around the world.

WHO'S INVOLVED IN THE ALLEN CORAL ATLAS

This unique scientific tool for reef science began when Vulcan Inc. brought together champions in the fields of coral sciences, satellite imaging and mapping technologies. This included the late Dr Ruth Gates, a renowned and much-loved marine scientist, Andrew Zolli, who oversees the global impact initiatives of a game-changing satellite imagery company and Professor Greg Asner, a leader in aerial spectroscopy and remote sensing. Catalysed by Vulcan's founder, the late Paul Allen, the vision was to create the world's first global coral reef habitat map and monitoring system, describing the benthic nature across reef shelfs. Paul Allen, who is well-known for being Microsoft's co-founder, was also a lifelong ocean enthusiast and avid diver and had charged his own team to "save the world's coral reefs" and the Allen Coral Atlas was one initiative that came from his directive.

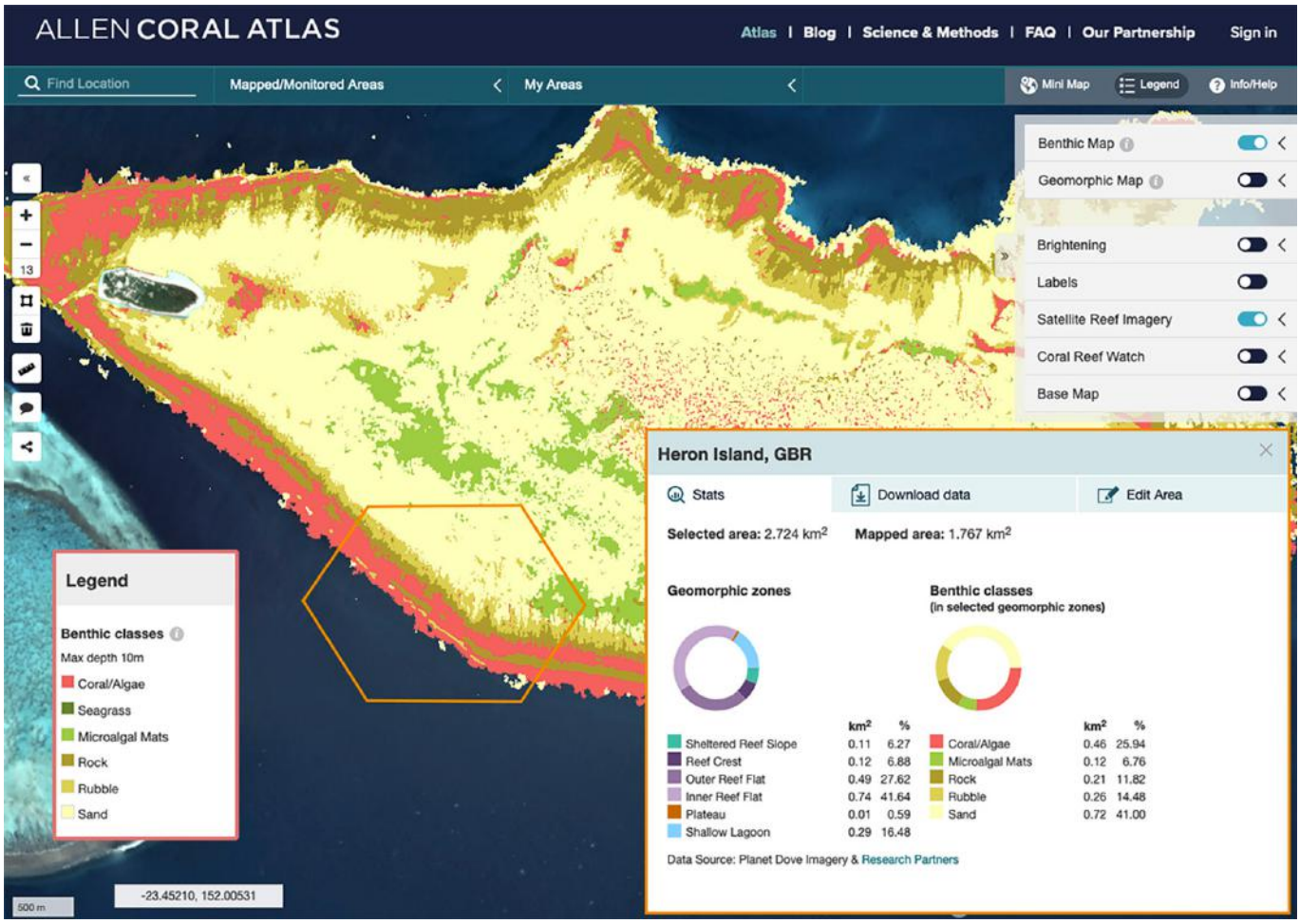
Although Dr Ruth Gates and Paul Allen are no longer with us, their aspiration to produce this global map has been facilitated by a group of passionate coral reef scientists and conservationists. The Allen Coral Atlas is an international collaborative partnership involving Planet Labs Inc., The Arizona State University's Centre for Global Discovery and Conservation Science, The University of Queensland's Remote Sensing Research Centre, the National Geographic Society and Vulcan Inc., with each partner playing a critical role in the development of this innovative scientific tool for reef science, helping to gain a clearer picture of coral reefs around the world.

WHAT DOES IT TAKE TO CREATE THE WORLD'S FIRST GLOBAL CORAL REEF HABITAT MAP

Given that it is not feasible to visit and study every single reef around the world, the Allen Coral Atlas has developed cutting-edge technology to automate the mapping of coral reef habitats based on high resolution satellite imagery. This high-resolution satellite imagery is obtained by hundreds of Planet Dove nanosatellites that orbit the earth on a daily basis. These satellites are roughly the size of a shoebox and provide the Atlas with a seamless 3.7 m resolution mosaic of the world's reefs. This imagery is further corrected by the Arizona State University (ASU) team led by Professor Greg Asner, removing cloud cover, sun glint and other atmospheric interferences, to allow a clarity never before seen using satellite imagery.

This clear view of the reefs combined with georeferenced benthic field data allows a team of GIS and coral reef biologists from the University of Queensland, led by Dr Chris Roelfsema, to consistently describe the benthic nature of coral reefs (on a region-by-region basis). Specifically, describing the habitat which falls within multiple predefined 20 x 20 m training reference samples within each region.


MAPS
CONNECTING
PEOPLE TO
HELP SAVE
REEFS



ABOVE: Overview of the Allen Coral Atlas, displaying the benthic habitat map and class legend for Heron Island, the Great Barrier Reef, Australia. The statistical analysis (panel on the bottom right) shows the output for both the geomorphic and benthic makeup for a specific portion of the reef (outlined).

These reference samples are fed through an automated machine learning mapping process, and then through an object-based clean-up process, to create a geomorphic and benthic habitat map that spans the entire region, encompassing all visible reefs (not influenced by turbidity or deep water). Once each region is mapped, it is released onto the Allen Coral Atlas website, freely available for exploration and download. The Allen Coral Atlas also provides an analytical tool which can be used to calculate the proportion of geomorphic and benthic habitat features within a particular reef or region of interest, that has been mapped. If you are interested in learning more about the methods behind these maps, please visit the Science and Methods section on the Allen Coral Atlas website for further information.

In addition to providing global satellite imagery and the two mapped layers, the Allen Coral Atlas is also planned to feature a monitoring tool for coral bleaching events globally. Professor Greg Asner and the team at ASU are currently creating a dynamic brightening alert layer that detects and uses changes in the spectral signature of corals as a proxy for bleaching events.

WHY IS THE ALLEN CORAL ATLAS A POWERFUL TOOL

The Allen Coral Atlas uses global consistency to map all the shallow tropical reefs of the world, drawing us closer towards a complete global geomorphic and habitat mosaic map. The Allen Coral Atlas uses the same mapping techniques and class descriptions to allow scientific comparisons between any reef. Secondly, the Allen Coral Atlas is free to anyone and everyone. Due to its open access, and freely available user guides, this easy-to-use scientific tool will allow for scientific benthic analysis to be undertaken for even the most remote and least studied reefs around the world. The Allen Coral Atlas is therefore pushing the boundaries of our current spatial knowledge of coral reefs, to a point where we can gain a more comprehensive understanding of coral reefs and their benthic nature around the world.

Headed by the National Geographic Society, the Atlas team prioritises field engagement to ensure that coral reef managers, scientists, and conservation practitioners have the resources necessary to use the maps for a high level of impact. The Allen Coral Atlas, in association with The Nature Conservatory, has produced free online courses to provide further background and information on the application of remote sensing and coral reef mapping. The Allen Coral Atlas and its resources can thus be used to address current knowledge gaps and to implement conservation and management applications.

HOW YOU CAN HELP

As the Allen Coral Atlas has now mapped 67% of the world's shallow-water tropical coral reefs, it is not long now until the coral reef community has a complete global geomorphic and benthic habitat map on hand. However, the collection of field data used to help with the creation of these Atlas maps has been severely impacted due to the COVID-19 pandemic. Therefore, we are seeking your help. In fact, members within the coral reef community have already rallied behind the Allen Coral Atlas, sharing benthic data to help make the Atlas maps as reliable as possible – an effort we are extremely grateful for. With the mapping of the Middle East scheduled next, we are thus seeking your help with the collection of georeferenced benthic data that can help us describe and identify the benthic habitat of these coral reefs. Such data could consist of georeferenced photoquadrats, image mosaics or existing habitat maps. Additionally, groundtruth point data that has a recorded GPS location per data point is also extremely helpful. If you believe that you have georeferenced benthic data that could help with our mapping efforts, please contact us via **submissions@allencoralatlas.com** – we'd love to hear from you. All data shared with the Allen Coral Atlas will only be

used internally and not shared or published outside our team and all data sets used to help with the calibration and validation of the Allen Coral Atlas maps will be attributed on the website.

With your help, the Allen Coral Atlas can support, inform and inspire critical action to protect and preserve the world's coral reefs.

"As long as we work together, with both urgency and determination, there are no limits to what we can achieve." – Paul Allen

ALLEN CORAL ATLAS™

To access the Allen Coral Atlas and for more information regarding the collaborative partners behind the Atlas, please see the following information below.

You can access the Allen Coral Atlas via the following link: **https://allencoralatlas.org**

The Allen Coral Atlas has now mapped 67% of the worlds shallow-water tropical coral reefs. You can explore all these reefs and download the maps through the Atlas: **https://allencoralatlas.org/atlas/#3.09/-4.7098/98.2806**

To find out more about those involved in this international collaborative partnership, you can visit our website here: **https://allencoralatlas.org/partners/**

Additionally, you can visit each of the contributing partners' websites:

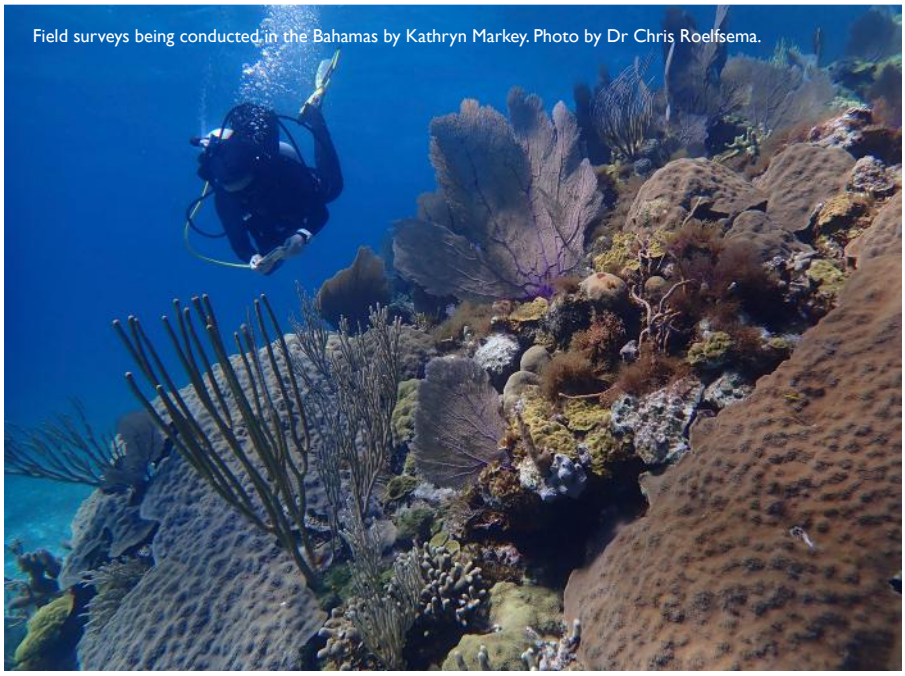
- Planet Lab Inc.: **https://www.planet.com**
- The Arizona State University's Centre for Global Discovery and Conservation Science: **https://gdcs.asu.edu**
- The University of Queensland's Remote Sensing Research Centre: **https://www.rsrc.org.au**
- The National Geographic Society: **https://www.nationalgeographic.org**
- Vulcan Inc.: **https://vulcan.com**

For more information regarding the science and methods involved in the Allen Coral Atlas, and how to best apply this scientific tool, please see below.

- Learn more about how Planet Lab obtains the most comprehensive and up-to-date high-resolution satellite imagery here: **https://www.planet.com/company/approach/**
- You can learn more about the science and methods behind the Allen Coral Atlas, its maps, monitoring programme and scientific analysis tools here: **https://allencoralatlas.org/methods/**
- If you want to learn how to best interpret and use the Allen Coral Atlas maps, or just want to learn more about remote sensing and mapping for coral reef conservation, then please feel free to sign up to our three free online courses: **https://reefresilience.org/new-online-course-remote-sensing-mapping-for-coral-reef-conservation/**
- To see all the coral reef community members who have contributed data to help with our mapping efforts, you can visit the attribution page of the Allen Coral Atlas here: **https://allencoralatlas.org/attribution/**

The coral reef on Heron Island, the Great Barrier Reef, Australia. Photo by Dr Emma Kennedy.

Dr Chris Roelfsema and Professor Stuart Phinn examining a high-resolution satellite image of Heron Island whilst in the field. Photo by Dr Megan Saunders.



Field surveys being conducted in the Bahamas by Kathryn Markey. Photo by Dr Chris Roelfsema.

CORAL BLEACHING

FEATURE AND PHOTOGRAPHY **LORENZO MITTIGA**

Reef bleaching events now have a recurrence interval approximately every 6 years, while reef recovery rates are known to exceed every 10 years. This means that, on average, reefs will not have sufficient time to recover between bleaching events and so a steady downward spiral in reef health is to be expected over the next foreseeable decades.

OCEAN CONSERVATION FACTS

Reef bleaching events now have a recurrence interval approximately every six years, while reef recovery rates are known to exceed every ten years. This means that, on average, reefs will not have sufficient time to recover between bleaching events and so a steady downward spiral in reef health is to be expected over the next foreseeable decades.

SUSTAINABLE DEVELOPMENT GOALS ON THE UNEP 2019 WORLD REPORT

The oceans SDG target for 2020 was to sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts. This included strengthening their resilience and to take action in their restoration stage in order to achieve healthy and productive oceans. The results have yet to be released.

Mass coral bleaching events (some on a global scale) have been occurring more and more frequently over the past 30 years. A large number of coral reef areas in the United States and internationally have experienced severe bleaching, some during back-to-back events.

Heat stresses have started up again after the last global coral bleaching event in 2014 which has affected coral reefs in the Caribbean from late October 2020 and is predicted to last through to May 2021.

THE SITUATION IN THE CARIBBEAN

The Caribbean has remained hot since June last year, particularly the southern Caribbean where heat stresses were predicted to persist through to December presenting a worry for the health of coral reefs throughout the region. A bleaching alert has been raised of Level 2 conditions throughout the Leeward Antilles (ABC island), Trinidad, Tobago, and Belize.

ON BONAIRE

Bonaire's Marine Park is presently experiencing a mass coral bleaching event. The alert Level 2 raised in December, according to NOAA, has gone back to a 'Watch Alert', but the reef still remains deeply affected by the heatwave. The reef will eventually recover from the studies being made, but it will take time – provided that no other heatwaves will occur within the next year. That could be fatal for the reef.

Global climate change is one of the greatest threats to coral reefs today. Higher temperatures that result in heatwaves wreak havoc underwater. Warmer than normal temperatures stress the corals, most often resulting in coral bleaching. Unless the water cools down again soon, the end result of

this bleaching event is likely to be mass coral mortality.

STINAPA (the Bonaire Marine park institution) is monitoring the situation and will keep updating the information. During this fragile stage, divers are asked to be extremely careful and to practice perfect buoyancy during their dives over the reef.

WHAT IS CORAL BLEACHING?

When corals are stressed by changes in conditions such as temperature, light, or nutrients, they expel the symbiotic algae living in their tissues causing them to turn completely white.

A warming planet means a warming ocean, and a change in water temperature – as little as 2 degrees Fahrenheit – can cause coral to drive out algae. Corals may bleach for many other reasons, such as extremely low tides, pollution, or too much sunlight.

CAN CORALS SURVIVE BLEACHING?

If the stress-caused is not severe and doesn't last too long, corals have been known to recover. If the algae loss is prolonged and the stress continues, corals eventually die.

CORAL RESTORATION

As Bonaire's reef is experiencing wide-spread bleaching at the moment, the Reef Renewal Foundation Bonaire (RRFB) staff, who are conducting the Coral Restoration Project (story published in the Divers for the Environment's September 2020 issue), are closely monitoring the nurseries.

Fortunately, the staghorn and elkhorn corals in the nurseries are not showing any signs of stress, but a few of the boulder corals are. Some boulder coral genotypes are able to withstand the increase of water temperatures better than others, and some might be able to recover better than others. The collection of data is critical in order to conduct restoration efforts in the future.

Thankfully, the bleaching event has recently dropped down to a 'Watch Alert', and we are hopeful that the reefs and the boulder corals will make a full recovery over time. RRFB will keep you updated!

The hard corals found at deeper depths, between 17 m and 40 m are the ones who have been observed to be more stressed and affected by the temperature shifts. The shallower corals are more accustomed to withstand the wider ranges of water temperatures. The 'white' appears to be much more intense at depth.

WORLD'S LARGEST DIVE COMMUNITY

JOINS FORCES TO PROTECT THE GREAT BARRIER REEF

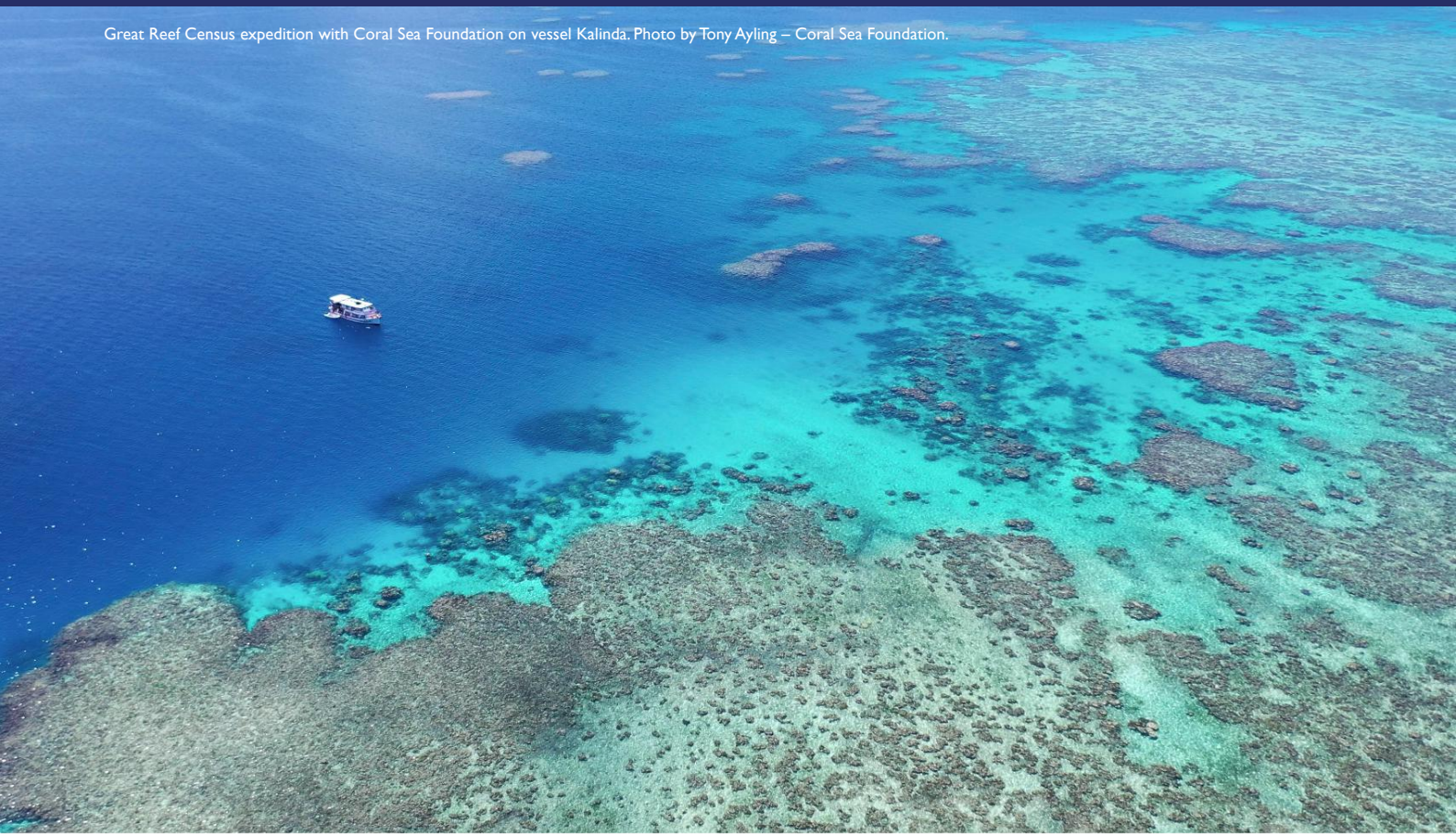
FEATURE **KATE O'CALLAGHAN – WWW.CITIZENSGBR.ORG**

The Great Reef Census provides opportunity for divers everywhere to impact the long-term health of one of the most iconic dive destinations on the planet through online image analysis.

Divers hold Great Reef Census banner during survey expedition on Spirit of Freedom. Photo by Harriet Spark.


REAT
REEF
CENSU
From Citizens of The Great Barrier

Great Reef Census expedition with Coral Sea Foundation on vessel Kalinda. Photo by Tony Ayling – Coral Sea Foundation.



L-R: Diver taking survey photos for the Great Reef Census at the Ribbon Reefs. Photo by Harriet Spark; Citizen scientists analyse an image on the Great Reef Census website; An incredible reef site seen during the Great Reef Census expedition on Spirit of Freedom. Photo by Harriet Spark.

PADI®, the world's leading scuba diver organisation, is teaming up with Citizens of the Great Barrier Reef on a first-of-its-kind citizen science project to help protect the earth's largest reef system. The Great Reef Census provides opportunity for divers everywhere to impact the long-term health of one of the most iconic dive destinations on the planet through online image analysis.

"As the impacts of climate change and other threats accelerate around the world, there is an urgent need to scale-up conservation efforts globally, which requires everyone to take part," says Andy Ridley, CEO of Citizens of the Great Barrier Reef. "The global dive community is in a unique position to support these efforts with the skills, passion and knowledge needed to support marine conservation efforts."

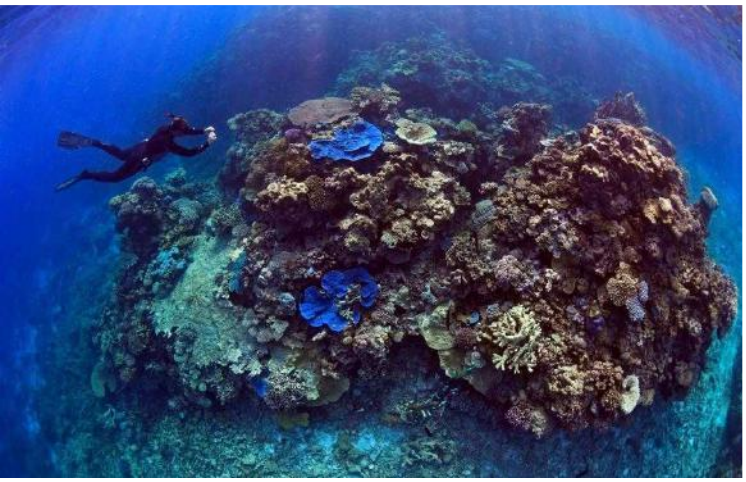
From October to December 2020, divers, dive boats, marine tourism operators and others in the reef community were mobilised to create a makeshift research flotilla. Their mission: to capture large-scale reconnaissance data and images from across Australia's Great Barrier Reef. Dive crew, scientists, tourists and conservation groups volunteered hundreds of hours and surveyed more than 160 reefs from the tip of Cape York to the remote southern Swains. Over 13,000 images were captured and uploaded to the Great Reef Census platform to be analysed.

"As PADI scuba divers and professionals, we are all ambassadors for our oceans," said Michelle Barry, a PADI Master Scuba Diver Trainer based on the Great Barrier Reef. "The Great Reef Census is a ground-breaking idea for ocean conservation that is inclusive of anyone with access to the internet. This allows people all around the world to visit the Reef virtually and to be part of an important project to protect it."

PADI and Citizens of the Great Barrier Reef are calling upon divers worldwide, and all who care about the future of the ocean, to help turn these images into meaningful data, helping scientists and managers better understand the health of the reef system. Each image can be analysed by anyone, anywhere, with internet access and a few minutes to spare.

"This is the future of conservation on the Great Barrier Reef. This is where anyone can show that they care," says Russell Hosp, PADI Master Scuba Diver Trainer, Environmental Manager and Master Reef Guide at Passions of Paradise, a PADI dive operator in Cairns, Australia.

Great Reef Census surveys taking place on Poseidon, Agincourt Reef 2. Photo by Brad Fisher – Ikatere Photography.



L-R: Citizens CEO Andy Ridley taking survey photos during expedition to the Swain Reefs on Adori II. Photo by Johnny Gaskell; Citizens CEO Andy Ridley at Moore Reef. Photo by Phil Warring.

"If people are really serious about saving the Great Barrier Reef, this is their chance to go to greatreefcensus.org, stick their hand up and say, 'Yes, I want to be part of the solution.'"

The Great Reef Census is the first to test the effectiveness of mass-scale engagement in a significant underwater research project. If proven successful, the model can be rolled out across the world, providing real-time status updates for the planet's treasured reefs. And, ultimately, serving as an influential tool to establish greater legal protections for coral reefs worldwide.

"Divers have long understood the value of citizen science and their unique ability to witness and report changes to underwater environments," says Kristin Valette-Wirth, Chief Brand and Membership Officer for PADI Worldwide. Programmes like Project AWARE's Dive Against Debris® continue to effectively provide data to influence policy changes for increased ocean protections.

"Many of us may not be able to travel to or dive the reef right now but, regardless of circumstance, we can contribute to its future – and ultimately the future of other reef systems around the world," continues Valette-Wirth.

From climate change to marine pollution and deforestation, the pressures on global ecosystems are accelerating rapidly. The Great Barrier Reef has experienced three mass coral bleaching events in the last five years, meaning traditional management and monitoring resources are becoming increasingly stretched.

"One of the greatest challenges to the Great Barrier Reef is that much of the world believes it's already gone. But the Reef is massive, the same size as Germany, so the reality is it's a patchwork system of incredibly healthy, degraded and recovering reefs," said Ridley.

Only five to 10 percent of the Great Barrier Reef is regularly surveyed, the Great Reef Census is designed to help fill critical gaps in our knowledge of how individual reefs are coping with stresses and has already returned valuable data.

GET INVOLVED

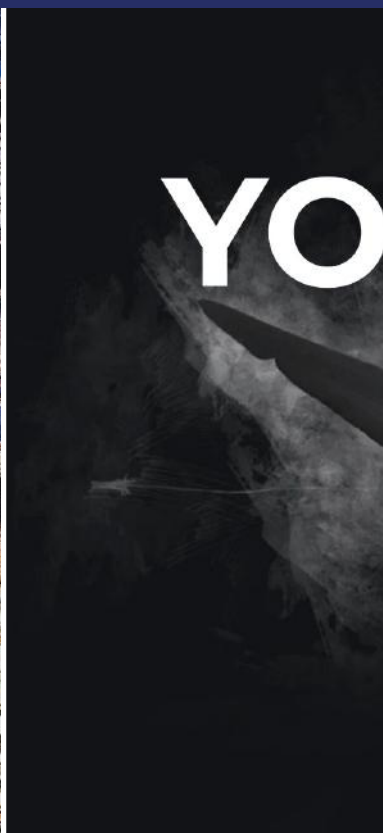
All are encouraged to get involved in the survey at **www.greatreefcensus.org**. To learn more about issues impacting ocean health and ways to be part of the solution, join the community of PADI Torchbearers™ uniting to save the ocean at **www.padi.com/onebillion**.

OVERFISHING: WHAT WILL WE BE LEFT WITH?

FEATURE **FERNANDO REIS – SHARKS EDUCATIONAL INSTITUTE**

According to the United Nations, 82% of the fish stocks in the world are overfished. This means that the industry is taking the fish out of the water faster than they can reproduce. And this means that marine biodiversity is being depleted.

Photo by Shawn Heinrichs



WILL IT BE WORTH DIVING IN THE FUTURE?

A few months ago, I attended a conference about ocean sustainability when I heard someone ask, *"What about subsidies to fishing methods? Aren't they known to have extremely high bycatch of key species for the marine balance, such as bottom trawls, long lines, gill nets, and such?"* Then I asked myself, are we really paying taxes to finance overfishing? Wow! It was in that moment that I realised that if we want to provide better protection and awareness to the importance of sharks within the marine balance, I need to research more about what is really going on with marine policies and fisheries.

Overfishing is defined as a situation in which for any given marine habitat, an area and its existing fish stock, the amount caught is greater than the capacity of the recovery level of those habitats. Basically, overfishing is taking more than it can give back. The only acceptable solution, is clearly a situation where less means more. If fish stocks keep on being reduced, smaller stocks can only correspond to smaller catches. On the contrary, if there's an effective reduction on fishing efforts, higher catches will occur.

Today we know better, when we neglect the state of the oceans, and when we do not take care of the natural habitats we come from which we will always depend on, situations like the current COVID-19 pandemic may occur more frequently. Please think about this. The ocean is large, and as the world responds to the current situation, all the negative pressures behind each horizon continuously affects the environment and the biodiversity. If it wasn't for the wide world web connections, the threats hanging over the oceans' balance would be ignored more than ever.

Let's pay a bit more attention to this, please. Why are we – the human species – so tied to the sea? As people, we have salt in our bodies. Our blood is salty. When we cry, our tears are salty, when we perspire, our sweat is salty. The level of salt we have in our bodies is more or less the same as the one of the oceans. We are connected to the oceans. So, when we neglect the state of the oceans, when we do not take good care of ocean sustainability, we are playing with fire.

We all know that without healthy oceans, we cannot survive. As Captain Paul Watson says, *"If the oceans die, we will die"*. Yes. We can't live without a healthy ocean. What threats are those that put our very own survival as a species at risk? There are so many human activities impacting the ocean balance, directly or indirectly, that one thinks it impossible to know which poses the biggest threat.

According to the World Trade Organization (WTO), there are several threats that have been weighing on life in the oceans for a couple of years. One of the most important, if not the main one, is overfishing.

WHY SHARKS?

Environmental organisations all over the world are now well aware of the importance and the crucial role sharks play in conserving the seas of our planet for the survival of life. What do the WTO policy makers know about sharks and fishery subsidies?

As we know, sharks are mainly caught for their fins, however their livers, cartilage and gills are also traded. Globally, commodity markets for sharks differ and although fins are generally supplied to Asian markets for consumption, meat is diverted along different trade routes to supply the main markets in Europe and South America. Furthermore, sharks and rays (their closest relatives), are particularly vulnerable to overexploitation due to their low fertility rate – relatively late age of reproduction maturity and slow growth rates.

What many policy makers do not know about sharks, is that due to them being top predators on the food web, they are essential to the balance of all marine biodiversity. We know when an ecosystem does not function properly, when it cannot properly breathe and, of course, when it cannot properly absorb carbon dioxide, we may have a serious problem. This is a small planet, even if we cannot see it all in one glance, everything is connected.

For the survival of many species of sharks and rays, we are living through the most critical period. From the international trade, fins are known to be the most valuable part of many sharks and some rays, and for this reason it is estimated that each year, between capture and international transactions, between USD 400 and 500 million are traded. Consumers of shark fins have different preferences for each particular species; Hammerhead sharks *Sphyrnidae spp.*, Oceanic Whitetip sharks *Carcharhinus longimanus*, and Blue sharks *Prionace glauca*, are preferred for shark fin soup, while Mako sharks *Isurus spp.* and Dogfish *Galeorhinus galeus* are preferred for their meat (Brown, 2020).

THE SAWFISH CASE

Due to overfishing and habitat limitations,

an iconic family of marine fish which were in critical danger is now considered to be facing a near-extinction situation: the Sawfish. They live primarily nearshore in heavily exploited tropical and subtropical regions, and they have low reproductive outputs, yielding some of the largest ova in the animal kingdom.

According to a recent paper from Helen Yan, Peter Kyne, Rima Jabado and others of the most recognised elasmobranch scientists (2021), published last month on Science Advances magazine, Sawfish fins are among the most valuable in the global shark fin trade. Also, *Sawfish rostra* are sold for curios and medicine, while rostral teeth are prized as spurs for cockfighting. In the absence of adequate fishing restrictions, intensely exploited populations collapsed rapidly in the early 21st century.

Today, sawfish remain among the world's most valuable internationally traded wildlife species, although most commercial international trade has been prohibited since 2007 under the Convention on International Trade in Endangered Species of Wild Fauna and Flora. The repeated losses of populations of these extraordinary species are likely to serve as stepping stones toward the first global extinction of a marine fish species.

The imperilled status of many populations was only recently recognised long after major declines and local extinctions had occurred. In this paper, scientists emphasise that Sawfish are highly vulnerable to population depletion: their tooth-studded rostra are easily entangled in nets, and their coastal habitat occupancy and geographic range drive local population growth rates below zero even more quickly. Retention bans and habitat protections are now urgently necessary to secure a future for sawfish and other similar species.

WHAT IS GOING ON IN EUROPE

The European Union (EU) countries collectively rank second in global shark catches, particularly Spain and Portugal (FAO, 2015), which were among the top countries that caught the most sharks globally between 2007 and 2011. Exports of shark fins from the EU are entirely destined for Asian markets, mainly for China and Hong Kong. Let it be known as an example from 2015, a Portuguese fishing vessel was apprehended in the port of Vigo, Spain, unloading 4.5 tons of fins from the Shortfin Mako *Isurus oxyrinchus*. The fishing captain was asked where they had caught the fins and he told the inspectors they had been fishing in New Zealand's waters. According to the EU Reg. N.o 605/2013 from 12 June, 2013, the landing of these fins was totally against EU legislation.

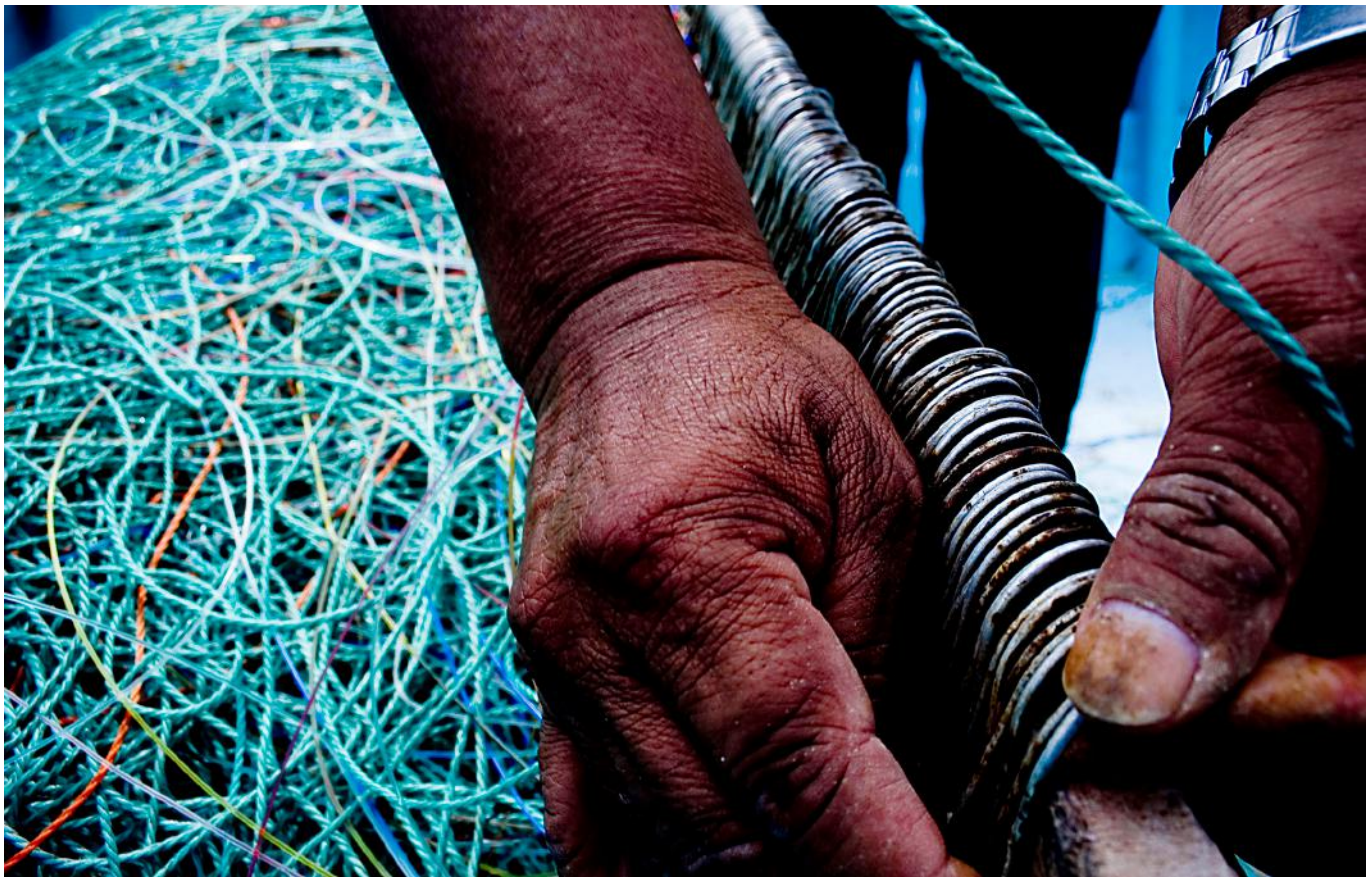
It is not surprising for this reason that in 2019 a group of EU citizens, of which your humble columnist is proudly a member, organised to ask the European Commission for a legislative change so that we do not lose more species of sharks and rays to extinction. The demand for shark and ray fins supplied by the EU represents a significant share of fin trade on the main Asian markets.

Will the European Citizens' Initiative, 'Stop Finning – Stop the Trade' be able to end the trade in fins in the EU, including import, export and transit fins that are not naturally attached to the animals' body? It is still very difficult to say, due to the current pandemic confinements we had to postdate all the events we had initially planned.

As you may know, finning is the practice of separating the fins from the body of the animal, normally developed by longline vessels, often with live animals where they are then thrown back into the sea to die a slow death so the fishermen can fill the tanks and bilges of the vessels with fins only. The goal of any shark fishing practice is to have a more valuable fin-only haul without the body.

A practice that is despite being prohibited in the UAE, as well as in the EU (European Union) waters, and in many other countries, finning is still widely practiced, mainly by tuna vessels that by definition would not target sharks. The longliner fisheries practice a non-selective fishing method that does not take into account the species, size or age of the shark. What matters here is the greed for the highest possible profits. Trawling is another practice – which sweeps away everything along the ocean floor – in which protecting shark and ray species from is an increasingly difficult mission to carry out. The legislation of norms and practices of marine environmental protection still settles today in a form that has become insufficient.

Many hopes today stem from the possible results of the implementation of Marine Protected Areas (MPAs). The problem is that despite the increase in the number of MPAs, biodiversity is being lost faster than ever. The current global policy of MPAs is failing to prevent the extinction of threatened marine species, particularly sharks and rays, mostly because some countries that classify areas as MPAs are not exclusively No-Take areas.



Longlinehooks in Equador. Photo by Maximilian Hirschfeld from the Coral Reef Image Bank.

The next decisions made by the governments of our planet on biodiversity and climate change must establish not only clear goals and objectives on how public bodies, companies and people can change towards a more socially, environmentally and economically sustainable future, but also on urgent measures of information and environmental education directed especially to the population that lives and depends directly on the exploitation of marine resources.

The current European Citizens' Initiative (ECI) 'Stop-finning – Stop the Trade' proposes an end to the trade in fins in the EU, including the import, export and transit of fins that are not naturally attached to the body of the animal. An ECI is a direct-democracy's tool of the EU that allows each European citizen to sign their support for this request. Over a year ago now, and as a result of the current pandemic, the European Commission renewed the period to collect one million signatures until the end of January 2022 in order to force a legislative change by the European Parliament.

We believe the finning ban is a rule that is not enough to protect critical species such as many of the sharks and rays in our oceans. The hope rests on the ban of the fins trade. I expect to return to this subject in the near future in order to give you an account of the status or the result of this citizens' initiative. Regarding our efforts, I simply invite all EU Citizens to sign their support to this legal proposal at **https://eci.ec.europa.eu/012/public/**.

ILLEGAL, UNREPORTED & UNREGULATED FISHING (IUU)

The indiscriminate overfishing of marine resources is one of the greatest threats to the balance of our social future and the common good. Why is the fight against the IUU fishing so difficult?

According to Juan Martín Cuevas (Wildlife Conservation Society of Argentina, 2020), it is calculated that the worldwide declared catch of sharks and rays should be, to get closer to reality, multiplied by a factor of 3 or 4. In fact, there is a very big difference between what is declared in the shark fin exports to Hong Kong, and what Hong Kong claims to import from each country. And the demand for shark fins by Asian markets is the main cause.

The IUU fisheries have a growing importance on this subject for the oceans agenda as it is declared by many fishery scientists, it is the Number ONE threat to the oceanic ecosystems around the world. In effect, it undermines the efforts to sustainably manage global fisheries and effectively conserve all ocean biodiversity.

In addition to the well-known pollution from plastics, the IUU is the major yet widely unknown economic and social disrupter, being detrimental to everyone who works in the legal fish trade, and is already emerging as a new market for organised crime. Sadly, today the depletion of fish stocks through IUU fishing threatens global food security, and the livelihoods of more than 40 million people working around the world in fisheries alone, in addition to millions more in partner industries.

As the indiscriminate overfishing of marine resources is one of the greatest threats to the balance of our social future and the common good, and the world really needs to stop the IUU and to promote the legislation for the prohibition of shark finning on the high seas worldwide; we also need to end the use and uncontrolled disposal of single-use plastics; and to stop using super chemical fertilisers whose surpluses are ultimately washed away by rainwater into coastal marine areas.

These are some of the essential and complementary steps to guarantee that we can start recovering towards the sustainable minimum levels of biodiversity that our planet needs.

THE FISHING SUBSIDIES

As I mentioned before, overfishing is defined by a situation in which a marine habitat, area and the existing fish stock is depleted, overfishing is characterised when the amount caught is greater than the capacity of the recovery level in those habitats. It does not help the oceans, it does not help marine biodiversity, it does not help fishermen. It very clearly, does not help anyone.

We already know we are in trouble, don't we? In fact, whether legal or illegal, what contributes the most to overfishing, are fishing subsidies.

According to the information available from the University of British Columbia (IISD, 2020), expert fisheries economists have concluded that subsidies paid with citizen taxes are often directed to finance fishing efforts such as the capacity of fleets, and this means with larger or more technologically equipped vessels, or to cover costs with fuel for further expeditions.

Incidents with large European fishing vessels fishing in the Southwest Atlantic, the Indian and the Southwest Pacific are not uncommon. As the fishing effort begins to exert its influence on a certain stock, in a certain fishing area, the yields per boat decrease, constituting a moderate exploration phase. It is then when the requests for fishing subsidies often begin.

With these supports, the fishing effort increases even more, and the biological limit for the recovery of the stock is quickly reached, which corresponds to the maximum production (that is, the maximum sustainable yield: MSY) and the subsequent abrupt decline in yields, which characterises the intense exploitation phase prior to overfishing (Correia, 2009). The fishing capacity is the amount of fish that a fleet can catch in a given period, being fully utilised. Over-endowment or overcapacity occurs when fishing capacities exceed the level required to catch sustainable amounts of fish. In other words, when a fishing fleet has the capacity to catch too much fish it can easily become over-loaded, and that is naturally very dangerous for everyone.

THE FAILED GOAL

This last January 2021 has marked the beginning of the United Nations Decade of Ocean Science for Sustainable Development. It will be a critical decade for the future of our planet, for our lives and, even more so, for our childrens' lives. On this occasion, the UN Secretary-General António Guterres stated that, *"Protecting and sustainably managing the ocean is essential – for food, livelihoods and mitigating climate disruption and related disasters"*. And he added, *"Restoring the ocean's ability to nurture humanity and regulate the climate is a defining challenge"*. As it is known, many scientists, world leaders, and personalities from different areas have been engaged to emphasise the value the oceans can have on our lives and how they can become the wellspring of solutions for a post-COVID era.

The proposed agreement on the elimination of fishing subsidies that contribute to overfishing or the allocation of fishing overcapacities, under discussion under the United Nations Sustainable Development Goal 14.6, was not been approved last year by the WTO member states as it had been expected. Specifically, the objective in question was that, by the end of 2020, the WTO member states would eliminate the financing of investments that can contribute to IUU fishing, as well as reduce the desire to introduce new subsidies to industrial fishing. This is, recognising that only differentiated, effective and appropriate treatments aimed at the least developed and developing countries, should be the target of negotiations on fisheries financing policies agreed by the WTO.

Such an agreement should be seen as an opportunity for nations to proactively transition towards sustainable and equitable fisheries that may even pave the way for other SDGs. According to Cisternos-Montemayor (2020), supporting fishermen does not require harmful subsidies. There are now proven reform options that highlight equity needs and reduce environmental damage to marine ecosystems. Subsidy reforms need clear objectives, managed with transparency and for their fair implementation. An agreement on SDG 14.6 can be a turning point for the oceans and for the well-being of those who depend on the oceans for their livelihoods and nutrition.

Responsible production of fishery products will require the broadest international cooperation not only in the WTO, but also between governments, civil society organisations, civil society and the general public. The truth is that the protection of marine biodiversity must be based on international cooperation policies that promote practices of control and surveillance of natural resources that ultimately belong to everyone.

In 2015, world leaders recognised the damage that financing of fishing activities could cause to fishing stocks as well as to the marine environment. Following this recognition, the United Nations has adopted one of the Sustainable Development Goals (SDG 14.6) to reach the end of 2020 in which the agreement of the WTO member calls for the end of overfishing subsidies.

Every year billions of dollars in government subsidies encourage more and more fishing. They pay for fuel for the ships, for new equipment, for all the factors that make the fishery more efficient. When a fishery becomes 100% efficient, it leaves behind no more than a desert. A dead ocean.

According to the United Nations, 82% of the fish stocks in the world are overfished. This means that the industry is taking the fish out of the water faster than they can reproduce. And this means that marine biodiversity is being depleted. Increasing fishery subsidies won't allow vessels to fish more, but they will navigate on a sea with less and less resources. What is actually needed in order to gain more marine resources is to fish less in order to give time and space to the recovery of many marine species that unfortunately, like so many shark species, are at the brink of extinction. Only with this strategy will it be possible to then catch more fish from the oceans of our limited planet.

Today, in March 2021, a month after the new WTO President Madam Ngozi Okonjo-Iweala took office, the world marine conservationists must keep the pressure up in order to make sure that the WTO continues to prioritise this critical issue in 2021 to reel in the deal at least this year. We are already late on the race for a sustainable future. We really don't have any more time to decide for a better future.

We need to make more and more sustainable commitments to our environment and to nature in general. Many of the people who live off the sea and its resources do not have the access to the information that others have. In parallel, with a regulation that is more oriented towards the sustainability of all marine biodiversity, and with greater vigilance towards its application, educational measures are needed to promote a blue economy and to guarantee the continuity of employment for the entire population that currently depends on the oceans.

Supporting and sharing what citizen groups are doing for the survival of sharks is an example of this. What we do not know is if we are going to win or lose, but at least one thing is for certain, we are doing our best. Reality indicates that it is necessary to advance jointly in the management of the fisheries and not only for sharks and rays, but for the entire marine biodiversity as it is an increasingly sensitive issue from a biological point of view. It is also very implicated on the economic and social sustainability of the people of the sea, which is what we all are in the end.

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MY BUDDY
THE UNDERWATER DIRECTOR

FEATURE **PATRICK VAN HOESERLANDE**

The collaboration between director and cameraman is a major challenge underwater.
The difficulty to communicate with the actors and the gaffers (light technicians) hampers coordination.
It does not always work out the way the director had intended.

I met Erik De Groef a few years ago. He is the coordinator and instructor of the underwater videography course I attended in preparation for an article on the topic. It struck me that he was very passionate on the subject in general, and of particular scenarios. He stressed that our video montages, however short, should tell a story and that a decent plot is the secret to a good film. When I wrote, 'underwater director' under 'My Buddy' brainstorming list, Erik was the first candidate to spring to mind.

In response to my invitation asking if he would be my buddy for this story, I received the not so surprising reply, 'With pleasure. We have to make a movie'. I only had a very basic idea to what I had in mind, so I was thrilled with his proposal. How better can one observe the work of an underwater director than to be a part of a film production? Erik, as it befits a good director, would take care of everything. Everything except the lead role, that would be my part. This was the part of the proposal I was less enthusiastic about. Besides a few small stage roles at school, I have no acting skills. However, in the context of gaining new journalism experience, I couldn't find an excuse to get out of it. I was going to be the subject of this dive video and get the practical knowledge needed to write about the topic of underwater video making.

On the day of our appointment, 'Put van Ekeren' was busier than usual. Not only were there many divers about, but there was now a complete film crew in the vicinity. I was a bit shocked by the size of the crew. I thought it was going to be a small get-together, but of course, you need a director, a cameraman, a script supervisor, support divers, and actors. If you add all these roles up, you quickly accumulate a team of ten people.

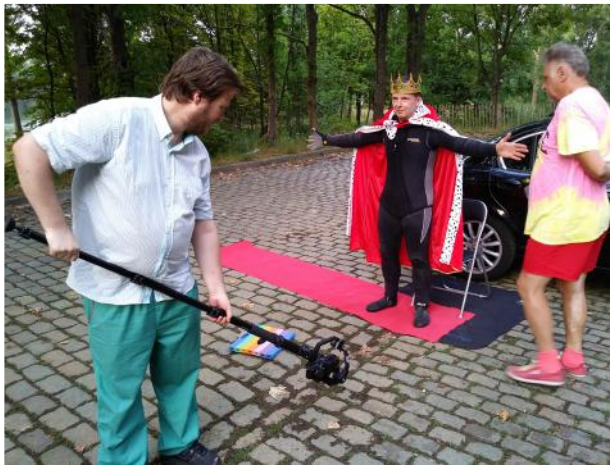
To be fair, this was the first time I had seen a film script. During my course with Erik we had talked about and seen a few examples of scripts with scenes, but we had never covered a complete scenario. Everything is written out scene by scene. The information for all the underwater parts were written down on dive slates to avoid us having to get out of the water to find out what to do for each next scene. As a whole it all looked very professional. This is serious business for Erik.

He wanted to take advantage of the remaining daylight to be able to finish all the above water scenes first. We would use powerful dive lights underwater, so the presence of daylight was less important. Fortunately, a film is not recorded in the order the clips are edited. The method of recording the shots in a different order to the timeline, and especially playing them that way, is a bit surprising for a newbie. This approach demands a high level of creativity from the actors as you must imagine the impact of the previous scenes without having yet played them.

Erik decidely increases the pressure on our little undertaking when he informs us that this is a low-budget film with only one day available to shoot it. He tells us that each scene can only be played once. Surprisingly, the first attempts worked wonderfully well. The fact that we did not have dialogue probably had something to do with this. We did not succeed in getting every scene in one take however, but we did manage to remain within budget.

After we had finished filming in our corner of the parking lot, we moved towards the pontoon, giving the public a show as a camera and film crew definitely stand out. My appearance as a king and the worries of my obliging lackey are not an everyday thing seen in Ekeren. With this said, we did benefit in getting the space required to film our project. Spectators and divers spontaneously moved to the side to get out of the picture. It did demand a little persuasion to get the bystanders on the pontoon to act as 'citizens' in our production. Not everyone was enthusiastic, but we did find some adventurous souls who were happy to play a part.

The director was satisfied with the footage we got on dry land and decided it was time for some wet action. The sunlight started to disappear. With my role as a diving king, I was already equipped in all my diving gear, but the rest of the film crew had to quickly change. As 'king', I had the time to go and greet my 'subjects' and explain to them the purpose of our performance of making a film for YouTube.



The preparation for the diving part proceeds as with any dive. Just because we chose to dive with a film crew of experienced divers is no reason to neglect the briefing and equipment checks. No, safety first. This is, however, no ordinary dive, so Erik gave us an adapted, comprehensive briefing with which scenes we would shoot and when, and where everyone should be positioned. The choreography between the different divers had to almost be perfect in order to get good shots. Each member needed to know where the other divers would be at any given time during the dive. The actors had to play their part, while the lights and camera circled the event as a whole. We agreed on a few adapted signals to synchronise this choreography.

The collaboration between director and cameraman is a major challenge underwater. The difficulty to communicate with the actors and the gaffers (light technicians) hampers coordination. It does not always work out the way the director had intended. Despite the preparation and the detailed, water-resistant slates, we were forced to coordinate the scenes a few times back up on the surface. The props and attributes did not always play along in our favour either. My special crown did not stay on my head, and my royal mantle (cape) would tend to float randomly through the water. I frequently had to move it away from my face. The many moving lights created a disorienting effect, so sticking together was much easier said than done. This of course meant that recording took much longer than planned, but all the scenes were needed to complete the movie. It was a few hours of hard work, but we got it all in the end and we had great fun doing it.

During the debriefing, I was told that two films would be made. Erik would edit 'De Koning Duikt' (The King Dives) and Ben van Asselt was to edit, 'the making of'. I thank Erik and everyone from his voluntary film crew for this unique and fun experience, and then made my way back to my car.

After I had left the parking lot, I realised how much more work was yet to be done. The biggest job was now with Erik and Ben to edit the available video material into a finished film. Hopefully, they had collected enough material to use because there were no possibilities to reshoot new ones.

After this educational acting performance, I decide that a successful career as an actor is not for me. Becoming a king is also not an option, and I'm better off with sticking to my current occupation. And of course, to write. With this in mind, I reviewed my list to see who my next buddy is to be. It promises to be a peaceful dive that you will soon read about in the next story in this series. Your suggestions for new buddies are always welcome.

EMAIL ME YOUR IDEAS TO:
patrick.vanhoeserlande@nelos.be.

ABOUT MY BUDDY

Diver: Erik De Groef
First Dive: 2004
First Video: 2010
Number of Dives: approx. 900
Dive Club: The Vilvodivers Club (VVDC), Belgium.
Certification:

- Assistant Instructor (**https://youtu.be/I6zS1Mug3x4**)
- Underwater Videograpny Instructor
- Specialisation in Underwater Biology
- EUL Cave 2
- EUL Tec 1
- EUL Gas Blender
- EUL DPV
- Lifeguard

Special Equipment:

- Sony A7S Mark II
- Sony FE 16-35 mm F/4.0 ZA OSS VARIO-TESSAR T wide-angle lens
- Sony FE 90 mm F/2.8 G MACRO OSS macro lens
- Seacam compact underwater housing with Hugyfloat arms.
- A dry suit with Santi heating system and heated gloves to get stable images.
- A Diver Propulsion Vehicle (DPV) – Suex Xjoy37 including camera attachment for long-distance diving.

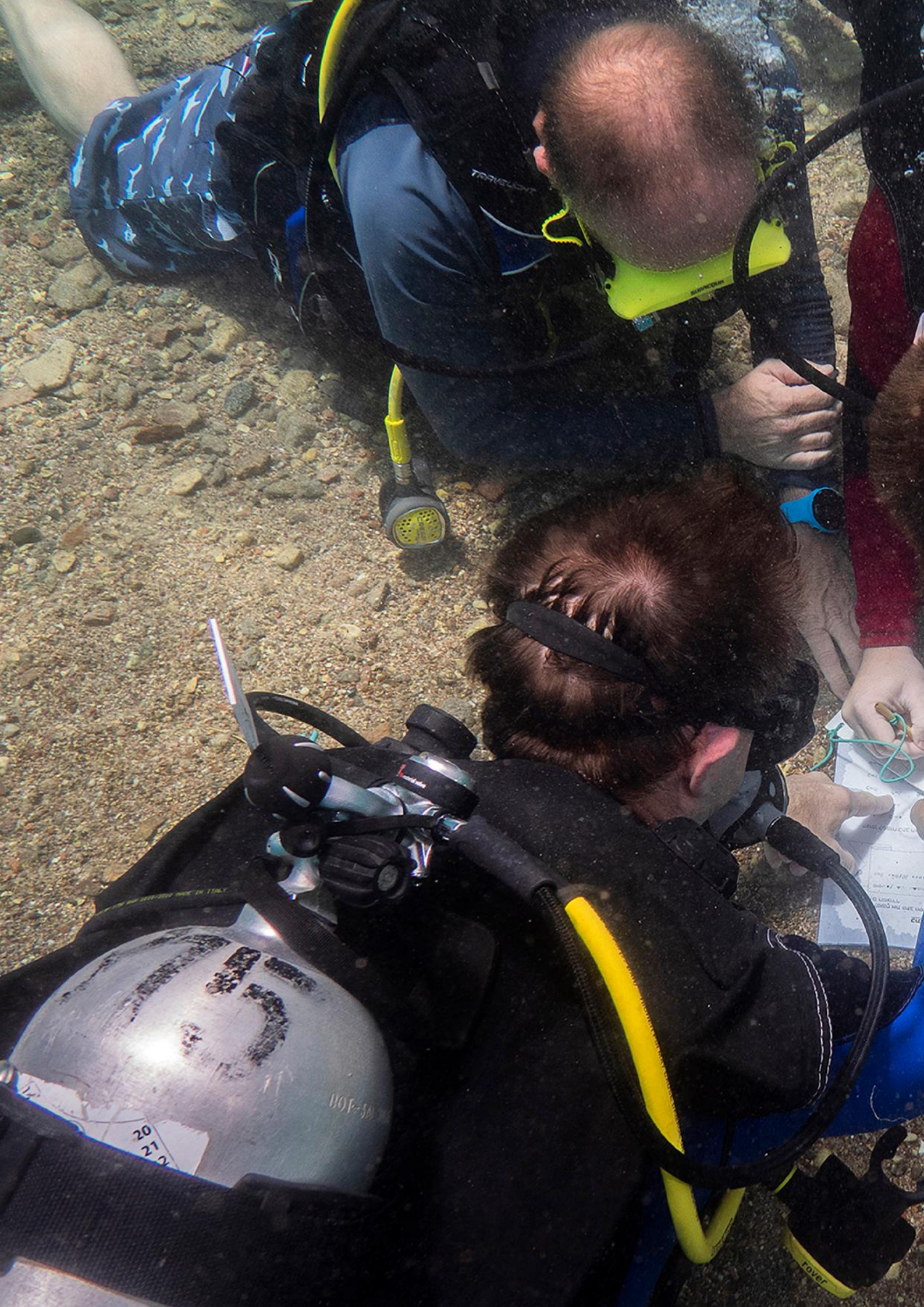
Favourite Local Dive Site: The Flooded Mine of Denée, Belgium (**https://youtu.be/Uah4KVfiLXk**).
Favourite Dive Abroad: Baron Gautch, Croatia (**https://youtu.be/wv-jPYiKOFI**).
Preferred Type of Dive: Cave diving (**https://youtu.be/1w62QCdeiUE**).
Most Spectacular Dive: Dos Pisos, Mexico (**https://youtu.be/tA48WnVjK2c**).

CHECK OUT THE RESULTS

You can take a look at the results from our filming day on YouTube (only available in Dutch):

De Koning Duikt by Erik De Groef
https://youtu.be/A_k8gyIHn4A

The Making of 'De Koning Duikt' by Ben van Asselt
https://youtu.be/oFhtump88fg



TROPHY OF THE DEEP

FEATURE **NINA SELBST**

The venue is in Eilat, Israel's southernmost town situated on a gulf stretching into the Red Sea, cheek by jowl with the Jordanian town of Akaba, blessed with a long stretch of beach and easily accessible coral reefs. The event takes place over a long weekend in May, a month of pleasantly warm temperatures, before the full heat of the summer kicks in.

This team is getting ready to assemble the pipes for the Underwater Construction challenge.

AN INTRODUCTION

March begins and will be nearing its end. The vernal equinox has passed. Daylight hours are growing longer, and warmer too. This is the time of the year when a call from Israel's Diving Federation is heard throughout the land, a call to register for the most exciting event of Israel's scuba diving calendar year. This is the Trophy of the Deep, a long weekend of challenges, of ingenuity and imagination, powers of analysis and rational thinking, teamwork and leadership, a weekend of camaraderie and strengthening community ties.

With the world facing their second year in the corona pandemic, we are still full of good cheer and optimism about the future. Things are starting to look up with the release of vaccines and we are starting to travel and venture again. We seize this moment to tell you our story and to take the opportunity of inviting our friends and colleagues in the international diving community to plan and join us in this flagship event taking place on the 3-5 June 2021.

THE ISRAEL DIVING FEDERATION

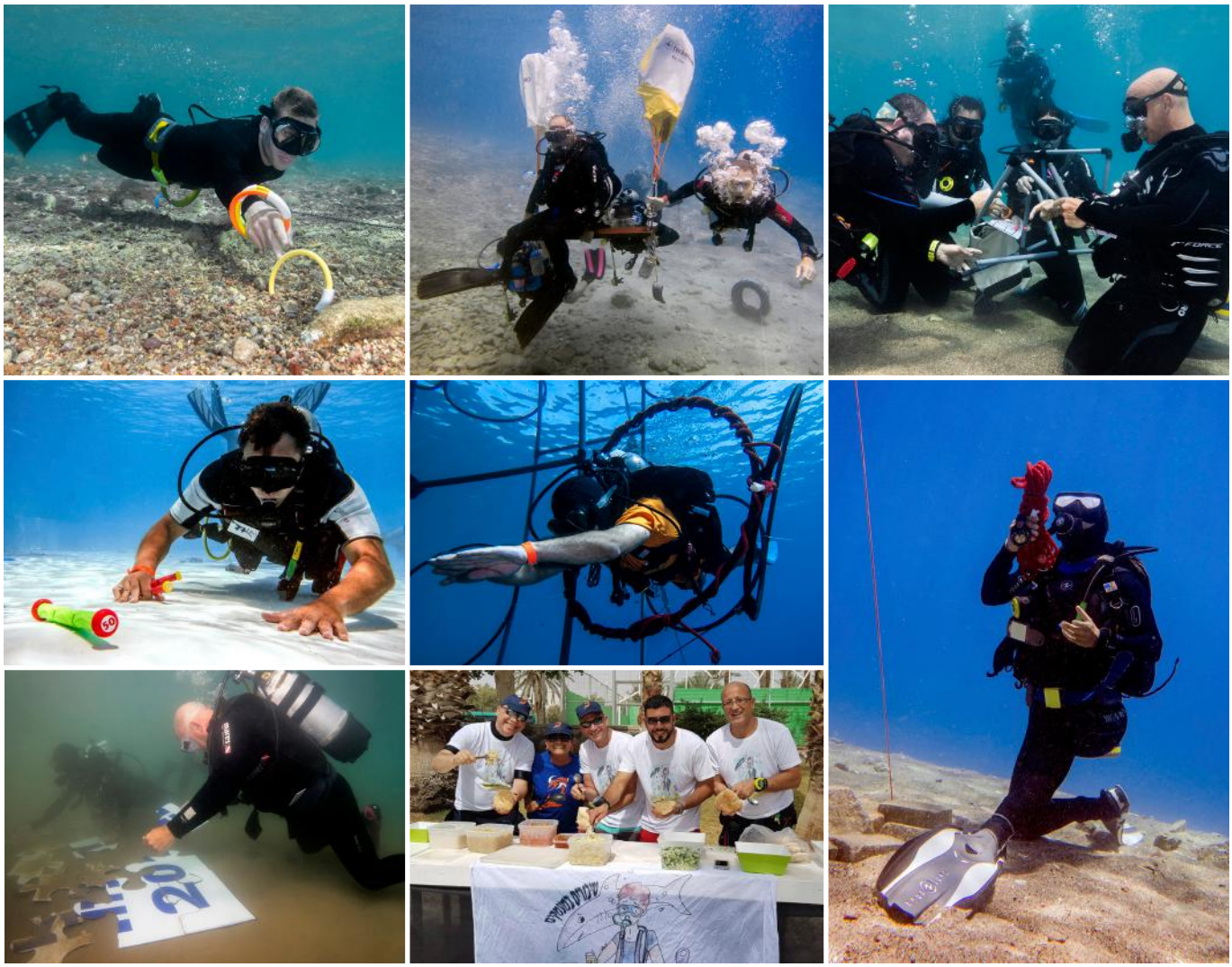
The Israel Diving Federation (TIDF) is a non-profit organisation that was founded more than half a century ago. From its first moment it aimed to encourage diving as a sport, to preserve existing diving sites and develop new ones, to spread interest in the aquatic underworld to all sections of the population and to make its wonders accessible to all and sundry.

Over the years it has given growing attention to expanding awareness of the vulnerability of this ecosystem and to developing activities to preserve and, where necessary, restore it. The Trophy of the Deep is the brainchild of leaders of the scuba diving community who have devoted much time and energy to realising the declared aims of their Federation. They have invested in the trophy, confident that people caught up at first by fun and camaraderie and of course the prospect of winning prizes and trophies, would find themselves drawn into volunteering for less obviously pleasurable activities, such as trawling the beaches and the ocean bed to free them of noxious plastic waste, and now also discarded face masks. They have been proved right. Over the last dozen years and more, enchanted weekends have contributed enormously to the coalescence of a scuba diving family whose members are bound together by their common concern for the ocean and all its marine life.

THE TROPHY & ITS CHALLENGES

The venue is in Eilat, Israel's southernmost town situated on a gulf stretching into the Red Sea, cheek by jowl with the Jordanian town of Akaba, blessed with a long stretch of beach and easily accessible coral reefs. The event takes place over a long weekend in May, a month of pleasantly warm temperatures, before the full heat of the summer kicks in.

The event itself is a competition, spread over three days. The participants work in teams of four, each with at least an open water diving qualification. The teams themselves, about twenty five in a typical year, are varied in their make-up. They come from all over the country. Some are drawn from single families – parents and children, or brothers and sisters. Some



L-R: Freediving beachcombers; lift her up but not too high; underwater construction; at home in the dark; hoola hooping; jigsaw puzzle; business acumen; a challenge participant.

represent diving clubs and some are formed by groups of friends or fellow workers. Some are unisex and some are mixed. One is drawn from a group of families whose ancestors have fished the Mediterranean Sea for several decades. Some participants are still in their teens, others, grandparents.

THE CHALLENGES

The teams face ten identical sets of challenges. These are designed to give all the participants opportunities to display their skills. Judges follow the proceedings with eagle eyes. Some of the challenges are scored for team effort, others for individual achievement. Penalty points for mistakes or failures to perform lie in wait for even the best endowed teams and lead to some quite surprising results.

FREEDIVING BEACHCOMBERS

This challenge involves a free dive to the sea floor to collect as many rings as possible, while avoiding those marked as penalty rings. Speed is of the essence as a lungful of air doesn't last very long.

LIFT HER UP BUT NOT TOO HIGH

The members of the team have to dive to a depth of five metres to find a bench on which one of the team members will be sat. The task is to move the bench and diver to a marked point further away at only three metres beneath the surface. Lift bags are available for help. Touching the sea bed or shooting up above the surface adds penalties, tipping the sitting diver off his perch brings total disaster.

UNDERWATER CONSTRUCTION

The team swims to a collection point to pick up a sack containing a number of plastic pipes and a page of instructions to join them together. The final construction must use all the pipes. Loss of parts that float out of reach adds penalties. Stirring up sand from the sea bed brings more.

RELAY RACE

This challenge takes place in a swimming pool, with a team member at each corner. The baton is passed from hand to hand as in any relay, but there are some surprises along the way, not to be revealed here.

AT HOME IN THE DARK

Each participant faces this challenge alone. Competitors are given a few moments to examine a map of objects laid out at the bottom of a swimming pool. They don blacked out masks and then have one minute to collect the point-scoring objects and avoid all others.

HOOLA HOOPING

Another individual challenge. Lines of hoola hoops of different diameters are stretched out at varying depths underwater. They have to be traversed in the right order. Speed is of the essence. Penalties await those who touch the hoops in passage or fail to control their buoyancy and shoot to the surface.

AN UNDERWATER DANCE

Teams are given one minute to perform an original underwater dance lasting just one minute. Rehearsing takes much longer than that. Points are accumulated for team work, choreography and costumes.

JIGSAW PUZZLE

There is no time to waste in this challenge. Team work is essential in putting a puzzle together underwater.

BUSINESS ACUMEN

This is the final challenge, the only one on dry land. Each team sets up a falafel stand along the beach and competes for customers from among the fans and spectators. The highest sales win the challenge.

ABOVE LEFT: An organiser runs through the rules and regulations of the challenges. **RIGHT:** Teams getting ready to start the competiton. **BELOW LEFT:** The crowd waiting for the results and prizes to be awarded to the winners. **RIGHT:** A much deserved evening of leisure with dinner on a cruise.

EVENINGS OF LEISURE

Competing in the challenges or giving support to those who do, rushing from one venue to another along paths not always easy to negotiate is really quite hard work. By the end of each day, everyone is ready for some relaxation. The organisers offer many choices for evening entertainment – a cruise with dinner and music, a bonfire in the desert, a diving quiz, a barbecue with dolphins for company. If that does not suffice, there are the pleasures of a wonderful Red Sea resort to be enjoyed, an ambience filled with sounds of music and dancing, tantalising odours from the town's many restaurants and the salty smell of the bracing sea air.

AWARDS FOR ALL

With all the challenges completed, the weekend reaches its highest point. The Mayor of the city, the heads of the Diving Federation, the hard-working organisers, the judges, the participants and their loyal fans, all gather for the Awards Ceremony. The results are awaited with bated breath. First comes the most prestigious award of all, the Trophy of the Deep, greeted by loud hurrahs and cheers which drown out any sighs of disappointment. Then come the presentations to the winners of coveted prizes – diving trips to Zanzibar and the Maldives, Divemaster courses, valuable diving equipment. Then the certificates are handed out, and on and on. As the ceremony winds to a close, no team is left empty handed without at least one prize to cheer them on their way home and to encourage them to participate again the following year.

TALE OF THE TROPHY

The following tale is drawn from the rich folklore of the fairly short life of the Trophy of the Deep and expresses its spirit well. Its roots are from a true story, but its passage has been altered from one storyteller to another. It has been embellished and gradually transmogrified into fable.

The Glazers of our story are a scuba diving family. Noa and Barak met on one of the early open water diving courses of the Diving Federation and have never looked back. They set up home in Michmoret, a village on the Mediterranean coast. High tides sometimes smashed at the perimeter of their wall. Marriage was followed by three sons arriving at close intervals. Each was presented with a snorkel, mask and fins almost as soon as they were buoyant in the water. Participation in the Trophy of the Deep began as soon as they could put together a team of four. When that rose to five, they drew lots to win a place in the team. Year after year they competed, always among the top teams but only rarely reaching first place in any of the challenges. This, as was obvious to others, was due to one very bad habit. They were always sharing their experience with others, always ready to give a helping hand or a word of advice to even their closest competitors.

As the years passed, the brothers came to feel that their family was incomplete. They longed for a little sister on whom to lavish their love, to cherish, protect and spoil, to be the mascot of their team. Finally, she did arrive and the boys named her Zissa, the sweet one. She filled their lives with joy and lived up to all their expectations, all that is, but one. She had no interest in the sea. Even when the whole family went down to the beach, she remained firmly anchored on dry land, absorbed in the books she always brought with her, hardly sparing a glance for the deep blue sea beyond the sparkling white sand or for the feathery cirrus clouds moving gently across the sky. The boys planned and schemed, and begged her to just put one toe in the water, but to no avail. On the edge of despair they plotted and planned and finally decided to give her a present for her twelfth birthday – a scuba diving course. She wanted to say, *"No thank you!"*, but as she thought of all the love that they had lavished on her over the years, the words stuck in her throat and instead she heard herself saying, *"What a wonderful idea."* There was no way out of it now.

Zissa shivered as she was helped into her wet suit for the first time. As her mask was fitted

The Shoshani family are Trophy veterans and have participated numerous times. Ilay, 12, pictured on the left, is the newcomer to the family team and her 2017 participation inspired our story. Ilay and her family won a diving trip to Zanzibar.

to her face, she closed her eyes tight and clung on to her instructor. After a couple of metres below the surface she finally dared to open them and she was confronted by the most beautiful scene she had ever seen in her life – a garden of multi-coloured corals and shoals of amazing fish. Her anxiety dissipated. Her fears were forgotten. She had to be pulled from the water when it was time to go home. She finished her diving course with flying colours only days before the closing date for registration for the Trophy competition. Her brothers insisted on including her in their team even though they knew it would cost them a lot of points and drive them down in the rankings.

The big day came and the competition opened. The first three challenges involved team work. On the first, the Glazer team effectively had only three members. Zissa contributed nothing as the others wrestled with sinking buoys while freediving. The second challenge was even worse. She did indeed contribute, but only penalty points as she kept sinking to the sea floor and kicking up clouds of sand. The third was a similar story. The boys cheered their mascot, but she was descending into a deep despond.

On the fourth challenge, collecting objects from the sea bed while wearing a blacked out mask, each diver was on his own. Seeing their sister so unhappy, the brothers gave little attention to studying the course and their results were inevitably poor. Zissa seemed to have lost all interest. When her turn came, she hardly looked at the course. She made her way along it at lightning speed. She dropped her trophy bag onto the table in front of the judges and looked for a route to escape into oblivion.

The judges, expecting the bag to be empty, were amazed to find it heavy and full. They tipped the contents onto the table, covering it with point-scoring stones and shells and even a tiny plastic dinosaur. There were no penalty stones marked with an angry red cross… In addition, the clock showed the fastest time ever recorded for the course. They couldn't believe their eyes. They checked the seabed and found the entire penalty bearing stones marked in red and not a point-scoring one anywhere to be found. Zissa had achieved a perfect score. It had never happened before. They wondered what chicanery had been used to deceive them. They demanded an explanation and she answered simply, *"I photographed the course."* A confused search began for the camera and minutes passed before they once again listened to her. *"Not with a camera. There is no camera. I just used my memory, my photographic memory!"* Gradually the confusion faded. Three young men lifted their mascot onto their shoulders and cheers began to spread through the crowd of spectators.

As order was restored, the competition moved forward. Zissa slipped gracefully through the line of hula hoops without touching a single one. Then she took charge of the jigsaw puzzle directing the placement of each piece with total confidence.

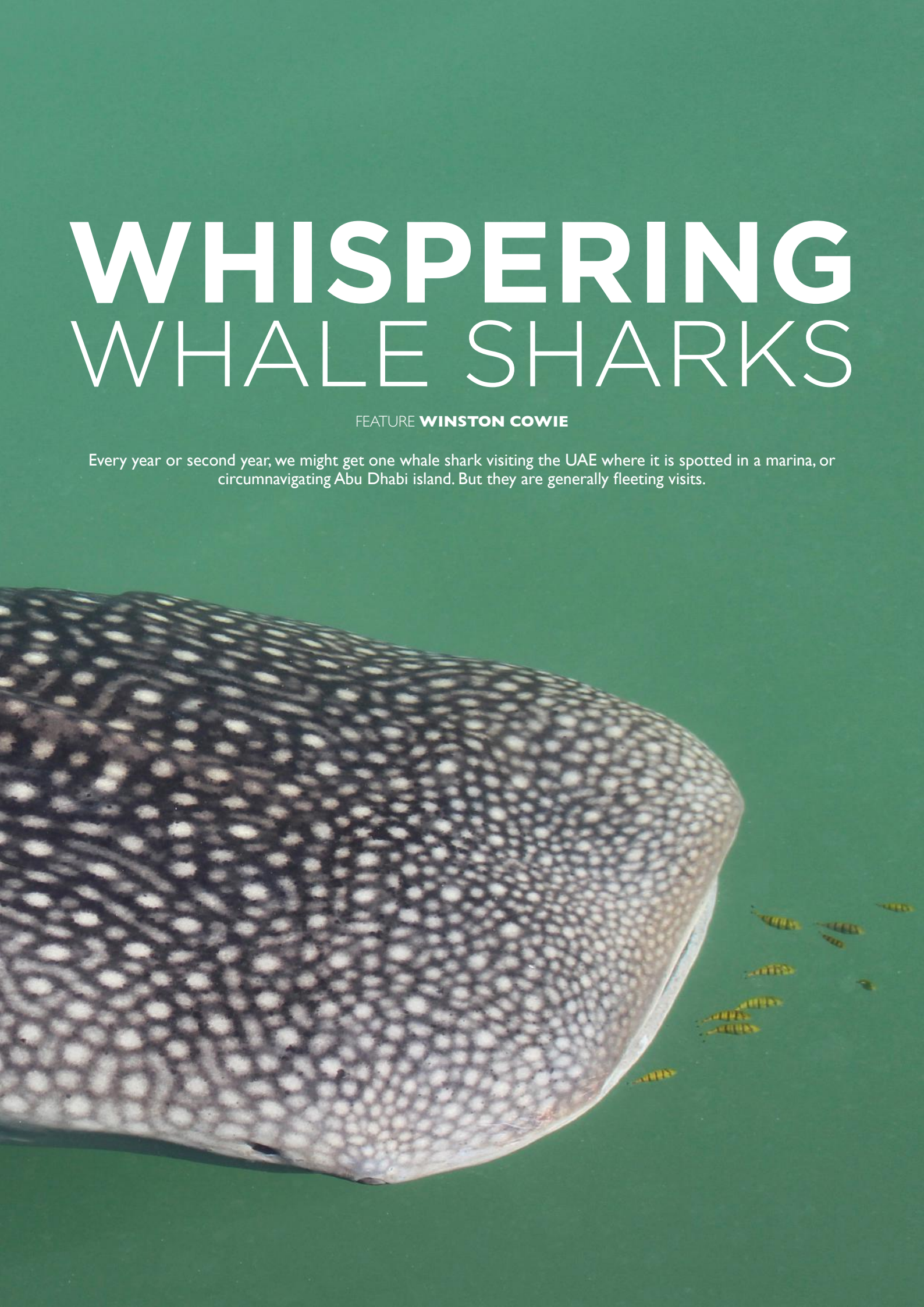
The last challenge was on dry land. All the teams set up falafel stands along the shore. The winners would be those who sold the most falafel. The result a foregone conclusion. Families and friends all forgot their loyalties and joined the long line to buy their falafel from a unique competitor.

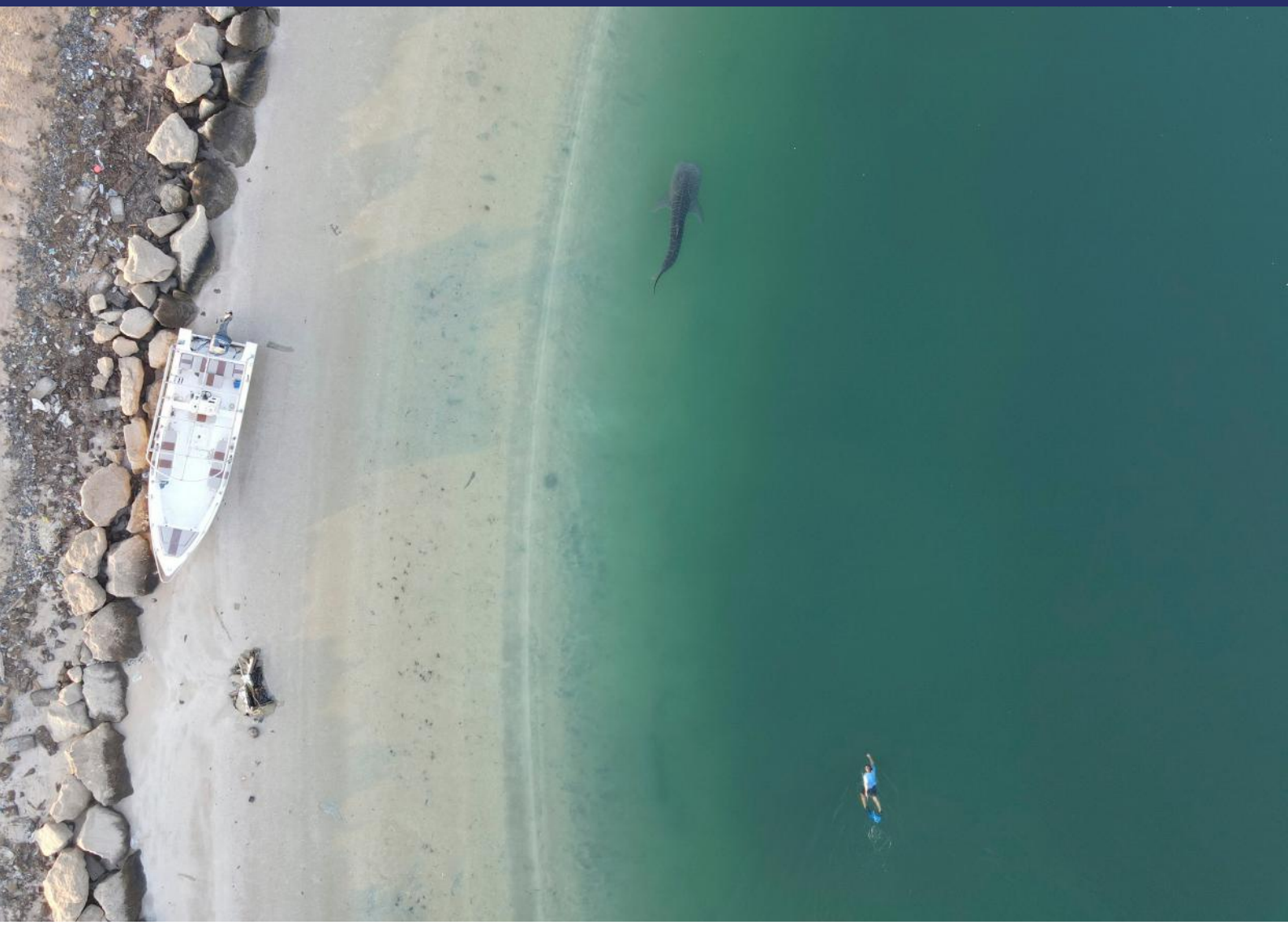
They danced and sang and crowned the slip of a girl, their new heroine, the Mermaid of the Deep.

WHISPERING WHALE SHARKS

FEATURE **WINSTON COWIE**

Every year or second year, we might get one whale shark visiting the UAE where it is spotted in a marina, or circumnavigating Abu Dhabi island. But they are generally fleeting visits.





ABOVE: Photo by Hind Al Ameri.

2020. What a year! The year the corona pandemic changed the world.

In Abu Dhabi, the majority of residents and citizens stayed home for the summer, unusual in normal times given it can be up to 50 degrees Celsius at times. People stayed indoors and kept to themselves, their families, their bubbles. Stayed safe.

And then the weather changed and people began to venture outdoors, wearing masks and keeping a social distance.

After such a long period with limited wider interaction, people were a little uncertain and had become cautious when interacting with others.

And then, in the Al Raha community of Abu Dhabi, something changed. Something wonderful happened. The community were visited by the biggest fish in the sea, a Whale Shark. Not one, but two.

Every year or second year, we might get one whale shark visiting the UAE where it is spotted in a marina, or circumnavigating Abu Dhabi island. But they are generally fleeting visits – they might be seen swimming past a boat, a promenade, or the corniche.

We are talking about one whale shark in the whole of Abu Dhabi Emirate, every year or second year. This is rare.

2020 was different. Twenty kilometres in from Abu Dhabi's Arabian Gulf facing beaches – the likes of the Corniche and Saadiyat, right on the inside of Abu Dhabi's archipelago, in the canal between Al Zeina and the iconic Aldar building, two whale sharks appeared. As if by magic.

The community flocked to the side of the canal to get a glimpse of these magnificent creatures with their characteristic brownish red and starry white spots.

Whale sharks (*Rhincodon typus*) are the largest shark, and indeed largest of any fish alive. They are endangered, and while there are no robust population estimates, a best guess is an estimated 7,000 left in the wild. They are long-lived and can live up to an age of 150 years and are the gentle giants filter feeding mostly on plankton. On average they grow to around a whopping 8-9 metres and they are recognisable by their unique spotting along their bodies.

And here in Abu Dhabi we had two! A juvenile male – 4 metres long and estimated to be around 10-15 years old, and a larger mature 6-7 m male. They both seemed to follow the same pattern, swimming in a gentle circular pattern, between two bridges – the bridges 200 m apart. They would swim close to the side of the canal, up one side, then when they reached the bridge, gently turn and head back down the other side until they reached the other bridge, and then again and again.

The larger whale shark disappeared after a few days. The juvenile 4 metre male stayed around.

It was a dream. Imagine, you spend your whole life dreaming of an encounter with this endangered species, the largest fish in the sea, something that 99.9% of the time you would need to travel for in order to be able to see one – within the region to the Musandam or Damaniyat Islands in Oman, yet here they were in Abu Dhabi's canal in the most unlikely of places.

Our team did regular checks on the whale shark,

LEFT: Photo by Maitha Al Hameli. **RIGHT:** Photo by Winston Cowie.

and the one thing we noticed from monitoring him, was that his eyes were always open.

I think that is one thing I have noticed in diving over the years – whether it be a seven-gilled shark in Fiordland, New Zealand; or green turtles and humpback dolphins off Butinah in Abu Dhabi – if you are relaxed and non-threatening – the sea creatures are just as interested and curious about you, as you are them. Sometimes they instigate the interaction, as it appeared in this case.

At times the young whale shark would disappear for a few days and no one would know where he was. On one occasion he had inadvertently picked up fishing gear – a couple of hooks and a sinker that had become tangled on his fin. This was likely from someone who had left a line fishing during the day in the hope of catching a fish. Seeing it, our team responded – we jumped in, free-dove down underneath him, checked the mouth – no hook – and then we saw it stuck in his pectoral fin. We pulled it out and untangled the other hooks and sinker from his fin before returning to the surface.

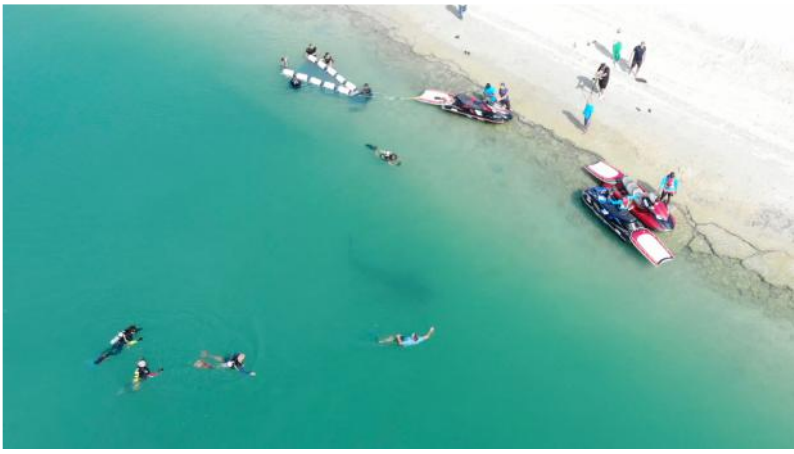
There were big smiles all around. And pretend social distance air high fives.

Another time, after he disappeared for a week, he came back with another fishing hook and plastic bag on his tail. We got on his trail – it was dusk and we felt that he was heading on his normal route back towards the Aldar Building. So we started walking the 5 km journey along the side of the canal. Every once and a while, we would ask someone if they had seen the whale shark, and they would reply, yes – 10 minutes before, yes five minutes before. And on it went. By this time it was nearly dark and we had covered 4.5 km. We saw that swish of his tail up ahead in the distance. The water was calm. We ran towards him and looked down. Indeed there was a plastic bag on his tail and a fish hook he had inadvertently got tangled on. We ran ahead of the whale shark and down the ladder where we waited for him to pass. In the growing gloom he swam passed and as he did, we gently grabbed onto his tail and pulled loose the hook and plastic bag. It came free easily enough, and off our whale shark kept swimming.

After seven weeks, the whale shark began to spend most of his time around the Aldar HQ building. When freediving with him and reviewing the footage afterwards, we noticed that he had lost some weight. Through our Memorandum Of Understanding on environmental cooperation and wildlife conservation with the National Aquarium – Abu Dhabi, and after consulting experts around the world who concurred that he was indeed skinny, our teams decided to feed him some krill to strengthen him up before we attempted to move him back to sea.

Our whale shark was hungry. Seeing is believing. He gobbled down the balls of krill we were feeding him in front of Aldar HQ. What a marvelous experience for the community – a 4 m whale shark being fed and eating krill right in front of you. It was beautiful, and by this stage he had a team of juvenile golden trevallies who were keeping him company. Quite the sight. A whale shark, krill, golden trevallies, right there. Staring down his three foot wide mouth.

We fed him for about a week before we moved him. This was with a team of divers from the National Aquarium – Abu Dhabi and the Environment Agency – Abu Dhabi and with vessel support provided by Abu Dhabi Marine.



ABOVE: Photo by The National Aquarium, Abu Dhabi. **BELOW LEFT:** Photo by Winston Cowie. **BELOW RIGHT:** Photo by The National Aquarium, Abu Dhabi.

We moved him about one kilometre towards Samaliyah Island before he dove down into the deep. We felt good. We hadn't touched him and he had swum off on his own steam.

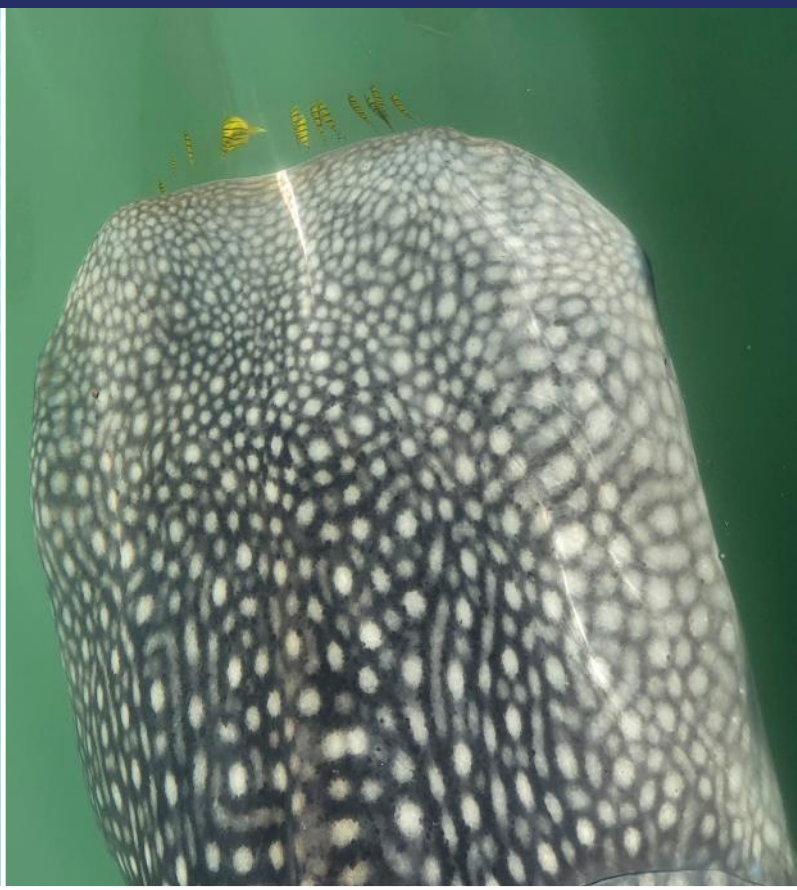
There were sightings of a whale shark near the Corniche in the week that followed, in the Yas Island Channel, and then at Al Bahia Channel. Our EAD whale shark team went to investigate and found him in Al Bahia Canal, mid morning, 15 kilometres away. That afternoon as we headed to to Al Bahia to investigate further, we received a call from a member of the public saying that our whale shark was back at Al Raha. We were amazed. That was the fastest 15 kilometres ever swum, let alone by a whale shark. We checked on the shark at Al Raha – it was indeed our young male. Back after a week away.

There were some niggling doubts though. The next morning we headed to Al Bahia, just to be sure. We saw a whale shark right up the end of the canal and in the early morning, pre-dawn, we slipped into the water. We got a big starry surprise. It was a different whale shark – a huge one – 6-7 metres long! In comparison to our other one, he was big and thick and had a massive block of a head on him. There was also a distinctive scar on his head. He looked strong and in good condition. It was the same adult whale shark we had seen 7 weeks earlier.

The Al Bahia Canal is a natural trap – it has a very narrow entrance that the water streams into at high tide and at low tide the entrance is very shallow. The whale shark was stuck in the canal. Once again with our colleagues from the National Aquarium and Abu Dhabi Marine, using a similar technique to the first Al Raha rescue, at high tide we manoeuvred him out of the canal. When our Al Bahia whale shark resisted, because of the current, we gently encouraged him on his way, and again, there was a feeling of elation to see him swim off out of the canal and into a larger canal that led out to sea. Rescue, round 2.

Back to the Aldar building. We recommenced feeding our younger whale shark, then planned to take him from where he was, on a stretcher, all the way out the 20 kilometre journey to the Arabian Gulf facing coast of Abu Dhabi. We fed him daily at 10:00 am every morning for four days, and planned to move him on the fifth day. The team turned up ready. He wasn't anywhere to be seen.

And then at 11:30 am, we were notified he had shown up at the Aldar Building. The triumvirate of organisations assembled – now all well acquainted with each other – the Environment Agency – Abu Dhabi, the National Aquarium – Abu Dhabi Team, and Abu Dhabi Marine. We placed the stretcher that Abu Dhabi Marine had prepared in the water and after



ABOVE LEFT: Photo by Hassan Al Hosani. **ABOVE RIGHT:** Photo by Winston Cowie. **BELOW LEFT:** Photo by The National Aquarium, Abu Dhabi. **BELOW RIGHT:** Photo by Winston Cowie.

persuading him with krill, closed the stretcher and towed him out to sea. The whale shark had a ready supply of oxygen on his stretcher and every few minutes we had divers check he was ok. What an amazing experience and really good team building between this wonderful team, now working together on their third whale shark rescue. By dusk we had moved him all the way out, past Sheikh Khalifa Bridge connecting Abu Dhabi and Saadiyat Islands, and out past the Louvre. The 20 kilometre journey had taken six hours. Out of sunlight, in the growing dark with no one watching, we released the whale shark and hooted at seeing him swim off into the deep. Success! We had successfully rescued two whale sharks. Or so we thought!

The next morning, Al Bahia reported that our big male was back in the canal. Imagine. Again! We headed there for a look. He seemed happy enough. For the next few mornings we met at Al Bahia and checked on the big fellow. He seemed in really good condition, but it was clear, he wasn't able to swim out of the canal because of the strong current and shallow depth at low tide.

Using the same technique as the younger whale shark, the larger shark swam onto our stretcher. He fitted perfectly. We then towed him another 20 kilometres out into the Arabian Gulf. We had plenty of sunlight this time so we took him as far as we could go. When we released him, he was swimming so fast we couldn't keep up with him.

We had put a satellite tag on him too. Where would he go?

It was a funny feeling for all of us – the community – our team. The most incredible seven week whale shark journey was over. Or so we thought.

We received a phone call that a whale shark was back at Al Raha.

We went to investigate – the whale shark could have been anywhere in the world at that point, yet there he was – back where we began in the exact place we first saw him. Maybe he was saying good bye. As for our Al Bahia whale shark, our satellite tag tells us he is back out where he is meant to be. Right out in the middle of the Arabian Gulf.

I feel that in a way we have learnt from these whale sharks. They have taught us to value nature; to value community; and about the threats abandoned fishing gear and plastics have on our oceans.

What an adventure. Whispering with whale sharks. In Abu Dhabi. Will they come back next year? I did hear a whisper that it would be nice if they did.

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DIGITAL ONLINE AWARDS NIGHT & EXHIBITION OPENING: Wednesday, 19th May 2021 | SUBJECT TO COVID-19

Enter your images into our photography and film categories found at the bottome of the opposite page to get the chance to win an array of fantastic prizes from our sponsors.

DIGITAL ONLINE'S MAIN OBJECTIVES ARE:

- To develop the human interaction with the underwater environment and highlight the beauty of its flora and fauna.
- To gather information on the number of underwater photographers in the UAE.
- To discover new promising underwater photographers.

Digital Online is open to all photographers and videographers of all skill levels with a valid EDA Membership status. EDA membership must be renewed if expired or acquired in order to take part.

DIGITAL ONLINE 2009-2021

Digital Online is about to celebrate its 12th Anniversary! The competition was introduced by EDA in 2009 to resident photographers to develop a relationship and human interaction amongst those unfamiliar with the underwater world environment. The competition holds both local and international marine life categories to offer variety between our local and international diving enthusiasts. The film category was introduced as an extension to the competition in 2012 to share our underwater world through motion pictures and deliver a better understanding of the habitats and surroundings.

The event, now going into its 12th year, sees the continuous and steady growth of new underwater photographers taking part and joining our regular yearly participants. The enthusiasm and passion strives on, and the drive to bring our underwater world's conservation to the forefront increases over time. The purpose of Digital Online is to keep our underwater world visible by displaying its hidden beauties and to exemplify its importance to all life on Earth through the powers of its ecosystems.

The event has attained equal success with the non-divers who come to support the participating photographers and videographers at the Awards and Exhibition Opening Night. Whether it's through discussion or articles brought to our readers through our free quarterly magazine – Divers for the Environment – the inspiration the event brings, is a success in its own right.

DIGITAL ONLINE
جمعية الإمارات للغوص
EMIRATES DIVING ASSOCIATION
PHOTOGRAPHY AND FILM COMPETITION

COMPETITION CLAUSE

EDA does not disclose photographers' names during the judging process. The competition is run fairly and without prejudice, professionally adhering to all of Digital Online's rules and guidelines throughout.

THE DIGITAL ONLINE RULES AND GUIDELINES 2021

RULES AND GUIDELINES

- Digital Online is open to all photographers and videographers of all skill levels with a valid EDA membership status. EDA membership must be acquired or renewed if expired in order to take part which can be done through the EDA website.
- Each competitor can only win one prize or prize package.
- Winners will choose their own prize.
- Participants are obligated to follow environmental conservation regulations and to respect the underwater world during the process of taking their stills and video. Be advised that any damage to the underwater world, including the disruption of the natural habitat of the marine life, provocation through touching, displacing, feeding or annoying, is prohibited and will disqualify the images or the photographer/videographer.
- By entering the competition, entrants declare that they own copyright of the submitted photographs and films and it entails an automatic acceptance of all the rules. EDA reserves the right to publish images in the 'Divers for the Environment' magazine, EDA's social media pages and on the EDA website. Images will also be used in any future promotional material for EDA events and competitions royalty free, but copyright remains with the photographer. Use of images or video will require no additional written or verbal permission from the photographer or videographer.
- Images (photos or videos) must not have already been submitted to previous Digital Online competitions.
- Photos and videos must be taken underwater unless specified in a category description.
- Manipulation is restricted to colour correction, brightness, contrast, sharpening and cropping, except for the Creative Photography category. The Digital Online judges reserve the right to examine untouched images in the other categories if requested.
- Removing backscatter is allowed to an extent, this does not include the removal of subjects such as fish or divers or cutting and pasting sections of images from one to another, except for the Creative Photography category.
- The winners will be announced and their work displayed at the exhibition and award ceremony in May 2021 (TBC). Participants who do not make it to the evening of the event will be asked to collect their prize from the EDA offices.
- Sponsors and prizes will be announced in the March 2021 magazine issue.
- We pledge to run this photography and video competition ethically and with integrity. Our judges have volunteered their time to help. The photographers' details remain hidden to the judges during the judging process.
- All judges' decisions are final.

REGISTRATION AND UPLOADING ENTRIES

- Submissions can be entered from Sunday, 21st March 2021.
- The entry deadline is Sunday, 18th April 2021, at 11:59 pm (GST – Gulf Standard Time).
- The participant must be a valid EDA member. Submit entries via email to **photo@emiratesdiving.com** with the requested category detail information.
- File names should include photographer's/videographer's name and the category:
  – Name - Best of Home.jpg
  – Name - Creative Photography.jpg
  – Name - An Ocean Breath.mp4
- Photo entries must be saved in jpeg format and should be sized between 2000 and 6000 pixels in the longest dimension. Please limit your images to a maximum file size of 5MB. Images will be viewed on a monitor and should be in the Adobe RGB 1998 or sRGB colour space.
- Video submissions must be in mp4 format.
- The preferred method for photo and video entry is electronically, however, if this method is not possible due to slow internet connection, you are able to submit via memory stick. Please note, media will not be returned.
- You will receive an email to confirm your registration and photo/video upload. If you do not receive one within 24 hours, your email may not have come through and you may need to try again.

Good luck to everyone taking part in Digital Online 2021. Dive safely and have fun!

*NOTE: HOW PRIZES ARE AWARDED

Once the judging is complete, the winners will be able to choose a prize available to them on the list they will receive via email. Digital Online Judges award a 3-way point system to each photograph/video consisting of Technique, Composition and Impact which is added to give the photograph's or video's total grand score.

Best of show with the highest points will get first choice. 1st place winners by highest score will choose a prize before all other winners, 2nd place winners before 3rd place winners, etc. Please note, each individual can only win one prize or prize package.

PHOTOGRAPHY CATEGORIES

Photographers may enter one image per photography category. The categories are open to photos taken with any type of camera: DSLR, mirrorless or compact.

DETAILS TO INCLUDE WITH EACH PHOTO SUBMISSION:

- Photographer Name
- Category
- Location
- Story Behind the Shot
- Camera & Gear
- Settings

1. **BEST OF HOME**
   Definition: Any underwater marine subject taken close to home, wherever that may be.

2. **CREATIVE UNDERWATER PHOTOGRAPHY**
   Definition: This field is wide open. It can involve a simple workflow used to capture a unique look of a photo. Or it can be a complex post-processing technique that is used to bring out the mood and textures in an image. Photos entered into this category can be taken in any underwater environment – including controlled environments (e.g., pools, tanks). The main subject can be anything ranging from an abstract concept to a person (a diver, freediver, model, etc.) to a fish. There are no post-processing (photoshop) limits in this category. This category is designed to let your imagination run free.

VIDEO CATEGORY

Videographers may enter one film with the following title:

3. **MY OCEAN**
   Definition: Looking for films of all genres – documentaries, narratives, shorts and animation films. Film subject must focus on all aspects of our underwater world including but not limited to, ocean exploration, wildlife, environmental, conservation and oceanography.
- All film genres will be accepted.
- Content must focus or relate to the ocean.
- Non-English films must have subtitles.
- If music is used, it must be from a public domain or royalty-free.
- Film length of 5 minutes max or less, including credits.
- Winning films will be chosen on the basis of creativity and the ability to tell a story that leaves the audience better informed and/or moved about the ocean.

THE SPONSORS AND PRIZES

Digital Online's 2021 Prize Sponsors will be offering this year's 9 winners the following prizes to choose from:
NOTE: Participants are only able to win one prize each. Entrants with multiple winning entries will be given priority in the points awarded.

1. AL MAHARA DIVING CENTER | www.divemahara.com
   & LE ROYAL MERIDIEN ABU DHABI | www.bit.ly/2ZuSmD0
   2 tank dive at one of Abu Dhabi's coral reef, wreck or artificial reef dives and complimentary one-night stay in Standard Room with breakfast for two persons. **Valid from the 18th May to 31st December 2021.**

2. XR HUB DIVE CENTER | www.puretech.me
   Paralenz® Dive Camera+
   - **Waterproof:** 250m
   - **Video Resolution:** 4k-30 FPS / 2.7k-60 FPS / 1080p-100 FPS / 720p-200 FPS
   - **Weight:** 155g (5.5oz)
   - **Dimensions:** 116 x 35 x 38 mm (4.5 x 1.4 x 1.5")
   - **Port:** USB-C (for fast charging)
   - **Storage:** 64 GB or 128 GB Micro SD-card (Class: U3 or V30) – not included
   - **Mounts: Mask & universal mount included**

3. STEVE WOODS | www.stevewoodsphotography.com
   Choose an Original Steve Woods Print from:
   www.stevewoodsphotography.com/prints
   All prints are 13" x 19" including a signed border. All prints are sent carefully wrapped in recycled paper and placed in a recycled shipping tube for delivery.

4. DIVERS DOWN | www.diversdownuae.com
   6 Dives Package to dive the East Coast's dive sites, includes tank and weights.

5. SCUBA SHADE | www.scubashade.com
   4 Dives Package to explore Dubai dive sites, includes equipment, tank and weights.

6. SANDY BEACH DIVE CENTRE | www.divesandybeach.com
   Double tank dive trip with or without equipment, including tanks and weights.

7. AL BOOM DIVING | www.alboomdiving.com
   2 dives on East Coast (Fujairah) with full equipment for 1 person.

8. EDA (2 Prizes) | www.emiratesdiving.com
   A copy of the beautiful hardcover photography book: The Best of Digital Online – EDA's Underwater Photography & Film Competition and your choice of 2 of EDA's new Shark and Turtle T-shirt designs.

A LOOK BACK AT DIGITAL ONLINE'S AWARDS LAST YEAR:

COVID-19 taught us how to turn a bad situation around and turn it into something good. As we were not able to host our annual Digital Online Awards and Exhibition Opening Night 2020, we awarded our Digital Online Winners their prizes along with our 2020 prize sponsors over Zoom webinars last year. Here are some of our happy winners.

THE DIGITAL ONLINE JUDGES

STEVE WOODS
Adventure and Wildlife Photographer

Steve is a British adventure and wildlife photographer, based in Vancouver, Canada. His aim is to photograph the natural world to show people how beautiful and awe-inspiring it is as well as trying to highlight the danger we are inflicting on the very ecosystems we revere so much, by photographing and documenting the issues at hand. Steve has worked for many years as a photographer in the UK and abroad, firstly as a newspaper and sport photographer, then moving into commercial, advertising and wildlife/adventure photography. With his passion for the natural world, he uses his skills as a photographer to work in marine conservation.

WEBSITE: www.stevewoodsunderwater.com
FACEBOOK: @SteveWoodsPhotographer
INSTAGRAM: @steve_woods_photography

DAVID DILEY | SCARLET VIEW MEDIA
Filmmaker, Underwater Cinematographer and Digital Colourist

David is a multi-award winning Film-maker, Underwater Cinematographer and Digital Colourist from the UK best known for his work with sharks and large marine megafauna as well as his multi-award winning feature documentary, "Of Shark and Man".

His profile has increased rapidly thanks to his work on a wide variety of projects for film and television, alongside his commercial work for a number of household brands.

David is the owner of Scarlet View Media, a high end boutique Production House in the north of England, and is a Panasonic Professional Ambassador and Angelbird Media Creative.

WEBSITE: www.scarletviewmedia.com
FACEBOOK: @daviddileyfilmmaker

IMRAN AHMAD BIN RAYAT AHMAD | ESCAPEINC
Internationally Published Underwater Photographer

Imran is a photographer and media lecturer based in Singapore with an extensive portfolio. He is highly committed to the education of future generations and in so doing gives presentations and runs workshops on conservation, underwater, travel, sportsphotography&cinematography. Imran is internationally recognised as a Professional Nikon Photographer, a SEACAM Pro Photographer and Ambassador, a Blancpain Ocean Ambassador, Mares, DAN, and DEEPBLU Abasssador, and an Ocean Artist Society Member.

He has been published in countless leading media publications around the world including Nikon Focus, Sport Diver (USA), Tauchen (Germany), Unterwasser (Germany), DAN (Asia Pacific) Scuba Diver Australasia, Scuba Diver, Hello Bali (Indonesia), Asian Diver, EZDive (Hong Kong), Scuba Diving (USA), CEO Magazine (Malaysia), Mediacorp's Slice of Life (Singapore), Straits Times, and Berita Harian, just to name a few. In addition, Imran has 5 of his own published underwater photography books.

WEBSITE: www.escapeinc.com.sg
FACEBOOK: @IMP.ESCAPEINC

MOHAMED ABDULLA
Underwater Photographer and Marine Scientist

Mohamed is a son of the Arabian Gulf. Coming from a long line of legendary pearl divers and fishermen, a strong bond ties him to the deep blue. Born in Dubai on a stormy night in November of 1989, he started his passion as a free diver and a spear-fisherman at an early age and naturally fell in love with the beauty of the underwater world. Mohamed started his underwater photography in 2008 which won him several awards and to which he has been published internationally since. His eye-catching and distinctive style is aimed at pushing the limits of how photographers represent life below the waves. Mohamed has dedicated himself to conservation and to the Art of Underwater Photography, putting forth the message, "the Ocean has given our ancestors everything, now it is our turn to give back". As a marine scientist with a masters degree in Environmental Science, he works closely with sea turtles, dugongs, dolphins, sharks and all other exotic species, as well as being responsible for many rare scientific discoveries in the Arabian Gulf region. Mohamed is also a PADI Instructor, the lead scientific diver for UAE University, as well as a research collaborator with many other universities in the UAE.

INSTAGRAM: @b47r

SIMONE CAPRODOSSI | SUNDIVE BYRON BAY
Underwater Photographer

Simone is an Italian underwater photographer, who has been awarded in several prestigious competitions and published internationally. After over 10 years of corporate life in Dubai, he recently moved to Australia where he now co-owns and manages Sundive Byron Bay, a PADI 5 Star Dive Centre offering dives at the amazing Julian Rocks in Byron Bay. After travelling to and photographing many unique diving destinations worldwide, he also runs expeditions with Sundive to help others experience and photograph his favourite ones such as the Sardine Run and Djibouti. Simone was the Overall Winner of Digital Online for two consecutive years until he became a judge for the competition and has been a main feature contributor to the EDA magazine, 'Divers for the Environment'.

FACEBOOK: @SimoneCaprodossiPhotography
INSTAGRAM: @scaprodossi

ALLY LANDES | EMIRATES DIVING ASSOCIATION
Project Manager, Editor, Graphic Designer, Photographer & Videographer

Ally has worked with EDA since December 2004 when she created and introduced the quarterly magazine, 'Divers for the Environment', as magazine Editor and Graphic Designer. She branded and helped foresee the development of Digital Online – EDA's Underwater Photography and Film Competition from its launch in 2009 and has since managed the event. Ally also coordinates the Dive MENA Expo with the Dubai World Trade Centre Exhibitions and Events Management team for the Dubai International Boat Show.

She keeps busy within her fields of passion, managing the EDA team, developing EDA's brand, running the events and social media, and FAM trips.

WEBSITE: www.emiratesdiving.com
FACEBOOK: @emiratesdivingassociation

[FUTURE DIVE TRIPS]

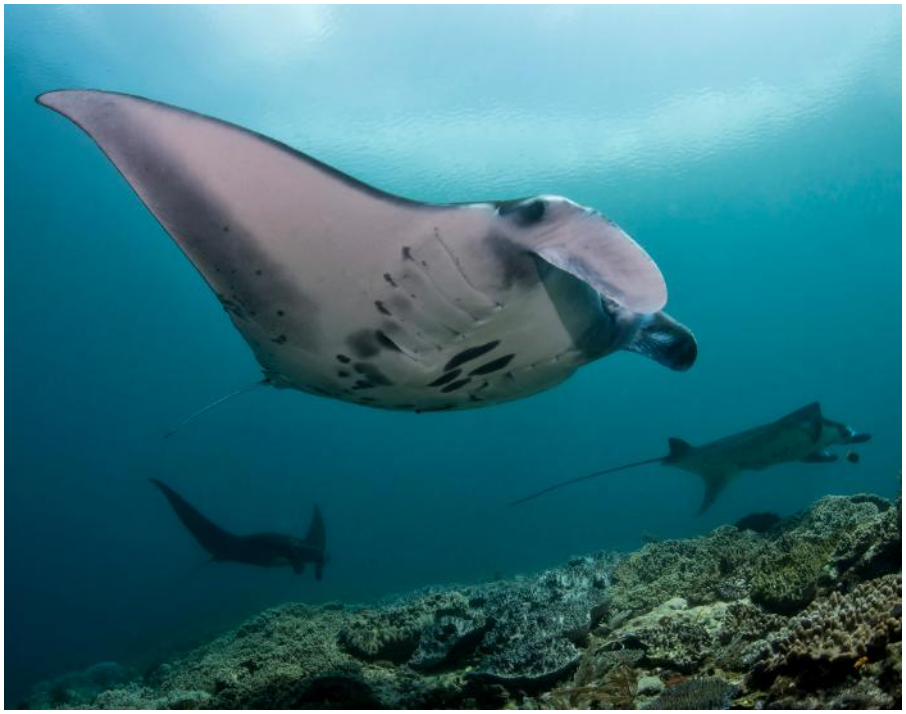
MARINE MEGAFAUNA FOUNDATION
DIVE WITH PURPOSE

FEATURE **MMF & AQUA-FIRMA** PHOTOGRAPHY **SIMON J PIERCE & ANDREA MARSHALL**

Join the trip of a lifetime. We aim to showcase the diversity of life and ecosystems within these seascapes while heightening your experience with our scientific insights.

DIVE RAJA AMPAT WITH MMF

24-31 MARCH 2021 & 03-13 MARCH 2022



We are excited to welcome you onboard this expedition of a lifetime, as we explore the waters of Raja Ampat, home to the richest coral reef ecosystem in the world during peak manta ray season.

The Raja Ampat Regency covers over 40,000 km^2 of land and sea and features more than 1,500 islands, with biodiversity levels considerably greater than any other area sampled in the Coral Triangle. With an abundance of marine life, you will be diving alongside 1,350 species of fish, six of the world's seven marine turtle species, 27 varieties of marine mammal, and large populations of both manta ray species.

TRIP HIGHLIGHTS

- Dive Raja Ampat in March during peak manta season.
- Joined by MMF's Researchers Dr Elitza Germanov (2021 trip) and Co-Founders – 'Queen of Mantas' Dr Andrea Marshall, and world-renowned shark biologist Dr Simon J Pierce (2022 trip).
- Enjoy Raja Ampat on "The Best Liveaboard in the World".
- Know MMF's marine conservation efforts.
- Expert underwater photography guidance and dedicated camera room.

THE CORALIA

THE WORLD'S BEST LIVEABOARD

Introducing the new liveaboard MV Coralia, your vessel for this MEGA Expedition – one of the finest boats in the region and recently voted the World's Best Liveaboard! A classic wooden Phinisi, the MV Coralia was built specifically for dive liveaboards with a commitment to conserve the surrounding environment. Aboard Coralia you will be well taken care of by the dedicated local crew, with a 1:1 staff-guest-ratio. This 48 metre schooner is ideal for travel through the Raja Ampat archipelago.

DAMPIER STRAIT

The MMF research team has been studying manta rays around the Dampier Strait for over five years. We will seek both reef and giant manta rays as this is the peak season in the region. We'll visit the best manta cleaning stations and feeding grounds in the area and have the opportunity to dive at the most exciting locations for other species such as Cape Kri, Mayhem, Sawandarek Jetty, Sardine's Reef, and Blue Magic.

WAYAG *

A visit to Raja Ampat wouldn't be complete without a visit to Wayag. Uninhabited, and incredibly picturesque, Wayag Island is an icon of Raja Ampat. Covering a total area of 155,000 hectares, Wayag is known for its beautiful atolls and extraordinary underwater life, including a reef manta ray nursery. The hike to Wayag peak will surely be a highlight!

* **Full charters, weather and conditions permitting.**

KAWE

While in the north, we will also visit Kawe, diving the famed Eagle Rock and Black Rock, home to even more manta rays, sharks, and game fish. The soft corals bloom in a variety of vibrant colours in this region and the currents support abundant life. We'll also aim for a world-class night dive at Aljui Bay where we will hunt for enigmatic critters such as ghost pipefish and a little-known octopus.

RAJA AMPAT TRIP DETAILS

This expedition can take a maximum of 14 guests. All prices are in USD per guest and based on double occupancy.

2021 | 24-31 MARCH (8 DAYS / 7 NIGHTS)
Master: $4,060 (4 cabins avail.)
Double: $3,745 (2 cabins avail.)
Twin: $3,745 (1 cabin avail.)

MMF HOST:
Dr Elitza Germanov

2022 | 03-13 MARCH (11 DAYS / 10 NIGHTS)
Master: $6,800 (4 cabins avail.)
Double: $6,600 (2 cabins avail.)
Twin: $6,500 (1 cabin avail.)

MMF HOSTS:
Dr Andrea Marshall & Dr Simon J Pierce

DIVE HIGHLIGHTS
We'll visit the best manta cleaning stations and feeding grounds in the area, and have the opportunity to dive at the most exciting locations for other species at famous sites such as Cape Kri, Mayhem, Sawandarek Jetty, Sardine's Reef, and Blue Magic.

INCLUDES:

- Liveaboard cruise on the MV Coralia
- Up to four dives a day
- Complimentary Nitrox
- Shore activities/excursions according to the programme
- Complimentary dive equipment for returning guests
- All meals and snacks, everyday
- Hot and cold soft beverage selection
- Tanks, weights and belts
- Transfers to and from Sorong
- Presentations from MMF hosts

EXCLUDES:

- International or domestic flights
- Sorong accommodation
- National park and port fees (~$250 pp)
- Dive courses
- Dive gear rental *
- Alcoholic beverages **
- On-board massages
- Laundry
- Use of on-board satellite phone
- Encouraged gratuity
- Travel insurance ***

MISOOL

We will then head to the far reaches of Raja Ampat with a visit to the southern sections of Misool. This community-protected region explodes with life, with some of the world's healthiest and most colourful coral reefs.

Here we will seek out reef and giant manta rays, and their smaller relatives, the devil rays. This region has extraordinary pelagic life, including game fish, sharks, gigantic fish schools, and great macro life such as pygmy seahorses and unusual nudibranchs.

Misool has an abundance of stunning dive sites, private bays for kayaking and paddle-boarding, and calm anchorages where we can dine under the stars. We like to allow ourselves to linger for several days to dive as much as possible and explore the beautiful area with its iconic karst limestone formations before returning to the Dampier Strait region.

FOR MORE INFO, GO TO:

www.marinemegafauna.org/trips-all/raja-ampat

DIVE THE TUBBATAHA REEFS WITH MMF
04-11 MARCH 2023

Dive into one of the world's most remote and vibrant coral reef ecosystems with MMF's Founders and Principal Scientists Dr Andrea Marshall and Dr Simon Pierce. This expedition can take a maximum of 14 guests. All prices are in USD per guest and based on double occupancy.

Tubbataha – meaning a long reef exposed at low tide – is what the indigenous Samal people called this area. Critical to the world's marine biodiversity, Tubbataha hosts the majority of the coral species and seeds much of the surrounding Philippines with coral and fish spawn and larvae. Considered as the Crown Jewel of the Philippines' underwater heritage, this magnificent slice of paradise is maintained in its pristine state by visitor funding ranger patrols.

The Tubbataha UNESCO World Heritage site is 97,000 hectares of remote vibrant coral atolls, abundant schooling fish, seabirds, and megafauna, including whale sharks, manta rays, sea turtles, and dolphins.

TRIP HIGHLIGHTS

- Dive Tubbataha Reef on Atlantis – the Premier Philippines Liveaboard and Trip Advisor Hall of Fame recipient.
- Joined by MMF Co-Founders – 'Queen of Mantas' Dr Andrea Marshall, and world-renowned shark biologist Dr Simon J Pierce.
- Get to know MMF's marine conservation efforts.
- Expert underwater photography guidance and dedicated camera table.

THE ATLANTIS
THE PHILIPPINES PREMIER LIVEABOARD

The 32.5 m P/Y Atlantis Azores is the Philippines premier liveaboard.

Dive amenities include a spacious dive deck, three-tier camera setup table, personal storage area, Nitrox, 2 tenders and hot water showers. Topside, Atlantis Azores features seven staterooms with private bathroom and shower, each with its own climate control.

One luxury suite is available with a private bathroom, desk, window and ample storage. Guests can enjoy a wide selection of movies on a flat-screen TV, or relax with a book from the library. There is also a partially shaded sun deck, complete wet bar and hot tub for further relaxation.

Carrying only 16 passengers, a highly attentive crew of 10 is on hand to ensure guest comfort and satisfaction.

FOR MORE INFO, GO TO:
www.marinemegafauna.org/trips-all/tubbataha

TUBBATAHA TRIP DETAILS
PRICE PER PERSON
Owner's Suite: $6,300 (1 cabin avail.)
Deluxe Stateroom: $5,700 (6 cabins avail.)

MMF HOSTS:
Dr Andrea Marshall & Dr Simon J Pierce
We aim to showcase the diversity of life and ecosystems within these seascapes while heightening your experience with our scientific insights.

DIVE HIGHLIGHTS
The Tubbataha UNESCO World Heritage site is 97,000 hectares of remote vibrant coral atolls, abundant schooling fish, seabirds, and megafauna, including whale sharks, manta rays, sea turtles, and dolphins.

INCLUDES:
- 8 days / 7 nights liveaboard cruise on the Atlantis Azores
- Up to four dives a day + 1 night dive per trip at the famed ranger station
- All meals and snacks, everyday
- Hot and cold soft beverage selection and social servings of beer, wine and local rum *
- Tanks, weights, belts and guide
- Internal transfers from Manila to Palawan (including flights) **
- Presentations from Dr Andrea Marshall and Dr Simon Pierce

EXCLUDES:
- International flights
- Manila accommodation
- National park and port fees (current rate: ~$180 pp)
- NITROX $216 pp
- Dive courses (Advanced or NITROX)
- Dive gear rental ***
- On-board massages (unavailable)
- Laundry (unavailable)
- Use of on-board satellite phone (available for fee)
- Encouraged gratuity (cash only)
- Travel insurance ****

DIVE THE MALDIVES WITH MMF
16-26 JANUARY 2022


Photo by Elitza Germanov

World-famous for its breezy, sparkling sand beaches and castaway atolls, the Maldives captures the wanderlust imagination. Here, dreams become reality as colourful reef ecosystems are nourished by sweeping currents that bring the cobalt blue waters alive with bucket list megafauna, including silky sharks, hammerhead sharks, silvertip sharks, thresher sharks, giant manta rays, whale sharks, and more. The lesser-known "Deep South" atolls of Addu and Fuvahmulah are gaining world-renowned status since being added to UNESCO's World Biosphere Reserves list. These unique locations are the highlights of our inaugural team trip to the Maldives.

Bring on the adventure to the Maldives' little-known southern atolls, dubbed the "Galapagos of the Maldives." Incredibly healthy coral reefs form the backdrop to a bucket list of megafauna encounters. Join MMF's Founders and Principal Scientists Dr Andrea Marshall and Dr Simon Pierce, and other MMF researchers and conservationists on this exciting expedition. This expedition can take a maximum of 20 guests. All prices are in USD per guest and based on double occupancy.

TRIP HIGHLIGHTS

- Dive the Deep South Maldivian atolls on the spacious and contemporary Serenity – of the Award Winning Emperor Fleet who has extensive experience running trips to the southern Maldivian atolls.
- Joined by MMF Co-Founders – 'Queen of Mantas' Dr Andrea Marshall, and world-renowned shark biologist Dr Simon J Pierce.
- Get to know MMF's marine conservation efforts.
- Expert underwater photography guidance and dedicated camera station.

THE EMPEROR SERENITY
FROM THE AWARD-WINNING EMPEROR FLEET

The contemporary and spacious 40 m MV Emperor Serenity boasts extensive experience in the south.

Dive amenities include a spacious dive support vessel 'dhoni' used to deliver divers to the dive sites under the care of four dive guides. The dhoni is equipped with air and NITROX compressors taking the dive clutter and noise away from the mother ship and limiting those forgetful dive tender moments.

There are dedicated rinse tanks, a camera table, and stations for charging and drying air guns for the photographers.

The mother ship, Emperor Serenity, features 13 roomy private bathroom and shower en suite cabins, individually climate controlled to your preference, with either king or double/single bed configurations. Five cabins are above deck, while others offer classic porthole views.

There are several indoor and outdoor lounge areas, a large dining area, a TV entertainment area, a library, a spa, and a full-service bar that allow you to be as sociable as you wish. A partially shaded large sundeck is perfect for sundowners, stargazing, or early morning yoga (mats provided).

Carrying 26 passengers, a highly attentive crew of 10 is on hand to ensure guest comfort and satisfaction, including special dietary requirements.

FOR MORE INFO, GO TO:
www.marinemegafauna.org/trips

DEEP SOUTH, MALDIVES TRIP DETAILS

PRICE PER PERSON
King Cabins: $4,550 (4 cabins avail.)
Double Cabins: $4,150 (9 cabins avail.)

INCLUDES:

- 11 days / 10 nights liveaboard cruise on the Emperor Serenity
- Up to four dives a day
- All meals and snacks, every day
- Hot and cold soft beverage selection and a glass of wine complimentary with dinner *
- Tanks, weights, belts, and guide
- Nitrox
- Boat transfer
- Taxes, service fees, including "Green Tax"
- Presentations from Dr Andrea Marshall and Dr Simon Pierce

EXCLUDES:

- International flights and internal flights from Male
- Onshore accommodation (if necessary)
- Dive courses (Advanced or NITROX)
- Dive gear rental **
- Specialised Tiger Shark encounter ***
- On-board massages and spa treatments
- Use of on-board wifi and satellite phone (available for a fee)
- Encouraged gratuity
- Travel insurance ****

* Guests can also bring alcohol without corkage fees
** Price depends on equipment needed
*** This dive is handled by the onshore operator and current rates are $30 / person
**** Dive insurance required, general travel insurance is highly recommended

The Maldives is a nation entirely composed of coral atolls, several within UNESCO World Biosphere Reserves, and a national network of Marine Protected Areas that protect threatened megafauna, including the world's largest known reef manta ray population.

We look forward to exploring these world-heritage sites and sharing our in-depth knowledge of manta rays, whale sharks, and other shark species that frequent the incredibly biodiverse waters of southern Maldivian atolls.

DIVE HIGHLIGHTS

Your 11 days /10 nights expedition will visit the best southern dive sites in the region with ample time to explore the manta ray cleaning stations south of the equator in Addu, the famed pelagic magnet that is Fuvahmulah atoll, to the sharky waters in and around Huvadhoo.

The Southern Maldivian atolls were awarded UNESCO World Biosphere Reserve status and are home to remote vibrant coral atolls, teeming with reef fish and abundant with pelagic shark species, including whale sharks, hammerhead sharks, silky sharks, silvertip sharks, thresher sharks, and both manta ray species, dubbing the area the Galapagos of the East.


Photo by Elitza Germanov

MEXICO WITH AQUA-FIRMA & MMF

18–24 JULY 2021 & 18–24 JULY 2022 & 24-30 JULY 2022

Join an international and local expert team of whale shark researchers, marine biologists, photographers & videographers amongst the world's biggest aggregation of whale sharks in peak season.

Accommodation at all-inclusive 5 star hotel with careful COVID-safe protocols.

The experience of snorkelling with the largest fish in the sea, the whale shark (*Rhincodon typus*) is not one you are likely to forget. These gentle plankton eating giants grow as large as 20 metres, display beautiful spot patterns from above, block out the light of day from below and often carry with them a living reef of fish life.

This exclusive experience off the Caribbean coast of Mexico allows a small group of people to join an expert Aqua-Firma research team member in search of whale sharks in the largest known aggregation of them on our planet. We have been operating these trips for 8 years, during what has proven to be a peak period of the year. More than 400 whale sharks have been counted on aerial surveys and our research boat is sometimes surrounded by as many as 200 or more sharks. Photographic and video opportunities can be superb.

In addition to whale sharks, we also sometimes encounter other aggregations, a potentially 3rd species of Giant Manta Ray. Some days we have been in the water with 100 or more of them, as they feed at the surface, swim between whale sharks or barrel roll. Our partners at the Marine Megafauna Foundation (MMF) are fairly convinced that this Atlantic version of giant manta is a separate species, but to prove this we need a combination of above and below photos plus DNA evidence from the same individuals. Dr Andrea Marshall has joined us in trying to achieve this, but whilst we gained photos and DNA, we didn't quite get the combination we needed. Join us on our quests in 2021 & 2022!

Most of our encounters with whale sharks are in blue water, so visibility can be excellent. We often find giant mantas in areas further west, where Copepods can appear in huge abundance. Visibility is much more variable in these waters, but it can provide us with opportunities to snorkel with dolphins and their babies; and the bonito tuna which they feed on. In reaching these areas, we transit past clear shallow waters of the Contoy Island National Park, where we often see dozens of green and loggerhead turtles swimming beneath us. We can snorkel with green turtles over shallow seagrass beds, with huge colonies of frigate birds and boobies circling the island to the east.

Other marine life we find out in clear blue water can be schools of 30 or more golden cownose rays, bottlenose, spinner and spotted dolphins, chance encounters with sail fish and marlin. As always with Mother Nature, every day is different. So far, we have never been a day at the afuera without a whale shark. When we find them amongst an abundance of food, sharks sometimes stop swimming and feed in a vertical position, creating a vortex sucking water in from the surface. These opportunities are wonderful for enabling us to focus on one individual in great detail and provide even better opportunities for film and photography than normal.

Aqua-Firma's leadership team in 2021 & 2022 will include one of the World's leading whale shark researchers, Dr Clare Prebble, and two of Mexico's leading whale shark researchers. Your participation enables Aqua-Firma to help fund the work of these researchers, whose expert insights into our ever growing knowledge of whale shark behaviour and distribution is very much part of this experience. Clare also happens to have taken hundreds of very high quality images of whale sharks and manta rays. Learning how to emulate the kind of images is as much a part of this experience as you wish – not only on location with free group and private photography workshops, but with advice we can provide before you go.

We will take a maximum of 9 people per team on research trips lasting up to 61/2 hours each day. Our first priority is to locate the whale sharks and once we do, you will be able to enter the water with them to assist in digital photo IDs and recording behaviour and species which use the whale sharks as mobile habitats. Clare and our local team will conduct in water surveys which will include on occasion, skin biopsy samples for DNA and dietary analysis. We may also apply data tags such as a satellite location transmitter or gyro sensor. In line with local regulations, we can put 2 guests in the water at a time with a researcher whilst those waiting their turn can observe whale sharks from above – often with mouth half in and half out of the water.

Our trips begin and end at Cancun airport, from where we will transport you to a 5 star all-inclusive hotel at Playa Mujeres, which lies on a peninsula on the Yucatan mainland opposite the far northern tip of Isla Mujeres. Whale shark encounters are best enjoyed by snorkelling since whale sharks feed here close to the surface. Snorkelling also permits faster movement on and off the boat and through the water.

FOR MORE INFO, GO TO:
www.aqua-firma.com/experiences/mexico-whale-shark-research-snorkel-freediving-cancun-isla-mujeres

MEXICO TRIP DETAILS

18-24 JULY 2021 – £2,260 / US$2,890
With Dr Clare Prebble from Marine Megafauna Foundation (5 star all-inclusive)

18-24 JULY 2022 – £2,260 / US$2,890
With Dr Clare Prebble from Marine Megafauna Foundation (5 star all-inclusive)

24-30 JULY 2022 – £ 2,260 / US$2,890
With Dr Clare Prebble from Marine Megafauna Foundation (5 star all-inclusive)

SUPPLEMENTS:
- Price per person sharing a twin bedroom
- Single supplement: £365 / US$399

INCLUDES:
- All accommodation in Cancun and Isla Mujeres
- All food* and drinks** by the glass are included, as well as use of fitness & recreation facilities, a supervised children's programme (ages 4-12) and non-motorised watersports equipment should you wish to use it.
- 4 long days out (up to 61/2 hours) in search of whale sharks and Atlantic giant manta rays
- Airport transfers in Cancun
- Lunchtime snacks and cold drinks when out at sea
- Guidance and talks by whale shark experts
- Contributions to help fund research

(* A surcharge applies for lobster, jumbo shrimps and prime meat dishes.)
(National and house brands.)**

EXCLUDES:
- International flights
- Snorkel kit
- Visa if needed
- Travel and personal effects insurance

THE GALAPAGOS WITH AQUA-FIRMA & MMF
06-13 SEPTEMBER 2021 & 08-15 AUGUST 2022

THE GALAPAGOS TRIP DETAILS
06-13 SEPTEMBER 2021 – US$5,840
Starts / ends San Cristobal

08-15 AUGUST 2022 – from US$5,990
Led by Whale Shark Researcher, Photographer and Founder of the Marine Megafauna Foundation, Dr Simon Pierce.

LOCAL CHARGES PAYABLE ONBOARD:
- Fuel Surcharge (US$150 for September 2021 departure)
- Hyperbaric Chamber Fee: $35 pp
- NITROX $150 for the week

SUPPLEMENTS:
- If you are willing to share a cabin onboard then there is no single supplement for the liveaboard.
- For a cabin to yourself add 85%.

INCLUDES:
- Galapagos diving liveaboard as indicated
- Shore excursions and zodiac activities
- All meals onboard vessels
- Coffee, tea and water
- An English speaking naturalist guide will be onboard, trained by the Charles Darwin Station and licensed by the National Park.
- Donations towards furthering the research and conservation aims of the Marine Megafauna Foundation, of which Dr Simon Pierce is Principal Scientist
- A year's membership of the Galapagos Conservation Trust

EXCLUDES:
- Diving equipment rental
- Flights
- Arrangements in Quito or Guayaquil (please contact us for flights and hotel package)
- Galapagos National Park entrance fee – $100** per person to be paid in cash at the airport in Galápagos
- Galapagos Immigration fee (US$20**)
- Hyperbaric chamber fee of $35
- Fuel surcharge ($150**)
- Tips
- Travel insurance

(correct at time of writing)**

Aqua-Firma's Shark Research Insights and Photography Dive Liveaboard expeditions, with hosts which include some of the world's foremost Whale Shark researchers. This includes the Founder of the Marine Megafauna Foundation, Dr Simon Pierce, and MMF Principal Scientist, Dr Chris Rohner.

These scientists conduct their work throughout the world, but the Galapagos is one of their highest priorities since it is the best place to see huge females, which can reach up to 18 metres or more in length. Joining this liveaboard will provide you with a unique opportunity to find out the very latest in whale shark research, as well as insights into other species of sharks and rays, plus local endemic species such as marine iguanas, Galapagos penguins and more. It also helps to fund the work of the Marine Megafauna Foundation, in the Galapagos and beyond.

VIDEO AND PHOTOGRAPHY
All of our hosts are highly accomplished with their cameras, with Simon prioritising stills photography and Chris leaning more towards video. Onboard workshops will provide you with the opportunity to learn how to get the best out of your underwater camera gear; and how to use software to edit your prized images.

Liveaboard trips are the only way to reach two of the Galapagos' most important diving highlights: Wolf Rock and Darwin. These are some 16 hours across the water from the rest of the islands and it is here where you will find some of the largest schools of Hammerhead Sharks you are likely to see anywhere in the world. This is also one of the best places in the world to dive with Whale Sharks.

There is a huge amount more to see at these dive sites and others, including giant manta rays, blue spotted rays, sealions, white tip sharks, Galapagos penguins and endemic marine iguanas. Our guests have even seen schools of dolphins underwater so large that they have been impossible to count in amongst the hammerhead sharks.

BEST TIME TO GO
Hammerhead sharks aggregate in schools at Wolf Rock and Darwin throughout the year. Whale shark sightings are more seasonal. You are very likely to see whale sharks between June and October, with August and September right in the middle of this seasonal peak.

Galapagos sea temperatures are always cooler than you would usually expect on the Equator. They are at their warmest around the New Year with sea surface temperatures reaching about 2°C (73°F). They reach their coolest in August when sea surface temperatures drop to about 18°C (64°F). In both seasons, thermoclines can take temperatures down by as much as 5°C (9°F). Typical underwater wear would be a 7 mm wetsuit with hood, but the ability to layer is useful since temperatures can vary considerably between the warmer north and colder south of the island group.

THE BOATS
Our liveaboards are 16 passenger motor yachts with combinations of twin, double and triple cabins with en suite bathrooms. Divers will head out in two separate Rigid Inflatable Boats.

PRIOR EXPERIENCE REQUIRED
Diving conditions in the Galapagos are not the easiest. You will need to be PADI Advanced or equivalent to join this trip, with about 30 dives or more experience and some dives conducted in the months leading up to the trip so that you are fully prepared. Preparation is something we can discuss and assist with in advance.

FOR MORE INFO, GO TO:
www.aqua-firma.com/experiences/galapagos-shark-research-insights-photography-dive-liveaboard

MADAGASCAR WITH AQUA-FIRMA & MMF
14–21 OCTOBER 2021 & 13–20 OCTOBER 2022

The diversity of marine life, wildlife and island beauty we experience on our October Madagascar Whale Shark Research – Islands, Marine Life & Lemurs trips, can really spoil you for tropical travels you do elsewhere.

Central to this experience is the team you will join, which consists of the leading whale shark researcher in Madagascar, Stella Diamant, of the Marine Megafauna Foundation (MMF) & Madagascar; and Aqua-Firma's Ralph Pannell, formerly of the charity Rainforest Concern. Stella & Ralph are passionate about all that Madagascar has to offer and can provide great insights into the ocean giants and wildlife we can see there. Your hosts are also highly experienced marine life and wildlife photographers, who can help you to log the highlights of what you see with on the go assistance with your own cameras; and copies of the best of what they photograph on the trip.

Whale Sharks are huge and beautiful creatures, which in Madagascar we find in some of the clearest bluest waters you can imagine. Something particularly exciting about locating them here, is what we find them with. Whale Sharks glide the tropical oceans in search of hotspots for plankton and small fish; something which the team's satellite tags monitor throughout the year. They are not alone in this search and when we swim with them in Madagascar, we usually find ourselves snorkelling with dozens of seabirds diving into the water around us, and schools of 200 or more bonito tuna. It's so busy that the sea surface literally boils with their feeding frenzies.

We might also snorkel amongst large schools of fast-moving mobula rays; sometimes a giant manta ray or two; and if we are really lucky, one of the rarest whales on Earth: the omura whale (*Balaenoptera omurai*). Also known as a false fin or false brydes whale, the 'roqual' baleen whales can reach 11 metres or so. Dolphins are usually a daily sight and we can sometimes snorkel with these too. Humpback whales are another regular sight above water – usually females with their calves, getting ready to migrate to Antarctica for the southern polar summer.

Healthy coral reefs and seagrass beds house yet more marine life. Reefs, such as those at Nosy Tanikely, are best for hawksbill turtles; whilst the seagrass beds stepping out from our base, provide excellent opportunities to swim with green turtles as they graze.

No trip to Madagascar is complete without seeing lemurs and chameleons. For starters, we will base ourselves close to a sacred forest where black lemurs frequently feed close to our camp. We will also spend a full day in the best-preserved forest on Nosy Be (Lokobe) in search of the Nosy Be sportive lemur, mouse lemur and black lemurs; and watch large troops of brown lemurs on the island of Nosy Tanikely.

In pursuit of pure beauty, we will embark on an overnight trip to one of the most idyllic tropical islands you can hope to find called Nosy Iranja. When we head to this island, we will start by seeking whale sharks, but also keep an eye out for female humpback whales nursing their newborn calves. Once at Nosy Iranja, we will provide excellent food and a large comfortable yet rustic beach tent from which you can walk across powder white sand into a shallow calm water bay.

Photography and video opportunities will be available above and below water. Stella and Ralph will be able to provide photography guidance and support throughout the trip. This will cover underwater and above water photography, plus use of software to edit your hard-earned images. Stella will also provide evening talks and day by day insights when out at sea into whale shark ecology and latest research findings from around the world. Your participation in this trip helps to fund Whale Shark Research in Madagascar, as do our other Whale Shark Research experiences at Mafia Island in Tanzania and Isla Mujeres in Mexico; and our Special Galapagos Shark Insights & Photography liveaboard trips.

MADAGASCAR TRIP DETAILS
14-21 OCTOBER 2021
FROM £1,950 / FROM US$2,490
With Aqua-Firma Photographer Ralph Pannell & Madagascar's leading whale shark researcher, Stella Diamant

13-20 OCTOBER 2022
FROM £1,990 / FROM US$ 2,550
With Aqua-Firma Photographer Ralph Pannell & Madagascar's leading whale shark researcher, Stella Diamant

NOTES:
The trip begins and ends in Nosy Be. Please contact us if you wish to start the trip from Antananarivo instead **

SUPPLEMENTS:
- Price per person sharing in a standard cottage
- Single supplement * £250 / $299
- Room upgrades available. Please enquire

(* If you would like to share and we can pair you with someone of the same gender to share with, then you can avoid any single supplement.)

DIVING (PAYABLE LOCALLY):
- Daytime dive £55 including full kit rental
- Regular night dive £55
- Fluorescent night dive £75

Save £10 per dive if you bring your own full dive kit, including dive lights for regular night dives.

There will be four opportunities for night dives.

INCLUDES:
- All transportation by land and sea
- All accommodation
- All trips within itinerary (except diving at additional charge)
- Contributions to funding the research
- All breakfasts
- 2 dinners (first night and when on Nosy Iranja)
- 3 lunches
- Water when out by boat
- Donations to our research partners
- Series of evening talks about whale shark biology and latest research findings from around the World
- Photography and photo software master classes as requested

EXCLUDES:
- International air fares
- Domestic air fares (if applicable)
- Additional accommodation in Antananarivo (if applicable)
- Travel insurance
- Meals not specified
- Drinks

(Starting the trip from Antananarivo: if you choose to fly into Tana and then take a domestic flight to Nosy Be, please note that you will need to spend at least one night in Tana before the trip is due to start and at least one night afterwards. This is to mitigate against any potential flight schedule changes or delays to your domestic flights. Please contact us for more information.)**

Some scuba diving can be fitted in for those qualified, including night dives in which you can opt to use fluorescent dive lights and mask filters. You will be amazed how the reef and fish look when we bring colours usually outside our visible range, into the observable spectrum. If you would like to conduct additional diving, then we can arrange an extension on Nosy Be dedicated to that.

FOR MORE INFO, GO TO:
www.aqua-firma.com/experiences/madagascar-whale-shark-research-islands-marine-life-lemurs

KOMODO WITH AQUA-FIRMA & MMF

26 OCTOBER – 02 NOVEMBER 2021 & 31 OCTOBER – 07 NOVEMBER 2022

Komodo and its idyllic tropical waters off western Flores in Indonesia are home to more than 1,000 identified manta rays. The area is also within the Coral Triangle with some spectacularly healthy and diverse coral reefs; and home to the World's largest lizards, the Komodo Dragons.

Our Manta Ray Research experience enables you to join Aqua-Firma Marine Scientist and world leading experts from the Marine Megafauna Foundation (MMF) as they undertake research into these majestic Ocean Giants. You will also be able to scuba dive, snorkel and photograph some of the World's best coral reefs and step onto the Komodo Dragon sanctuary of Rincon Island where you can engage with these huge animals as close as is safe to do so.

We will be based in western Flores at our base at a comfortable hotel on a beach set within a calm bay. For all but one of our full days here, we will head out in traditional wooden boats amongst some beautiful islands in search of manta ray hotspots. Sea, current and wind conditions will dictate where we are best to search for manta rays, but our highly experienced team will be best placed to select the best cleaning stations and locations where manta rays will be busy gorging on plankton brought in on Komodo's legendary currents.

Photo IDs and behavioural observation will be something everyone can assist with, whilst one of MMF's key research aims for Komodo is to assess the risk that tiny fragments of plastic (microplastics) pose to filter feeders like manta rays.

In addition to sites where we hope to interact with manta rays, you will also have the chance to dive and snorkel at some simply stunning coral reef sites. Do not be surprised to come across areas where coral cover is 100% from shallows to 30 metres. Here we can often find lots of green and hawksbill turtles, large schools of sweetlips and other fish, giant sea fans, beautifully coloured corals, sponges and more.

No trip to Komodo is complete without seeing the Komodo dragons, so we will take an afternoon to land on Rincon Island and enjoy guided walks amongst them. We will be able to enjoy the savannah scenery here and see water buffalo and Timor rusa deer whose lives are continually under threat from the dragons. You might even see an apparently docile dragon lunge from the shadows in a sprint towards one of these large mammals. Stick with us and you won't become a target yourself!

We can hope for some excellent photo opportunities with manta rays as well as coral reefs. Guidance will be available throughout for underwater and above water photography, plus use of software to edit your hard-earned images. We can also assist you in advance with advice on kit, be that starter level waterproof cameras, to advanced underwater camera systems.

Our team will also provide evening talks and day by day insights into manta ray ecology and latest research findings from around the world. Your participation in this trip helps to fund manta ray research in Indonesia, in the same way that our whale shark research experiences do at Mafia Island in Tanzania, northern Madagascar, the Galapagos Islands and Isla Mujeres in Mexico.

This trip starts and ends on the Indonesian island of Flores. If you are keen to see more of Indonesia and other parts of South East Asia, then we can make travel arrangements for you as needed, such as incorporating more time on Bali, Raja Ampat, Sulawesi, Borneo, Papua New Guinea, Singapore, Hong Kong and Australia. Many airlines fly into and out of Bali, so there is a great deal of choice amongst airlines.

FOR MORE INFO, GO TO:
www.aqua-firma.com/experiences/komodo-manta-ray-research-coral-triangle-dragons-photography-dive-snorkel-scuba-diving

KOMODO TRIP DETAILS
26 OCTOBER – 02 NOVEMBER 2021
£2,075 / US$2,490
With Aqua-Firma Marine Scientist, Charlotte Caffrey & Marine Megafauna Foundation's Senior Scientist, Manta Ray Programme, Dr Elitza Germanov

31 OCTOBER – 07 NOVEMBER 2022
£2,075 / US$2,490
With Aqua-Firma Marine Scientist, Charlotte Caffrey & Marine Megafauna Foundation's Senior Scientist, Manta Ray Programme, Dr Elitza Germanov

SUPPLEMENTS:
- Scuba diving & dive kit rental supplement £165 / US$199
- Single supplement £350 / US$430

INCLUDES:
- All accommodation
- All meals
- All snorkelling
- Snorkel kit rental
- All transportation by land and sea
- All trips within itinerary
- Contributions to funding the research
- Water when out by boat
- Series of evening talks about manta ray biology and latest research findings from around the World

EXCLUDES:
- Flights
- Optional day trips on day 7 (£65 / $80 per person)
- Travel insurance
- Drinks

TANZANIA WITH AQUA-FIRMA & MMF
28 NOVEMBER – 06 DECEMBER 2021 & 27 NOVEMBER – 05 DECEMBER 2022

Whale sharks (*Rhincodon typus*) are the biggest fish in the sea reaching up to 20 metres in length. The opportunity to interact with these gentle giants and assist in their research is a humbling and awe inspiring experience. At the enchanting Mafia Island off the coast of Tanzania, you can join our whale shark research team which includes two of the world's leading whale shark researchers, Dr Simon Pierce and Dr Chris Rohner.

Researchers have been monitoring whale sharks for several years now off the west coast of Mafia Island and sightings have been consistently good across the northern hemisphere winter. The team is often in the water with several sharks at once and we often see two or three of them as we fly into and out of the island during peak periods.

We have timed this trip to fit a peak period in whale shark sightings in November, when East Africa's seas are also usually calm – ideal for diving and snorkelling on some of Africa's richest coral reefs. Whilst whale shark interactions are the core of this experience, we have also incorporated a full itinerary of diving for qualified divers on reefs on the opposite coast of Mafia, within an 821 square kilometre Marine Protected Area which is afforded complete protection from fishing. This means that you can dive amongst some incredibly healthy fish life. You can find yourself eyeball to eyeball with large numbers of huge groupers and snappers, which in other coral reef locations around the world would have long been destined for the cooking pot. For those who do not dive but wish to snorkel here, we can arrange snorkelling trips if you wish.

In addition to large specimens of fish, the marine park protects an incredible diversity of fish life and marine ecosystems. In Chole and beyond, you can find further excellent hard coral areas, extensive mangrove forests, sponge and soft coral sub-tidal beds and wide inter-tidal flats. This variety encourages more than 400 species of fish to reside here, 400 types of sponges, 200 types of algae and habitat for green and hawksbill turtles. Mafia Island is an important breeding ground for small fish and larvae, and plankton which is what encourages the interest of whale sharks.

Mafia Island itself has a beautiful coastline, combining stunning beaches, hard coral islets with extensive areas of mangrove. You can feel very detached here from mainland Africa, amongst lovely islanders whose dhow sailing boats paint a beautiful picture against the island's varied coastline.

TANZANIA TRIP DETAILS

28 November – 06 December 2021 – £2,490
- Includes return flights Zanzibar – Mafia Island
- Team includes Whale Shark Expert and videographer Dr Chris Rohner
- Ideal for divers and snorkellers

27 November – 05 December 2022
From £2,490
- Includes return flights Zanzibar – Mafia Island
- Team includes Whale Shark expert and videographer Dr Chris Rohner

NOTES:
- Price per person sharing
- The trip begins and ends in Zanzibar, but we can change this to Dar es Salaam for participants where needed.

SUPPLEMENTS:
- Single supplement* £265
- Divers** add £410 (covers 10 dives)

(* If you would like to share and we can pair you with someone of the same gender to share with, then you can avoid any single supplement.)

INCLUDES:
- All accommodation
- All transfers within Tanzania by air, land and sea
- Full board on Mafia Island
- Breakfasts in Zanzibar
- 5 whale shark research outings
- Expert leadership from our whale shark team
- Contributions to support ongoing whale shark research on Mafia Island

EXCLUDES:
- (** **10 scuba dives)**
- International flights (please ask for a quote)
- Marine Park fees at Mafia Island (currently $23.60 per day)
- Airport departure tax in Zanzibar
- Insurance
- Tips
- Visas
- Alcoholic and soft drinks
- Dive and snorkel equipment rental

PRIOR EXPERIENCE NEEDED:
- Snorkellers need no special experience – you just need to be comfortable snorkelling in open water.
- Divers need to be Advanced certified in order to dive beyond Chole Bay. If you are not, then you can enrol in an Advanced course during this trip.

ACTIVITY LEVEL: Moderate

STANDARD OF ACCOMMODATION:
Comfortable coastal lodge with white sand beach and lovely views over Chole Bay. Lodge upgrade is available.

To experience the best of Africa's marine life and terrestrial wildlife, you can consider joining one of our small group safaris before or after this trip to go in search of The Great Migration. The Great Migration brings more than a million grazing wildebeest, plains zebras and Thompsons gazelles into the Serengeti, where we can also hope to see leopards, cheetahs, lions, hyenas, elephants, hippos, buffalo and more in huge abundance. This safari also goes in search of tree climbing lions and monkeys of Lake Manyara; and the bountiful wildlife of the Ngorongoro Crater where black rhinos are always a part of what we hope to see.

FOR MORE INFO, GO TO:
www.aqua-firma.com/experiences/whale-shark-mafia-island-research-coral-reef-snorkel-dive-photography-tanzania

ISLAND FEVER

IF THE BUBBLES DON'T GET YOU, THE MOSQUITOS WILL!

FEATURE **DAN EUROPE STAFF** PHOTOGRAPHY **DAVIDE BASTIANI**

THE DIVER

The diver was a 49-year-old female with more than 200 lifetime dives. She had no known medical history, took no medications regularly and was generally healthy and fit.

A TROPICAL DIVE VACATION

Our diver headed to a popular Caribbean island for a weeklong dive vacation. Over six days she completed 21 problem-free dives, all of which were conducted on air and were within the no-decompression limits of her computer. She performed a safety stop at the end of each dive. The maximum depth of her deepest dive was 34 metres; the rest of the dives ranged from 9 to 27 metres deep. The diver refrained from excessive consumption of alcohol and other behaviours that might have negatively affected her health or safety while on vacation.

WHAT HAPPENED?

On the day of her departure from the island, the diver's preflight surface interval was greater than 24 hours. She had no specific complaints but did have a general sense of feeling unwell. During the first of her two flights she began to experience deep muscle and joint aches. The discomfort was in multiple areas and was accompanied by nausea and a severe headache. The symptoms did not resolve on the ground between flights, but they did not worsen during the second flight. She arrived home and hoped to recover by getting some rest. After a less-than-recuperative night's sleep her symptoms did not diminish, and, concerned about the possibility of decompression sickness (DCS), she decided to contact DAN.

The DAN medic to whom she spoke suggested that she seek medical attention at the closest emergency department. While the possibility of decompression injury could not be excluded, the timing and the nature of her symptoms made other possible explanations more likely. When she arrived at the emergency department she had a fever of 39°C. She underwent a variety of diagnostic procedures, including several laboratory tests and thorough physical and neurological examinations. All indications pointed to a diagnosis of dengue fever, not DCS.

The hospital staff administered appropriate supportive care, which included IV fluids and medications to help manage her pain and nausea. She was ultimately discharged, and the doctor instructed her family on how to monitor her condition and continue her care. The fever and nausea subsided within three days, and the aches and headache finally resolved after two weeks. Fortunately, her treatment was covered by the non-diving emergency travel component of her DAN insurance.

THE IMPORTANCE OF MEDICAL ASSESSMENTS

This case should serve as a reminder that travel to tropical areas exposes divers to risks beyond those associated with diving. The timing and nature of this diver's symptoms justifiably led her to suspect the symptoms may not have been related to diving. However, she wisely deferred to the expertise of medical professionals and, in doing so, received prompt evaluation and care for the illness she had. (It is worth noting that the established flying-after-diving guidelines are associated with a consistently high safety record.)

The importance of receiving a medical assessment that considers multiple possible diagnoses cannot be overstated. While localised pain and severe fatigue are common symptoms of DCS, generalised muscle pains and fever are not. The evaluating physician recognised this and expanded the differential diagnosis list accordingly. The diagnosis of dengue fever is made on the basis of clinical findings (signs and symptoms) as well as history of travel to known risk areas. Fortunately, this tropical disease is not generally life-threatening, and full recovery is expected within a few weeks, as occurred in this case.

Most divers are familiar with the signs and symptoms of DCS, but it is important to remember that these signs and symptoms are not exclusive to DCS and may indicate other maladies.

YOU GIVE ME FEVER

Dengue fever is a mosquito-borne infection. There is a documented rise in infection rates throughout the Caribbean and in the southeastern United States. Rates have not increased to an alarming level, but travellers should be aware of the disease. The infection is characterised by an acute onset of a fever three to 14 days after being bitten by an infected mosquito. The classic dengue fever presents, after this incubation period, as follows:

- Acute fever
- Muscle and joint aches/pain
- Severe frontal headache
- Acute pain behind the eyes
- Nausea and loss of appetite
- Rash
- In rare cases, bleeding

The pain associated with the disease can be severe, especially in subsequent infections. This severe pain gave rise to dengue's nickname, "breakbone fever." The fever and pain should be managed with acetaminophen (Tylenol); avoid aspirin, ibuprofen, naproxen and other nonsteroidal anti-inflammatory drugs (NSAIDs) as these can promote bleeding.

In most cases the fever resolves within a few days, but fatigue may persist for days to weeks. There is also now an approved vaccine, however it is recommended only for those who have had Dengue fever or live in a population where most people have been infected. To learn more about dengue and other tropical diseases, check the online information and updates from the European Centre for Disease Prevention and Control or the World Health Organisation. As always, if you develop symptoms after diving, do not hesitate to contact DAN.

Before leaving make sure your DAN membership is still active. If it isn't, join DAN or renew your membership at: www.daneurope.org.

Your DAN membership ensures the services of the biggest international network for assisting divers anywhere, during any emergency.

GRADIENT FACTOR CALCULATIONS

FEATURE **MICHAEL MENDUNO**

Developed by decompression researcher Erik Baker in the 1990s, Gradient Factors (GF) are commonly used with Buhlmann decompression models to adjust for conservatism. GF are presented as a fraction of the maximum inert gas "supersaturation" or M-value that can be tolerated by each of the theoretical tissue types or "compartments" considered by the Buhlmann model without resulting in DCS. The popular Buhlmann ZH-16 model has 16 tissue types with saturation/desaturation half times ranging from 4 to 635 minutes.

Most dive computers or decompression planning software allow the user to set one GF to control the initial ascent phase of the dive, by limiting the supersaturation or over-pressurization of the "leading tissue" (the compartment with the highest supersaturation level) to a fraction ex: 50% of the M-value for that tissue. Users typically set a second GF to limit the supersaturation in tissue types during the final ascent to the surface.

Gradient Factors can also be used to measure nitrogen supersaturation in the leading tissue at any given time and depth of a dive profile during the ascent to the surface. For the DCS Risk Factor study, researchers calculated the GF values for the 16 tissue types over the course of each dive profile used in the study. They then recorded the maximum GF value for the leading tissue associated with each dive. Think of it as a measure of the conservatism of the underlying dive profile.

ABOUT THE AUTHOR

AlertDiver.EU contributing editor Michael Menduno is an award-winning journalist & technologist who has written about diving and diving technology for decades. He coined the term "technical diving." His work has appeared in magazines such as Alert Diver, DeeperBlue.com, DIVER, Quest, Scientific American, Sports Diver, Undercurrent, Undersea Journal, WIRED and X-Ray. He founded and served as editor-in-chief for aquaCORPS Journal (1990-1996), which helped usher tech diving into the mainstream of sports diving. He also produced the first Tek, EuroTek and AsiaTek conferences. In addition, Michael serves as the editor-in-chief of InDepth, Global Underwater Explorers (GUE) online magazine.

UPCOMING EVENTS

CLEANUP ARABIA CAMPAIGN

INDEPENDENT DIVE & BEACH CLEAN-UPS | ONGOING
The Campaign Post COVID-19 for EDA Members

Cleanup Arabia should not just be about our campaign in November each year over a few weekends. Cleanup Arabia should be every day we are able to get out into the outdoors and give our environment some TLC. With so many of us independently taking part, solo or in small groups, we are able to cover more ground and different areas than we would at one big event. Check out and read the complete Cleanup Arabia Guide for Members here: https://bit.ly/3pLM6kV

EDA MOVIE SCREENING

WILD ABU DHABI: THE TURTLES OF AL DHAFRA
Wednesday 5th May 2021 | 40 mins | Screening Details TBA Soon

The Environment Agency – Abu Dhabi's (EAD) new film showcases the groundbreaking work of the EAD team who are dedicated to studying turtles in the hottest sea in the world, the Arabian Gulf, also known as the world's natural climate change laboratory.

Abu Dhabi is home to two of the seven species of turtles found on the planet – both of which are threatened – the critically endangered Hawksbills, and the endangered giant Green turtles. EAD has been working on the protection of sea turtles since its establishment 25 years ago as part of its mandate which is dedicated to the conservation of biodiversity and endangered species of all kinds in Abu Dhabi.

DIVE MENA EXPO | RESCHEDULED FOR NEXT YEAR

CO-LOCATED AT THE DUBAI INTERNATIONAL BOAT SHOW
Dubai Harbour | 8-12 March 2022

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.

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THE MARINE MEGAFAUNA FOUNDATION | SAVING OCEAN GIANTS
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EXECUTIVE TEAM

Executive Director | Ibrahim Al Zu'bi
Email: projects@emiratesdiving.com

Project Manager | Ally Landes
Email: magazine@emiratesdiving.com, photo@emiratesdiving.com

Administration Assistant | Ioline Gomes
Email: projects@emiratesdiving.com

Project Coordinator | Maisa Abuzatoun
Email: maisa.abuzatoun@emiratesdiving.com

Heritage Department Manager | Mr Juma'a Bin Thaleth
Email: heritage@emiratesdiving.com

MISSION STATEMENT

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

LEGISLATION

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

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

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Emirates Diving Association
P.O. Box 33220
Dubai, UAE

Office Location: Jumeirah 1, Al Hudaiba Awards Buildings, Block B, 2nd Floor, Office #214

Tel: +971 4 393 9390
Fax: +971 4 393 9391
Email: projects@emiratesdiving.com
Website: www.emiratesdiving.com

Facebook: Emirates Diving Association
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EDA'S UNDERWATER PHOTOGRAPHY AND FILM COMPETITION 2021

SUBMISSION DEADLINE

Sunday 18th April 2021 @ 11:59 pm (GST)

AN EVENT BY

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