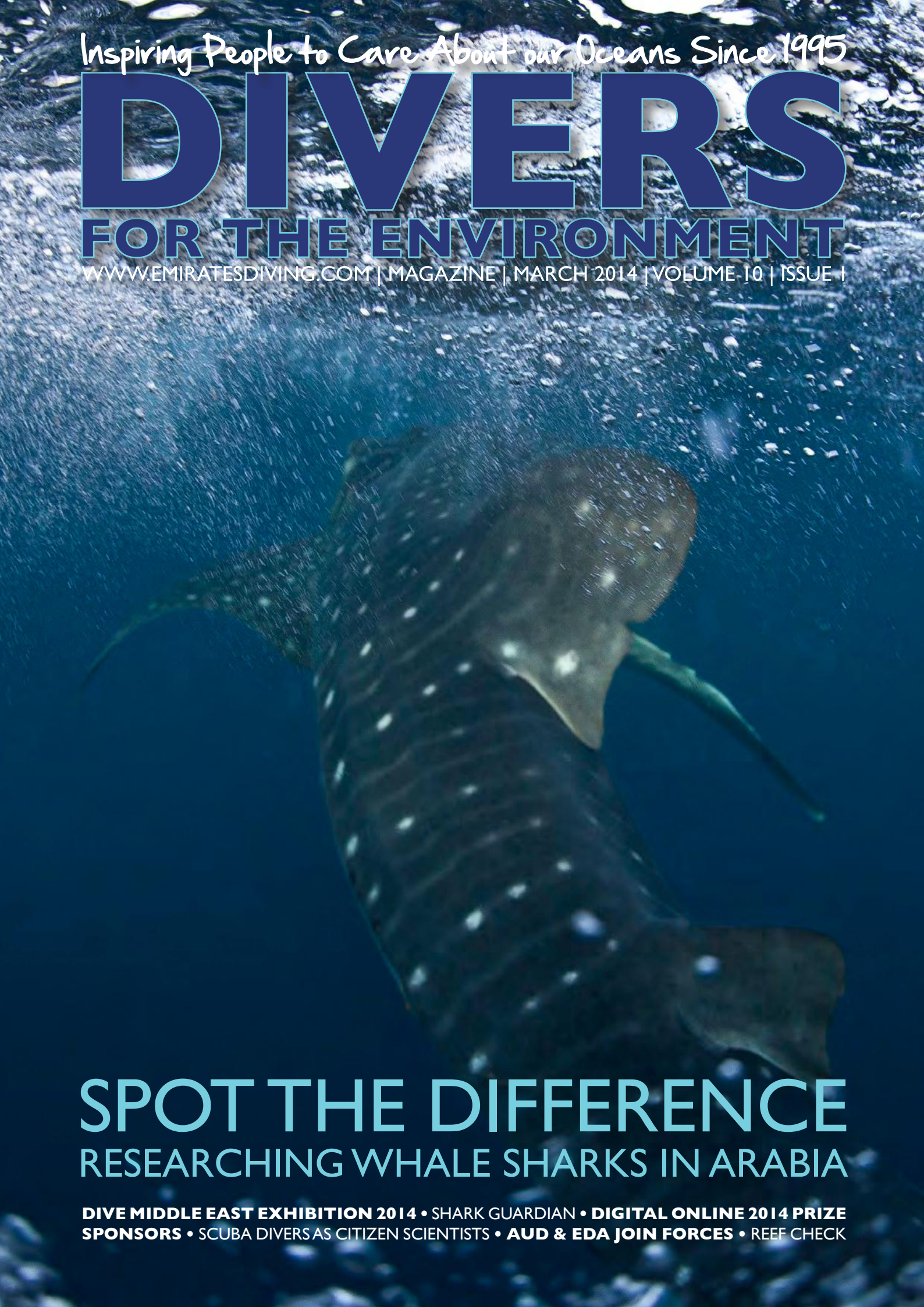
Inspiring People to Care About our Oceans Since 1995

DIVERS FOR THE ENVIRONMENT

WWW.EMIRATESDIVING.COM | MAGAZINE | MARCH 2014 | VOLUME 10 | ISSUE 1



SPOT THE DIFFERENCE

RESEARCHING WHALE SHARKS IN ARABIA

DIVE MIDDLE EAST EXHIBITION 2014 • SHARK GUARDIAN • **DIGITAL ONLINE 2014 PRIZE SPONSORS** • SCUBA DIVERS AS CITIZEN SCIENTISTS • **AUD & EDA JOIN FORCES** • REEF CHECK

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EDA
جمعية الإمارات للغوص
Emirates Diving Association

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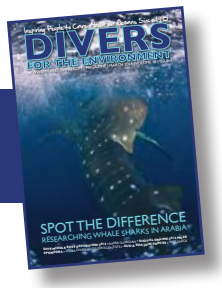
DIVERS FOR THE ENVIRONMENT

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. It is hoped that the magazine can become a platform for individuals to voice their opinion on marine and diving related issues. You are welcome to submit an article for the next issue of "Divers for the Environment" released in June 2014. Send all articles, feedback or comments to: **magazine@emiratesdiving.com**

EDA COVER
PHOTO BY DAVID ROBINSON



REDUCE REUSE RECYCLE

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EDA'S 19 YEARS HAVE GONE A LONG WAY

IBRAHIM N. AL-ZU'BI
EDA Executive Director

I would like to welcome you all to the March issue of 'Divers for the Environment'. We have 19 years of marine conservation, protecting a national treasure so that others may be able to enjoy them. That is what EDA stands for. By giving his blessing to establish this organization in February 1995, the late Sheikh Zayed bin Sultan Al Nahyan, not only placed conservation as a priority for us to uphold, but inspired us to bring about change ourselves.I want to take this opportunity to show my appreciation to all our members and staff for the dedication, loyalty and enthusiasm that they've demonstrated throughout this journey. Of course, none of what we have accomplished so far could have been possible without the leadership and visionary thoughts from our Board of Directors. I'm confident that the next 19 years will hold even more achievements we can be proud of.

As this is our first issue of the new year, I would like to take this opportunity to thank our sponsors, we are grateful for the financial support they have given EDA to enable us to continue our mission of conserving and protecting the UAE marine resources. We salute them for being environmentally responsible organizations and we hope that our partnership will last for a long time. When we first started in 1995 we only had a handful of EDA members. But now, we have more than 2,250 members. Looking back, who would have thought?!?

2013 was a busy and excellent year for EDA, DMEX 2013 was the biggest so far, Clean Up Arabia 2013 had the highest participation although we had bad weather conditions and our membership numbers rose significantly.

As you may know, March is the month of DMEX – The Leading Diving Exhibition in the region, where the diving community of the UAE and the region meets alongside the Dubai International Boat Show to discuss diving updates and share the latest available diving gear available. I always get asked about the future of the diving industry in the UAE and will this sport still boom in the region. My answer is clear and it is always the same; diving is a passion and the sport of diving and the diving industry in the UAE and the region will continue to boom, not only because the people of the UAE are people of the sea, but also because of the amazing infra-structure that we have in this country and the long term development goals the government has in place, marking the UAE as an international tourism destination. DMEX is getting so popular and it is becoming a hub for the diving industry within the region and globally. We hope to see you all at this year's 8th DMEX and that you enjoy the event.

We started 2014 with two big activities that you will read about in this issue. Our members' social event with 'Shark Guardians' was a great success and a very informative event where we raised awareness about sharks not only for our members, but also for some students in Dubai. The second main event was signing a Memorandum of Understanding (MoU) with the American University in Dubai (AUD) to collaborate and engage their media students with EDA events and projects as part of their university curriculum and work experience.

I am looking forward to this year's Digital Online – EDA's Underwater Photography and Film Competition Awards evening to meet all the underwater photography and video gurus who are participating in the competition and sending EDA their amazing photos and footage of the varied marine life from all the places our members have dived. I want to thank the Digital Online Guest Judges and wish them luck in their tough job judging all the amazing entries from our members and am looking forward to seeing all the final results on the 28th of May at the American University in Dubai.

As you all know, EDA is an official Reef Check Training Facility in the UAE so we continue to allocate space for Reef Check News from all over the world in all our issues! With EDA being one of the main Reef Check partners, we hope you will enjoy reading up on the updates and research regarding the conditions of the coral reefs in our oceans! We also have important articles from DAN in the health section about nutrition and diving and medical examinations for scuba diving.

I also want to take this opportunity to thank our EDA members who continuously share their insightful diving experiences and underwater photography 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 trips. We hope your passion and enthusiasm continues and you will continue to send us news about your next diving adventures.

I do hope you enjoy reading this issue. We have a busy year ahead, full of activities and events awaiting you. The EDA team is working tirelessly toward another successful year and we're looking forward to seeing you all at the next EDA event.

Happy reading and safe Eco Diving!

Ibrahim Al-Zu'bi

AUD AND EMIRATES DIVING ASSOCIATION COOPERATE TO INCREASE ENVIRONMENTAL AWARENESS

BY **GHADA KHEIR BEK**

LANCE DE MASI: *No one should be considered educated without an understanding of the role of environmental preservation in improving the quality of life on our planet.*

BRAD MOODY: *Our Digital Media students are converting EDA's print publication into an interactive multitouch publication for the iPad.*

Dubai, February 11, 2014. The American University in Dubai (AUD) signed a Memorandum of Understanding (MoU) with the Emirates Diving Association (EDA) to initiate mutual collaboration and strong relations in order to increase awareness on environmental matters through education, research, and other activities.

Mr. Khalfan Khalfan Al Mohiari, EDA's Financial Director and Board Member, and Dr. Lance de Masi, President of AUD signed the MoU, in the presence of Mr. Ibrahim Al-Zu'bi, EDA's Executive Director, Ms. Reema Al Abbas, EDA's Projects Manager, and Ms. Ally Landes, EDA's Event Coordinator. Also joining the signing ceremony were several AUD faculty and staff members including Dr. Jihad Nader, Provost/ Chief Academic Officer, Dr. Woodman Taylor, Chair of Visual Communication and Associate Professor of Art History, Mr. Brad Moody, Associate Professor of Digital Media, and Ms. Peggy Awad, Director of External Relations.

"I am frequently asked what constitutes an educated person. Of course, in my answer, I include, among others, words such as numerate, literate, culturally aware and sensitive. I also never forget to make some reference to the environment. No one should be considered educated without an understanding of the role of environmental preservation in improving the quality of life on our planet. It is my hope that our association with EDA will further this dimension of an AUD education" comments Dr. de Masi.

In addition to providing AUD students with internship opportunities, EDA will extend environmental services exclusively to the university's students, faculty, and staff. These services include marine environmental and ecological education programs, presentation on studies and monitoring programs undertaken by EDA, as well as covering any special topic requested by AUD.

"We are so proud to have the students of AUD base their projects and work experience on EDA's ongoing work to promote the safeguarding of our underwater world's future and on a project for the Dive Middle East Exhibition 2015. The bond in co-joining our work and translating it through the American University's students' courses is an inspiration to us all" comments Mr. Al Mohiari.

Indeed, this partnership will provide AUD's Digital Media students with an expansive opportunity and necessary resources to further engage in real life Underwater Media situations. "EDA has given our students real project opportunities in multitouch interactive books, magazines and video" comments Prof. Moody. "The intermediate video class is doing a group project on the Dive Middle East Exhibition/EDA. They will be conducting interviews of key people and dive exhibitors, shooting trial dives – test equipment (underwater) and various elements of DMEX (the largest dive exhibition in the Middle East). We are also working on converting EDA's print publication into an interactive multitouch publication for the iPad".

With this agreement, AUD will explore joint events and activities opportunities, engage its students and faculty in environmental initiatives and projects and pave the way for exchange of knowledge between both parties. This collaboration is in line with AUD's commitment to environmental education, community outreach, and excellence in teaching and learning, as well as its desire to give back to the UAE community.

EDA is a non-profit voluntary federal organization and is accredited by UNEP as an International Environmental Organization. Its mission is to conserve, protect and restore the UAE marine resources by empathizing and promoting the marine environment and environmental diving. It was established 19 years ago and has more than a dozen partners and sponsors supporting its goal of inspiring people to care about the ocean.

ABOUT AUD

The American University in Dubai (AUD) is a private, non-sectarian institution of higher learning founded in 1995. It serves UAE nationals and international students who seek

world-class career-oriented education. AUD, as an international institution of higher education, encourages global understanding by providing an atmosphere of cultural diversity and opportunities for an international education.

- AUD is officially licensed by the Ministry of Higher Education and Scientific Research of the United Arab Emirates. The Ministry has accredited the university's programs in International Studies, Business Administration (both undergraduate and graduate), Communication and Information Studies, Engineering, Architecture, Visual Communication and Interior Design, Education (graduate), and Construction Management (graduate), in addition to a Certificate program in Middle Eastern Studies.
- AUD is accredited by the Southern Association of Colleges and Schools (SACS) Commission on Colleges (COC) to award Bachelor's and Master's degrees.
- AUD is approved to operate by the State of Georgia Nonpublic Postsecondary Education Commission (NPEC).
- AUD has received specialized accreditation for its Bachelor's of Business Administration (B.B.A.), and Master's of Business Administration (M.B.A.) degree programs in business through the International Assembly for Collegiate Business Education (IACBE).
- The university's undergraduate majors in Marketing Communications and Advertising have been accredited by the International Advertising Association (IAA) in New York.
- The Civil, Computer, and Electrical Engineering Programs of AUD's School of Engineering are accredited by the Engineering Accreditation Commission of ABET.

For more information, please visit:
www.aud.edu.

INCORPORATING REAL LIFE PROJECTS FOR THE CLASSROOM

FEATURE **BRAD MOODY**
ASSOCIATE PROFESSOR OF DIGITAL MEDIA | AUD

The Interactive class

The American University in Dubai is excited about creating a relationship with Emirates Diving Association. Staff within EDA have a profound passion for the UAE, the marine environment and diving. What we at AUD want to do, is incorporate this passion into the classroom creating engaging, real life projects for our students to experience. On a personal level, I find this type of integration fosters a great deal of stimulation within the classroom. Relationships such as the one that AUD and EDA are currently building, provides amazing opportunities for not only the students, but the corporation as well, while serving to benefit the environment at the same time.

The partnership that has been created will provide AUD's School of Architecture, Art & Design, Department of Visual Communication, Digital Media concentrated students with expansive opportunities as well as resources to further engage in real life Underwater Media situations. EDA has given our students project opportunities in multitouch interactive books, magazines and video that will provide the students with an accurate representation of what is necessary in a true to life work experience. This relationship will also serve to benefit the AUD community at large in additional areas, including but not limited to, the Sciences, Business, Advertising and Marketing.

At present, AUD's Intro to Interactive class and Intermediate Video class are collaborating in order to be involved in the Dive Middle East Exhibition (DMEX), creating larger scale, group video projects.

As we plan our future relationship with EDA, we are in hopes of organizing an AUD/EDA dive club that will allow our students the opportunity to be involved in both the environmental activities that EDA supports as well as the increasingly popular sport of diving.

The Intermediate Video class

AUD | AMERICAN UNIVERSITY IN DUBAI

School of Architecture, Art and Design





AN EDA SOCIAL WITH VOX CINEMAS PRESENTS SHARK GUARDIAN

A special event took place at VOX Cinemas in Mercato Mall, first on Monday 3rd of February for the Duneha home school group's children between the ages of 8-11 and then again on Wednesday 5th of February for EDA's members and friends.

Directors of Shark Guardian, a UK Charity for Shark and Marine Conservation presented an exciting video and slide show about sharks, the role they play in our oceans, the variety of species, interesting shark facts and how to get involved with shark conservation.

Brendon Sing and Liz Ward-Sing are professional diving instructors with a great deal of shark diving and shark research experience. The presentation was enlightening for everyone – whether a snorkeler, diver, professional diver or just interested about sharks and other marine life in general.

To find out more about Shark Guardians visit www.sharkguardian.org

VOX cares



SHARK GUARDIAN

VIDEO AND SLIDESHOW PRESENTATION

Presented by Brendon Sing and Elizabeth Ward-Sing | Professional Scuba Diving Instructors, Shark Divers and Researchers!

SHARK GUARDIAN

Global Ocean
for those who care

WHEN: Wednesday 5th February 2014
WHERE: Mercato VOX Cinema
TIME: 19:30 - 21:00

Discover the amazing nature of sharks as the world's apex predator and greatest protector. Sharks are important for our ocean ecosystem that supports all life on Earth. Come and find out more about sharks and conservation!

To reserve your place, please call EDA on +971 4 393 9390
or email projects@emiratesdiving.com

www.sharkguardian.org | info@sharkguardian.org

Photo by © Simone Caprodossi

EDA
جمعية الإمارات للغوص
Emirates Diving Association

VOX cares

DIVE MIDDLE EAST EXHIBITION
DMEX 2014 IS NOW IN ITS 8th YEAR

THE DIVE MIDDLE EAST EXHIBITION

Whether you're a casual or seasoned diver, immerse yourself in a world of underwater adventure during the 8th Dive Middle East Exhibition, the only international event in the Middle East. Supported by the Emirates Diving Association (EDA), discover state-of-the-art diving gear and equipment, alongside a series of professionally delivered practical and interactive activities in our on-site demonstration pool, designed for divers of all levels.

DMEX
DIVE MIDDLE EAST EXHIBITION

4-8 March 2014 | 15:00pm - 21:30pm
Dubai International Marine Club, Mina Seyahi

THE VENUE – DIMC

Founded in 1988, the Dubai International Marine Club is one of the most established marina and watersports clubs in the region and has become the diving force behind the growth of national and international water sport events in the Middle East. Located on Dubai's rapidly developing waterfront, next to the Le Meridien – Mina Seyahi and the iconic Palm Jumeirah, DIMC is the ideal venue partner for the Dubai International Boat Show.

AL BOOM DIVING
STAND NO: DMEX L1, L2, L3 & M10

Al Boom Diving

Al Boom Diving's back again for DMEX 2014 and we're looking forward to our biggest show ever with FOUR stands in total.

For those of you thinking about taking the plunge and finding out more about our daily diving and snorkelling trips and PADI Dive Courses look no further than DMEX-L1 where we'll have a team of PADI Dive instructors on hand to answer your questions. As the UAE's most established Scuba Diving Company, Al Boom Diving has partnered with the Le Meridien Al Aqah Beach Resort and Spa; Atlantis, The Palm; Jebel Ali Golf Resort and Spa and the Dubai Aquarium and Underwater Zoo to put us on the doorstop of some of the best diving and facilities the Emirates has to offer.

Our Aqua Lung & Cressi Stands (DMEX-L2 & L3) will showcase the latest equipment from these industry pioneering manufacturers. Come and say hi to their representatives from France and Italy.

Al Boom's popular DMEX Dive Shop (DMEX-M10) will be packed with a huge variety of our latest and greatest products. Aqua Lung, Apeks, Aqua Sphere, Cressi-Sub, Suunto, Ikelite, Light & Motion, Poseidon, Innovative Scuba Concepts, Underwater Kinetics, Sea and Sea, GoPro, Polar Pro, UK Pro, Octomask, Go Mask, IGills, Amphibious Outfitters, Trident Diving Accessories, Sea Pearls weights, XS Scuba Cylinders & accessories, Faber Cylinders and more…you'll find it all at Al Boom Diving's DMEX Dive Shop!

SCUBA SCHOOLS INTERNATIONAL
STAND NO: DMEX L8

SSI
SCUBA SCHOOLS INTERNATIONAL

SSI is more than a Certification Agency. SSI is an international training agency which strives for individual service and is known as the "Business Support Company" of the diving industry.

Since 1970, SSI has been an internationally recognized Training Agency. We have over 3,000 SSI Dive Centers, Resorts and Schools in more than 113 countries. SSI training materials are published in 30 different languages and we have more than 40 years of experience in delivering business support and quality education. SSI is also ISO certified worldwide with an emphasis on quality education.

SSI offer: Swim, Snorkel, Scuba, Freediving, Extended Range, Technical Extended Range Diving and Poseidon Mark VI Rebreather diving. It also offers a wide variety of business support programs designed to help increase store revenues.

SSI offers the most innovative Online Service Portal to its members and it is the only training agency which offers FREE Online Training for its customers.

SSI MISSION is to improve the profitability and success of SSI Dive Centers and staff by integrating a fully developed strategy with high quality business and educational programs.

DEEP BLUE SEA DIVING CENTRE
STAND NO: DMEX M41

DEEP BLUE SEA DIVING

We are one of the leading dive centers in Dubai, established in 2004 and Khorfakan Oceanic Hotel in 2013.

We offer a range of courses from beginners to instructors & First Aid Courses. Our Diving Centre offers a full range of facilities including Boat, dive shop, classroom, equipment rental and a booking office.

We work closely with various corporate clients providing recreational and professional diving training.

We offer weekly diving trips to various locations within UAE and Oman.

We are the regional representative for IDEA Middle East, and are also authorized to issue diving certificates by various global diving organizations, such as PADI, CMAS and SSI. We are the agency for Beuchat, also the distributor for Suunto and OCEANIC diving equipment in Dubai, amongst other established brands sold in our dive shop.

We are Corporate and Established Partners with:

- Emirates Airline
- Emirates NBD
- Emirates
- Dubai First
- Fly Dubai
- Collette Group

TOURISM MALAYSIA
STAND NO: DMEX L5

Tourism Malaysia's mission is to promote Malaysia as an outstanding destination of excellence and to make the tourism industry a major contributor to the socio-economic development of the nation.

It is a country which offers a unique and diverse look into the rest of Asia as a melting pot of races, cultures and religions.

Come and discover the many wonders of Malaysia, and be prepared to be amazed with Visit Malaysia Year 2014!

Visit our official website at **www.tourism.gov.my** for further information.

Selamat Datang (Welcome) to Malaysia!

TOP CLASS CRUISING
STAND NO: DMEX L28

Top Class Cruising is a leading Liveaboard operating company incorporated in Maldives and specialized in managing luxury yachts. Our mission is to provide our customers with the greatest vacation of their lives. We offer unmatched quality, service and attention to detail like no other. Thanks to our Italian management and highly professional Maldivian crew, we provide exceptional professional customer service and outstanding personal attention to each and every customer. Your experience onboard will be exclusive, private and intimate. Whether you are a family with young kids, a group of adults, a single looking for fun, or a couple looking for a romantic retreat, your vacation onboard is set to your pace and tailored to your preferences. This is a unique opportunity to escape the stress of everyday life in absolute luxury and comfort diving, snorkeling, sunbathing or simply enjoying the paradise called Maldives.

AMIT
STAND NO: DMEX M31

AMIT (Abdulla Moh'd Ibrahim General Trading) is a family business established by Abdulla Mohamed Ibrahim in 1981 as a small trading company to cater to the burgeoning demand for modern marine equipment in the United Arab Emirates, a Gulf nation with strong maritime traditions. Since then, the company has succeeded in becoming the UAE distributor for a number of electronic brands, including Garmin and other innovative products across outdoor recreation, fitness, marine, aviation and tracking, and currently has 4 showrooms located in Dubai, Sharjah and Abu Dhabi. Today, AMIT is the premier Marine and Land Equipment Company in the UAE and Middle East, combining strategic planning, ingenuity, creativity and highly qualified dedicated personnel to maintain our reputation for efficiency, reliability, and professionalism.

EMIRATES DIVING ASSOCIATION
STAND NO: DMEX L33

EDA is a non-profit voluntary federal organization and is accredited by UNEP as an International Environmental Organization. Our mission is to conserve, protect and restore the UAE marine resources by understanding and promoting the marine environment and promote environmental diving. Divers can prove extremely utile in conserving the marine environment through observing, reporting and preventing environmental abuse.

DAN Europe will be with us this year so come on over to say hello to the EDA and DAN team to ask any questions you may have. Don't forget to collect a copy of the EDA March magazine issue, 'Divers For The Environment'.

For more information about EDA, go to: www.emiratesdiving.com.

ESAL MARINE
STAND NO: DMEX M21

Esal Marine, a division of Esal Trading LLC is a specialty marine and water sports distribution company that services the Middle East markets with the latest unique products from all around the globe with a main focus on brand building and excellent customer service trying to redefine the leisure of water sports in the Middle East with affordable products that satisfies all tastes.

We are proud of being the Middle East's exclusive distributors for SEA-DOO® and SEASCOOTER™ and with this range of products, our aim is to enhance the water sport and leisure industry to provide extreme water sport fun to our customers.

You can soon start following us on our website www.seascooters-me.com

PREMIERS FOR EQUIPMENT
STAND NO: DMEX L18

Premiers For Equipment is a 100% local establishment based in Abu Dhabi, United Arab Emirates founded in 2001 dealing with several government authorities, municipalities, oilfield companies, divers and diving centers.

We are committed to provide first class service to complement our quality products and to offer our clients a strong local support in the field of diving, be it in recreational, sports or technical.

We are the sole agent Oceanic (USA) and Aeris (USA) for sport and recreational diving, Persistent (USA) and Picasso (Portugal) for spearfishing, Teknodiver (Italy) for custom made diving suits, Explorer Case (Italy) for water proof cases, OceanReef (Italy) for underwater telecommunication systems and Hollis (USA) for technical diving.

We offer all levels of recreational PADI courses.

THE PAVILION DIVE CENTRE
STAND NO: DMEX M40

As a PADI Career Development Centre, we can provide you with just about any PADI course you might be interested in from Discover Scuba Diving to PADI Instructor. In addition to mainstream scuba training, we also hold (DDI) Disabled Diver Training for Instructors and divers with disabilities. We also specialize in the education of children aged 12 to 18 through the Jumeirah Tawasul project and in addition to gaining a PADI license, children can also get involved in our environmental projects.

We regularly dive at the popular shipwrecks off Dubai as well as the impressive Musandam. We stock SCUBAPRO dive gear and accessories.

We have a great deal for you this year at DMEX so come and visit the booth for more information.

DEEP TREKKER
STAND NO: DMEX L22

Deep Trekker's mission is simple: we want to give anyone on the earth an opportunity to explore the depths of our vast oceans, seas, lakes or rivers with a Remotely Operated Vehicle (ROV).

The DTG2 remotely operated vehicle is a product like no other the world has seen. Its compact size, on-board batteries, and hand-held integrated screen and controller make the DTG2 ROV the leader in portability and ease of use, while maintaining the capabilities of larger and higher priced ROV systems.

Experience for yourself this ultimate exploration tool and the thrill of discovering a ship wreck or reef without having to leave the deck.

AL-HADDAD SCUBA
STAND NO: DMEX L14

Al-Haddad Scuba is one of the leading companies in Saudi Arabia and one of the fastest growing scuba suppliers in the Middle East, with powerful brands such as National Geographic Snorkeler, Intova, Tovatec, Amphibious Outfitters, Tecline, Scubatech, L&W, and Aropec.

Our passion for the best quality products never ends. Many of our products are tailor made from our suppliers to meet our regional requirements with a wide range of more than 700 items to choose from and a large warehouse with more than 13,000 items available in stock to fulfill any order from any territory.

We are currently National Geographic Snorkeler's sole distributor for the gulf region and the Maldives as well. Our aim is to provide you with the best products and the best prices for it.

ATLANTIS, THE PALM
STAND NO: DMEX L21

ATLANTIS
THE PALM, DUBAI

Atlantis, The Palm is the first entertainment resort destination in the region and located at the centre of the crescent of The Palm in Dubai. Opened in September 2008, the unique ocean-themed resort features a variety of marine and entertainment attractions, as well as 17 hectares of waterscape amusement at Aquaventure Waterpark, all within a 46 hectare site. It is home to one of the largest open-air marine habitats in the world, with over 65,000 marine animals in lagoons and displays including The Lost Chambers Aquarium, a maze of underwater corridors and passageways providing a journey through ancient Atlantis. Aquaventure features 18 million litres of fresh water used to power thrilling waterslides, a 2.3km river ride with tidal waves and pools, water rapids and white water chargers. Dolphin Bay, the unparalleled dolphin conservation and education habitat, was created to provide guests a once in a lifetime opportunity to learn more about one of nature's most graceful mammals. Atlantis, The Palm is also known as the culinary destination in the region with a collection of world-renowned restaurants including Nobu and Ronda Locatelli. The resort boasts an impressive collection of luxury boutiques and shops as well as extensive meeting and convention facilities.

SCUBATEC DIVING CENTER
STAND NO: DMEX L34

Scubatec Diving Center LLC is a 5 Star IDC Center established in 1993 and licensed by the Professional Association of Diving Instructors (PADI). We are well known in Dubai as one of the friendliest and busiest dive centers. Our team of dedicated and professional instructors will ensure that you gain all the knowledge and experience required to be safe scuba divers. Scubatec prides itself on the personal touch and prefers smaller groups on dive trips so the divemaster and instructor can dedicate more time and attention to individuals. We also feel the same way about diving courses and can cater to one student at a time, ensuring that you the diver gets the best of our time. We will also fit the timings around your schedules, enabling you to do the courses at your own comfortable pace. Diving is one of the worlds fastest growing sports. Allow us at Scubatec to show you the magic and thrill that the underwater world has to offer. With Scubatec you can be sure to have a memorable and exciting underwater experience. We sell the following brands: Oceanic, IST, Akona, Sherwood, Gopro and Sealife under water cameras, have a full time repair workshop, and rent diving and snorkelling equipment, as well as offer dive trips in the UAE and Oman.

SCUBATEC
Diving Center

PRODIVE MIDDLE EAST
STAND NO: DMEX L31

PRODIVE
MIDDLE EAST

Prodive Middle East offers a professional scuba diving training facility. From Go to Pro PADI recreational certified courses and daily dive trips to the Dubai wrecks. We also have a full time dedicated technical diving instructor able to take you beyond normal adventures.

Scuba diving is a sport which caters for just about everyone. From age 8, you will learn underwater skills which will build confidence in and out of the water. From individuals to groups, families, schools and business groups, Prodive Middle East caters for everyone.

Our course fees also cater for everyone's circumstances. Our Platinum service is for 1:1 or 2:1 where your instructor will tailor the course to your schedule, at a place suitable for you making it easy, we come to you. Our superior service is available at the dive center. There is a course schedule where you can choose the appropriate session at the appropriate time making it easy, you come to us.

For additional information you can contact the Prodive Team on 04 399 5711 or email us on info@prodiveme.com.

OMAN SAIL LLC
STAND NO: DMEX M51

SEAOMAN
Discover, Explore, Experience

OMAN SAIL

Welcome to SEAOMAN. This site is dedicated to getting you and your family on, in and underwater in the Sultanate of Oman.

Oman's stunning coastline is undoubtedly best explored by sea. For those seeking a perfect holiday, enjoy luxurious accommodation and our various activities tailored to your specific needs. Explore the breathtaking views and discover an underwater paradise together with thrilling activities from sailing, private charter and diving enjoyed by all! Let Oman Sail take you on a journey of discovery.

AL SAMMAK DIVING & MARINE SPORTS
STAND NO: DMEX L7

AL SAMMAK السماك

Al Sammak Diving was established in 2000.

They trade and deal in:
- Scuba diving equipment & accessories
- Freediving equipment
- Outdoor camping equipment
- Fishing equipment
- Boat inflatables and tubes

They also offer scuba diving and free diving courses and certifications, diving gear rentals, equipment repairs, air and nitrox fills and organize diving trips locally and abroad.

TWINS TRADING
STAND NO: DMEX L30

Twins Trading Import and Export and Commercial Agencies. Company with limited liability INSAT 2001, located in Hurghada Egypt Red Sea Governorate. Imports activity kits and tools for diving and exports clothing (T-shirts) to the European Union.

Success Partners:
Hurghada Red Sea
- Extra divers Makadi
- Extra divers Sharm El Arab
- Aquarius Red sea
- O2 Dive Shop
- Diving Attitude

Marsa Alam
- Extra marsa Alam
- Extra port ghalib

Sharm Elshik
- Extra Sinai
- Sinai Divers
- Maison de la Mer
- Dive stop Shop
- Aquarius Sharm

Dahab
- Neptune Shop

SHEESA BEACH'S CLEAN UP INITIATIVE

FEATURE **NEIL MURPHY** PHOTOGRAPHY **RUMYANA TAKOVA**

February is the month dreaded by dive operators in the Musandam, cold water, bad visibility and unpredictable weather patterns can hamper any planned event during this time. However, the environment that we choose to spend our time in is under threat from increasing population, tourism and simple ignorance on the part of people and we cannot always wait for warm weather, great visibility and no wind.

Friday the 7th of February was chosen as the due date for Sheesa Beach in association with the good folks and members of Emirates Diving Association to practice what we preach. Friday dawned with clear skies and not a breath of wind and after the preparation of getting the dhow and speedboats ready for the trip, all the participants started arriving. A very pleasing aspect to the clean up was the level of participation, we certainly did not expect the number of people who were willing to donate their time to a great cause. Marine conservation and awareness really has boomed over the years.

Our intention was Lima Rock and the surrounding dive sites, but alas the weather gods conspired against us as we set out. We decided to duck into Ras Sanat (the cave) and do our clean up there. A number of factors go into making weather based decisions such as which direction are the wind and waves coming from and where do we anchor in order to keep the show stable so people can still enjoy lunch and are able to relax in between dives.

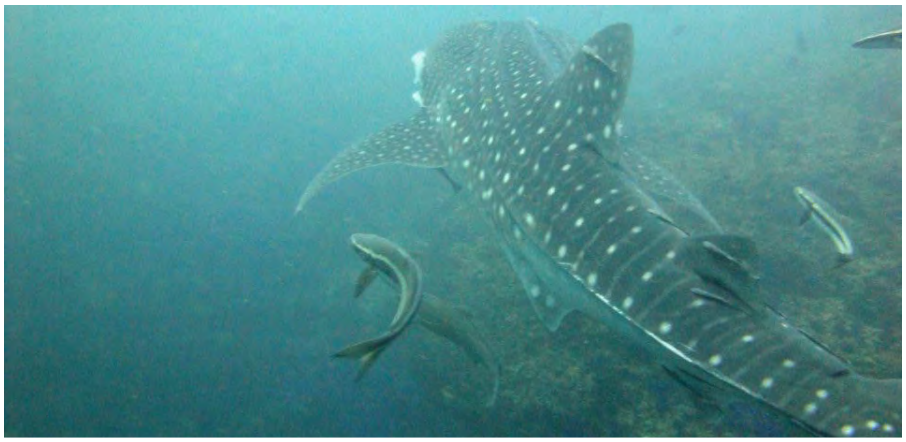
Three teams set out and we were greeted with 22 degree centigrade water and 3m visibility. Undeterred, the participants went about the

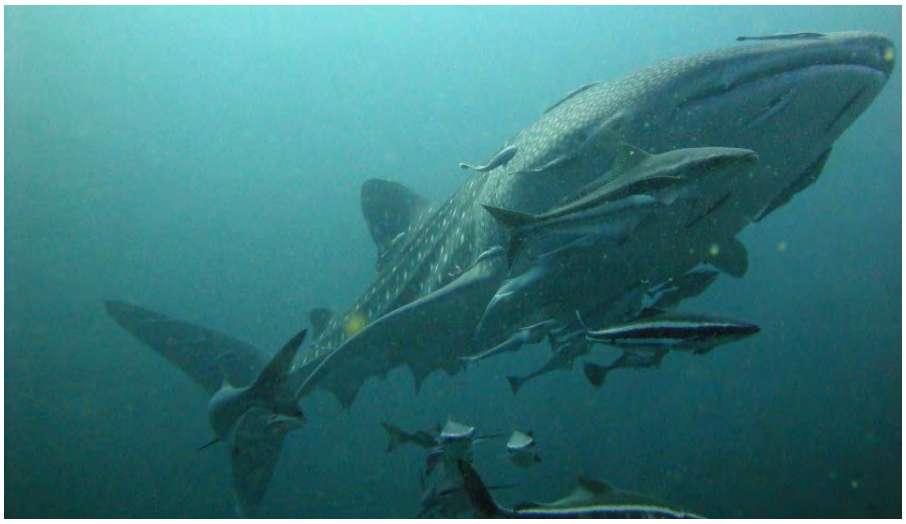
the task of cleaning up the site with gusto. Rope, fishing nets, bottles, cans, packets and other debris were all collected in the green bags that were kindly sponsored by EDA and dumped into the boat allocated for rubbish. After the 1st dive, a hearty lunch was enjoyed by all before setting out on the 2nd dive. Ras Sanat was a great location as it is used by all the dhow and dive operators in Dibba on a daily basis and thus the human impact factor is very evident. All in all, a total of around 35 kilograms was collected by everyone. After everyone had toweled off, put on warm clothing and gulped down a warm cup of tea or coffee, a certificate presentation was done for every person that participated. No matter how well you plan a trip, it is only as good as the people on board and we had a great bunch of people all sharing the oceans plight, a good laugh in the face of adverse weather conditions and knowledge in the fact that we left a dive site in a healthier state than when we arrived. Our eco warriors returned to port after having braved the cold and terrible visibility but happy and proud in the knowledge that "today we made a difference".

Special thanks must go to Rumyana Takova of Sheesa Beach for her efficient and professional organization of the event, the guides of Sheesa Beach who never stopped cracking a joke and keeping the event lighthearted, Rico Guioguio of Al Marsa and Matt and his team from Extra Divers Zighy Bay who all pitched in with equipment, boats and guides to help with this event. Not only did we make a small dent in a huge global problem, but it brings everyone together and it was especially pleasing to sit down at the end of a successful day with all the staff of the different companies in the Musandam and share a cold beverage and a common interest in a realm that offers us enjoyment, employment and lifelong memories and new found friends.

We will be hosting a clean up debris day on a regular basis from now on, so if you are up for a relaxing dhow trip coupled with a worthy cause, then give us a call, check our Facebook page or drop us a mail for future dates and events. After all, conservation is the application of a common sense to a common problem for the common good.

DISCOVERING MUSANDAM WITH AL MARSA TRAVEL





Musandam based diving and cruises specialist Al Marsa Travel is now offering a host of services to help guide visitors through some of Oman's most spectacular reefs and rock formations to find a huge selection of marine life spread over more than two-dozen unique dive sites.

Located 120km away from Dubai, Musandam is home to several exotic marine species, including Lion fish, Whale Sharks, Pilot whales, Lobsters, Hawksbills and Green turtles. Al Marsa's multi-lingual SSI/PADI and EFR – certified instructors will help visitors attempt to see them all. The company now offers beginner and experienced PADI courses including Discover Scuba, Open Water and Advanced courses.

Al Marsa Travel also offers stunning dhow trips in Musandam, allowing guests to explore the 500 year old tradition of dhow boat cruising across the Gulf of Oman through the fjords of the Musandam Peninsula.

Al Marsa Dhows have the privilege of entering the breathtaking world of the northern Hajjar mountain range Ru'us al Jibal with its awesome rugged 'Fjord-like' coastline known as the eastern Musandam Peninsula. It is here, surrounded by the warm waters of the Indian Ocean and Gulf of Oman, that one of the widest biodiversities of marine species can be found anywhere in the world. The deep drop offs and cool water upwellings, provide an abundance of plankton, making this a rich feeding ground for a huge variety of marine life and coral gardens.

Perhaps more than this is the almost indescribable beauty of nature here itself, clear starlit nights, panoramic ocean seascapes, hidden coastal villages with their interesting history and traditions in dhow building and fishing. We have top of the range Arabic Dhows that cruise you up into these hidden bays, which are for the most part, inaccessible from the land. Every vessel we have is fully equipped (including satellite communication) for cruising and living onboard with air conditioned cabins, large open sun decks ,freshly prepared meals by our onboard chefs and all the facilities for diving, snorkeling, fishing and kayaking.

Al Marsa Travel will take part in the ATM on 5-8 May 2014. Please visit us at our stand, CP 2530.

THE SMALLSPOTTED CATSHARK

FEATURE **ANDREW ROUGHTON**

I'm sure everyone in the scuba diving community has their favourite aquatic animals. In tropical waters there are those we all long to see – Dolphins, Manta Rays, and Whale Sharks. And there are those we see regularly, but still hold in high affection – Lion Fish, Puffer Fish, and Moray Eels. However, in cold waters, my absolute favourite has to be the Smallspotted Catshark. It may seem like an odd choice as it's not particularly uncommon, big, or dangerous. Nevertheless, for me, it's without question the highlight of any cold-water dive.

Of course, with many avid shark spotters, there is the thrill of diving with a potentially dangerous animal. It's a patent adrenaline rush, which few of us could honestly deny. And of course the Smallspotted Catshark is no more dangerous than an Eel, Barracuda, or Freshwater Pike. However, when moving, the Smallspotted Catshark has all the grace of any big shark. She doesn't jolt around nervously like many regular fish species. Instead, she glides majestically through the kelp beds like the ocean's equivalent of a big cat stalking its prey through the African Savanna. Then, conversely, when she comes to rest on the ocean floor, she sits unflinchingly and allows intrepid underwater photographers to sit next to her and snap away to their hearts' content, which is an absolute dream when compared with many shark species, who, although wonderful to observe, rarely stay still long enough to get a good photograph taken.

Now, to be fair, the Smallspotted Catshark is more commonly known as a Dog Shark or Dog Fish, which can be quite confusing. However, a Dog Shark – sometimes known as a Sandy Dog or Rough Hound, just to add to the confusion – is actually a shark found more commonly in the deep waters of Western Europe. Conversely, the Smallspotted Catshark can be found by divers in shallow waters, on both soft and hard sea beds, all across Great Britain and the Republic of Ireland.

So whether you're diving in Cornwall, Connemara, or the Clyde, although you may be in a quest to see Seals, Dolphins, or even Basking Sharks, I strongly urge you to take the time to watch these beautiful creatures – whether they're gliding through marine meadows or nestled in the sea bed – and capture some time with one of the ocean's least publicized, but most enchanting aquatic animals.

ECOVER BLUE MILE MAKES A TRIPLE SPLASH!

PHOTOGRAPHY **© SPORTENVIRONMENT.COM/ROY RILEY**

Two flagship events and one big weekend planned for this summer's mass participation event that gets the nation immersed in our wonderful blue environment.

Registration has gone live for the Ecover Blue Mile flagship events at Weymouth and Plymouth with a new programme of activities suitable for absolutely everyone to get involved. This is the first time that a full programme is taking place in Weymouth as well as Plymouth, giving more people than ever before the chance to enter the Blue Mile and support the Marine Conservation Society's crucial work protecting our seas, shores and wildlife.

In addition to this year's flagship events, schools, colleges and community groups across the UK are being encouraged to Go Blue! and do something amazing for our seas. The Go Blue! big weekend will kick off on Friday 6 to Sunday 8 June with celebrities joining in the fun to help raise awareness about the need to protect our seas.

Olympic Canoe Slalom Champion, Tim Baillie is lending his support and agreed to kick off the Go Blue! campaign by leading a combined Ecover and MCS team 60 miles across Scotland in the Great Glen Paddle. The team will be raising money for MCS and promoting the work of the charity as they paddle from Fort William to Inverness on 22-23 March.

Tim Baillie said "I'm really pleased to lend my support and be part of Team Go Blue! The Great Glen is an iconic stretch of water linking the east and west coasts of Scotland and I hope we can inspire people across the UK to join in and be part of the Go Blue! big weekend."

This year, the Ecover Blue Mile Weymouth will take place on the 19-20 July and will feature a brand new open water swim and aquatriathlon for both individuals and teams. There will also be a paddle sports course for kayakers and stand up paddleboarders with the second edition of the UK Naish SUP paddle series taking place on Sunday 20 July.

The Ecover Blue Mile Plymouth returns for a fourth time taking place on the 13-14 September as part of the Ocean City Festival.

Ecover Blue Mile event manager, Teresa Page said expanding the event with a full programme in Weymouth was a natural progression: "It's such a brilliant venue, with a great beach and waterfront. We were blown away by the welcome we received by everyone last year when we put on the water sport taster sessions.

"We can't wait to get back there with a full programme this year. Families and children can try out the paddle sports and there's also a chance for people to be competitive in the races. The one mile swim is brand new for Weymouth and we're looking for lots of people to come and enjoy the course."

Visit **www.thebluemile.com** for more information and to register to take part.

ABOUT ECOVER BLUE MILE

The Ecover Blue Mile launched in 2010 as a new mass-participation event designed to connect the nation with our seas, shores and wildlife. Today the Blue Mile is more than just an event and has grown to include a nationwide schools and grassroots programme with over 200 organisations taking part. This year we plan to engage with hundreds of school children across the UK to celebrate our seas and raise some money to support the work of our official charity partner, the Marine Conservation Society.

ABOUT ECOVER

Ecover is the world's largest producer of ecological cleaning products, using sustainable plant and mineral-based ingredients to create highly effective cleaning products that achieve the lowest possible toxicity and the most rapid and complete biodegradability. Constantly innovating, Ecover continues to expand and improve its product range, including the development of a new Eco-Surfactant for use in its hard surface cleaners, meaning the range cleans as well as – or better than – the UK's leading conventional brands. All of Ecover's plastic bottles are made from Plant-astic – a 100 per cent renewable, reusable and recyclable plastic made from sugarcane. Ecover was the first cleaning brand in the UK to use Plant-astic and has used it across its product range since 2011.

For more information on this pioneering brand, visit **www.the-splash.co.uk**.

ABOUT THE MARINE CONSERVATION SOCIETY

The MCS is the UK charity dedicated to protecting our seas, shores and wildlife. MCS is the official charity partner of the Ecover Blue Mile and Ecover Blue Mile participants are asked to fundraise for MCS alongside their participation to help protect the environment they enjoy so much.

MCS campaigns for clean seas and beaches, sustainable fisheries, and protection of marine life. Through education, community involvement and collaboration, MCS raises awareness of the many threats that face our seas and promotes individual, industry and government action to protect the marine environment. MCS provides information and guidance on many aspects of marine conservation and produces the annual Good Beach Guide, the Good Fish Guide and Fishonline on sustainable seafood, as well as involving thousands of volunteers in projects and surveys such as MCS Beachwatch.

www.mcsuk.org

BECOMING A DIVING INSTRUCTOR

FEATURE **BECHIR CHEHAB**





EXPERIENCING TO DIVE

I was born in Lebanon in Beirut in 1982 during the civil war. At that time it was very hard to live in the capital, so my parents decided to move out and live near Byblos, one of the most historical and beautiful beach cities where we were safe from the bombings. During quieter times, I used to enjoy boat trips with my Dad and since then, the ocean was my quiet place.

I was always fascinated by scuba diving and I moved to Dubai in 2005 where I got to try a couple of trial dives but never had the chance to enroll in a diving course. I moved back to Lebanon in 2010 for a year and I stayed near Byblos where I was fortunate to have a dive center nearby (Dive the Med Club).The dive center's instructor and owner, Kamal Greig (NAUI Course Director) had convinced me to enroll in the Open Water course.

From the moment I wake up in the morning with the idea of being underwater, kitting up the dive gear, the dive itself and the social networking, where you get to meet lots of different people from all walks of life, that is the moment I enjoy the most about diving.

A Whale Shark is the most spectacular thing I've seen while diving. The first time I saw this amazing creature was in Thailand, back in 2011 where I got to swim near a peaceful 9 meter fish. It was so peaceful and impressive. Another impressive dive had been in Lebanon at a beautiful wreck of a French submarine at a depth of 37m. But the most impressive place I've dived, was in Sipadan, Malaysia.

RESCUE DIVER

After intensive diving activities, I decided to take a course that would allow me to have the self-confidence to help others and myself if required and the Rescue Diver course actually changed my mind's diving concept.

I had done my Advanced Open Water (AOW) certification, Nitrox Diver and a couple of specialties including the Deep Diver. In order to become a Rescue Diver you need to have the Advanced Open Water done as well as the Emergency First Aid Responder (EFR) course.

Being a Rescue Diver is not a challenge, but it's a self-confidence course. The only challenge is if you encounter an incident. Your safety is the main priority, otherwise you wont be able to help anyone.

DIVING INSTRUCTOR

I decided to do my Open Water Scuba Instructor (OWSI) course following on from my Dive Master course which is the first level in the pro diver certifications where you assist instructors and underwater guides with their students to help them overcome any difficulties.

I am currently a Master Scuba Diver Instructor, Nitrox Instructor, EFR Instructor and a Disabled Diving Instructor (DDI). I became an OWSI in 2012 and it was after I had done 4 months of the IDC (instructor development course) with Al Boom Diving with the help of PADI Course Director (CD), Mohamed Helmy El Amine where the last 10 days had been the most hectic and tiring days. I had had a few sleepless nights working on the theory. After that, the Course Director lets you know whether or not you are ready to do the IDC exam.

The IDC is divided in to 2 days. Day one is the theory test which takes around 3 hours and then you have the pool session and classroom presentation. On day two, there is the rescue scenario and open water dives to do. At the end of the examination, I got to hear the best news from the CD examiners, "Congratulations! You are now a PADI instructor!".

The IDC was a unique experience for me from the start right up until the end. It is an intensive 10 day training. I have to take the opportunity to thank my CD, Mohamad Helmy, Master Instructor Sam Thomas and my fellow ID candidates, which are now all PADI Instructors; Ranjith, Daria, Tom, Houssam and Captain Taha.

WORKING WITH DISABLED DIVERS

I then wanted to do something different in my diving career. A fellow diver and another friend and buddy had told me that they had enrolled themselves to do a disabled divers course.

There are usually two challenges; either physical or mental or sometimes both, the psychological approach is an important role in addition to the special skills that are learnt during the DDI training course.

The course itself was beyond rewarding and this is where I pay respect to DDI Course Director, Mark Slingo, who is himself wheelchair bound after an accident 5 years ago. He has taught instructors, IDC staff, Master Instructors and Course Directors to become Disabled Diving Instructors. The remaining part of my reward will be when I get to teach more divers with disabilities and give them the opportunities to enjoy our underwater world for themselves.

ABOUT MY JOB AND HOBBY

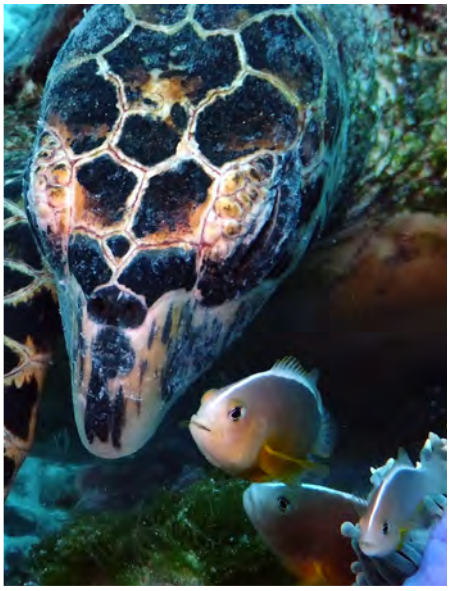
I work for the number one outdoor company in the world, JCDecaux. My company provides media solutions for different out of home setups. During the week days, I am head of the media and advertising agency, exposed to public relations and selling and during the weekends, I usually teach scuba diving courses and socialize with fellow divers.

I love both of my jobs and I don't think I would quit one for another. It may be nice to run a dive center one day. It could be a nice way to retire.

For some people I would say, just be ready to see the world from a different angle…and for others, this would be a good opportunity to enjoy the silence and peace of mind and enjoy the sight with your eyes, without speaking or being spoken to.

ALL ABOARD, WHO'S COMING ABOARD

FEATURE **PAUL SANT – DIVERS DOWN**



22 guests, various nationalities and dive levels, thrown onto a boat and set to sea for 5 days, sounds like an adventure! When I say boat, I really mean liveaboard (MV Oktavia) that can handle up to 40 guests and crew.

Novembers' travel club to the Similan Islands was our largest group yet, and required Karen's logistical skills to make it all come together. My job is easy, all I need to do is smile, dive and occasionally offer advice! As the trip was so big, I enlisted Matt as our second Instructor, although he is familiar with Thailand, it was his first experience in the Similan's. Matt ran several successful courses whilst on the boat and helped me to ensure the guests had everything they needed.

The liveaboard departure was at around 1730, we all found our cabins and settled in for the 19 dives over the next 5 days. We had favourable conditions forecasted for the week, with the odd drop of rain expected a few days in.

Over the next 5 days, we managed to fit in all the 19 dives, although we managed only one on Richelieu Rock as the weather worsened and made it unsafe to get back on the dive platform. This turned out to be to our advantage as whilst diving Tachai Pinnacle, we had a Whale Shark spend the whole dive above us!

The down side to the lumpy sea was we managed only 2 beach trips, not the 3 as advertised. For me, it was great to go back to Sail Rock (Donald Duck Bay) and stand where I had got engaged the previous year!

The diving was great and all the guests dived as much as they wanted, some overcame fears, some improved and some learnt new skills, but definitely all 22 had a great holiday.

The next trips are scheduled for the 4th-9th April 2014 and the 29th November until the 4th December 2014. Prices start from AED3,750.

COULD TELA HOLD ONE OF THE CARIBBEAN'S BEST CORAL REEFS?

FEATURE **DR DAN EXTON**

Tela Bay in Honduras may hold one of the Caribbean's best coral reefs

A newly discovered reef in Honduras could turn out to be one of the best coral reefs in the Caribbean.

Truly healthy coral communities are now few and far between and in the Caribbean they are a rare commodity indeed. The dual threats of overfishing and organic pollution in particular have led to widespread overgrowth of algae resulting in phase shifts away from traditional coral dominated systems.

For many years now scientists have been discussing the importance of so called refuge habitats for the continued survival of reefs around the world. These are typically environments which go against everything people associate with coral reefs – the crystal clear waters replaced by increased turbidity. These conditions have long been argued to buffer benthic communities from environmental factors such as high light, which plays such a crucial role in many global threats such as coral bleaching.

It is with these ideas in mind that, whilst descending below the surface in the murky waters several kilometres offshore in the mainland Honduran bay of Tela, a quite astonishing sight was revealed. Complex communities dominated almost entirely by Scleractinian corals covered the area known as the Banco Capiro, giving the reef the impression of a healthy Indo-Pacific site, let alone one in the highly impacted Caribbean.

Preliminary data collected by local conservation organisations indicates the Banco Capiro has an average cover of hard coral of 69% (compared to a Caribbean average of below 25%), and only 2.5%

macroalgal cover. In addition, populations of the sea urchin *Diadema sp.*, a vital herbivore on Caribbean reefs which was almost entirely wiped out throughout the region by disease several decades ago, was found to be 16 times the local average and approaching pre-disease densities.

To put into context, reefs around the nearby tourist hotspot of Utila and the Cayos Cochinos Marine Protected Area exhibit coral cover of 25 and 18% respectively, algal cover of 23 and 47% respectively, and an urchin population which is absent but for a few isolated individuals.

Initial observations by Operation Wallacea scientists, who will be establishing an annual research base in the area from 2013 onwards, also noted a high level of coral recruits and the clear recovery of more complex coral structures (eg *Acropora sp.*) which were regionally reduced by recent hurricane activity. These factors further point towards an extremely healthy benthic community which shows signs of high resilience. This is no isolated good news story either, for the Banco Capiro reef stretches for many kilometres across the mouth of the bay, with exploratory dives suggesting the quality of the benthic community does not diminish throughout.

But a healthy coral community does not necessarily equate to a healthy reef ecosystem, and it is not all good news on Banco Capiro. Apart from the impressive hard coral community, the most striking feature of the reef is the almost complete absence of fish, making diving eerily quiet. We know from anecdotal evidence that fishing pressure in the area has been high in the past, but also that the total collapse of fisheries has led to a high degree of livelihood diversification and a move away from heavy fishing reliance.

Fish and invertebrates are an integral component of a coral reef ecosystem, and their recovery on Banco Capiro will be crucial to the long term health of the system, but efforts are being made to ensure this happens. There are extensive mangroves and seagrass beds nearby, which provide important nursery grounds for reef fish, whilst Operation Wallacea will be working alongside local conservation organisations to lobby for the inclusion of Banco Capiro in nearby protected areas which currently ignore the marine environment.

There is certainly a feel good factor around Tela and its hidden treasures, with the potential both for conservation and research an exciting prospect for local stakeholders and the scientific community alike. With this momentum and continued efforts to gain its protection, Banco Capiro could soon be truly considered as one of the most important reefs in the Caribbean.

NOAA STUDY FINDS HIGH LEVELS OF POLLUTANTS IN GUÁNICA BAY 'REPRESENT SERIOUS TOXIC THREAT' TO CORALS AND FISH

EFFORT CREATES ECOLOGICAL BASELINE TO IMPROVE WATERSHED MANAGEMENT

FEATURE **NOAA**

Andrew Mason with NOAA's Center for Coastal Monitoring and Assessment collecting a sediment sample.

The pollutants measured in the sediments of Guánica Bay, Puerto Rico, in a new NOAA study were among the highest concentrations of PCBs, chlordane, chromium and nickel ever measured in the history of NOAA's National Status & Trends, a nationwide contaminant monitoring program that began in 1986.

Researchers from the National Ocean Service's National Centers for Coastal Ocean Science (NCCOS) studied the reef's ecology to help establish baseline conditions that coastal managers can use to measure changes resulting from new efforts to manage pollution. Among the items studied were habitat types, coral cover, fish and pollution stressors such as nutrients, sedimentation, toxic contaminants in Guánica Bay.

"These concentrations of pollutants represent serious toxic threats to corals, fish and benthic fauna – bottom dwelling animal life and plants," said David Whitall, Ph.D., the report's principal investigator and NOAA ecologist. "We also observed lower indicators of biological health, such as how much of the coral covers the sea floor offshore from Guánica Bay when compared to an adjacent study area, La Parguera. Further research is needed to determine if this is the result of the toxins or some other cause. At this point, we cannot definitively link it to pollution."

The new measurements demonstrate the importance of long-term contaminant monitoring programs like National Status & Trends, which allow new data to be placed in national and historical perspective. Funding was provided by NCCOS and NOAA's Coral Reef Conservation Program. NOAA is the co-chair of the US Coral Reef Task Force, which had designated Guánica Bay as a priority watershed. Project partners included: NOAA's Restoration Center, and the University of Puerto Rico at Mayagüez.

NOAA's mission is to understand and predict changes in the Earth's environment, from the depths of the ocean to the surface of the sun, and to conserve and manage our coastal and marine resources.

MYSTERIOUS DISEASE AFFECTING SEA STARS

ALONG THE PACIFIC COAST OF NORTH AMERICA

PHOTOGRAPHY **KEITH ROOTSAERT**

The past few months have not been kind to sea stars along the Pacific coast of the US and Canada. A mysterious withering or wasting syndrome is sweeping down the coastline infecting sea stars seen in both the intertidal zone and in the shallow subtidal (60ft deep and less). The first sign a star is infected is the development of small lesions on their outer bodies and an overall deflated look. The lesions grow and their tissue continues to deteriorate, causing arms to fall off. In the end the stars more or less disintegrate, often within just a few days. Several species are being affected including ochre stars (*Pisaster ochraceus*), giant-spined stars (*Pisaster giganteus*), sunflower stars (*Pycnopodia helianthoides*), sun stars (*Solaster stimpsoni*), among others.

This is not the first time coastal California has seen a decimation of sea star populations. Major die-offs of ochre stars in southern California occurred during 1983-1984 and again in 1997-1998. The cause of the infection has been unclear. Past pathological studies have indicated a bacterium (Vibrio) as well as a virus might be the cause of the disease, and the two episodes in southern California were both associated with warm water events. Even though this year's outbreak did occur during the warmer time of the year, this has not been a particularly warm year for Pacific coast waters.

While notable sea star die-offs have occurred in the last few decades, this year's outbreak is of concern for several reasons: 1) previously a single species has been affected as opposed to seven now affected; 2) past occurrences have been geographically localized while this year, the Pacific coast from Alaska to San Diego has been affected; and 3) this is the first time sea stars have been affected in cooler waters off Washington and Alaska. Interestingly, a smaller outbreak has also been reported in the Atlantic off the coast of Rhode Island and Maine, however, it is unknown whether it is linked to the west coast outbreak in any way.

Since earlier this summer a research monitoring group called PISCO (Partnership for the Interdisciplinary Study of the Coastal Oceans) has been tracking the spread of the disease at their study sites and by collecting reports from the general public. Turning to citizens has been a successful way to obtain information over a much broader geographic area, from both on land and underwater.

Reef Check California has added the task of noting the presence/absence of diseased sea stars to our reef monitoring surveys. Since finding out about the disease, volunteers observed 25 sites from Sonoma County to San Diego and the Channel Islands. Reef Check volunteers have also been observing reefs during their own recreational dives and sending in any sightings. It is a situation in which the more eyes that are on the water the better we will understand what is happening.

Sea stars play an important ecological role in the marine environment, particularly in the intertidal where they have been identified as "keystone" predators, a predator that has an exceptionally large influence on the distributions of their prey. Because of this, ecological changes are likely to occur due to the die-off, though the extent is difficult to predict. Monitoring programs such as PISCO and Reef Check track ecological changes over time, providing important data, not only on sea star populations, but also of their habitats, predators, and prey. Time will tell what changes may occur and Reef Check volunteers will be in the water to track them.

To report sightings of diseased or healthy sea stars: http://www.eeb.ucsc.edu/pacificrockyintertidal/data-products/sea-star-wasting/

REEF CHECK HONORS HEROES OF MARINE CONSERVATION AT ANNUAL GALA

Two of California's marine conservation heroes were honored at Reef Check's "Save the Reefs, Save the Oceans" Gala, September 19th at the Jonathan Beach Club in Santa Monica. Bob Meistrell was honored posthumously with the Reef Stewardship Award for his lifetime commitment to the sea and in celebration of his legacy and the 60th anniversary of his co-founding of Body Glove and California's surf culture with his twin brother, Bill.

Russ Lesser, Reef Check Board Member and President of Body Glove, accepted the award after performing, accompanied by Sarah Ramsey-Duke, a special tribute song to Bob.

Dirk Burcham, a Reef Check California program diver since 2007, received the Citizen Scientist of the Year Award. For the past four years, Dirk has led all southern California Reef Checkers in completing the most survey transects. Dirk also was a member of the Scientific Advisory Team that assisted in the development of the California survey protocol.

Thank you to all who attended, bid, donated, and volunteered – your efforts helped make the gala a big success! Special thanks to sponsors AES, Bluewater Photo, Body Glove, Gibson Dunn, Edison International, Houlihan Lokey, Miner Family Winery, Nova Ortho-Med, Oakley, VeeV and ViralBooth.

REEF CHECK CALIFORNIA EXPANDS ITS BAJA PROGRAM

BY **REEF CHECK CALIFORNIA**

This past summer was a busy one as I spent 17 days in Baja California, Mexico working with two fishing cooperatives along the Pacific coast during their annual Reef Check California (RCCA) training and recertification. I was joined by Dan Abbott, a long-time RCCA volunteer diver and instructor. We worked with our long-time Mexican non-profit partner organization, Comunidad y Biodiversidad (COBI) as well as with two fishing cooperatives, Buzos Y Pescadores De La Baja California S.C.L.at Isla Natividad and Sociedad Cooperativa de Produccion Pesquera Pescadores Ensenada in El Rosario. It was a long but successful couple of weeks and both Dan and I had a great time working with all of the divers.

This was my fourth year working with the team at Isla Natividad. We spent about a week working with this large group, which gave us plenty of time to do our classroom and field training. We'd previously been working with a core group of about eight divers but this year was a bit different. This summer, we promoted the very experienced team of five returning divers to mentors and these divers took their roles quite seriously. They did an excellent job of guiding their protégées both in the classroom and in the field. With the help of our mentors, we were able to add 16 divers - both younger fishermen and a group of island women - to the team. These newer divers had completed their open water scuba certification with one of the COBI scuba instructors in the last year and they all did a spectacular job during the RCCA training. It was awesome to see each mentor walking around with their team of two or three divers, explaining the dive plan in exact detail or keeping an eye on their buddies underwater. And the new Reef Checkers were very keen to learn and could be found studying their species identification cards during breaks from the class and quizzing one another. And for the first time on the island, we had a representative from CONAP (Comision Nacional de Areas Naturales Protegidas), who works specifically in the local El Vizcaino Biosphere Reserve, join our training and he was very excited to be part of the effort. We were lucky to have stellar diving conditions and warm topside weather to make our training very comfortable as we explored the beautiful underwater world around the island. All in all it was a very successful week!

Immediately following our time at Isla Natividad, we traveled several hours north to work with the divers from Sociedad Cooperativa de Produccion Pesquera Pescadores Ensenada in El Rosario. This is a new group for us but we felt very welcomed as everyone there was looking forward to working with us. When we arrived, we got a tour of their very impressive new processing facility that is currently under construction. During this inaugural training, we taught six very determined divers from the cooperative how to perform invertebrate, seaweed, substrate and fish surveys. Days were long - during a typical day, we'd meet at the office at 6:30am and we would arrive back at the cooperative office at around 4pm after doing two very chilly dives and driving to and from the harbor. We'd typically need to fit in a late lunch before returning to the cooperative office to have evening lecture and fill scuba tanks for the next day. Despite the lengthy days, it was fun to work with a different cooperative and to explore new areas along the Baja coastline. Our last dive site, in particular, was amazing, with the ocean floor jam packed with seaweed and invertebrates and rockfish I've never seen in all my days diving in Southern California. On the last evening, we had a little 'graduation' ceremony at the cooperative office and the divers grilled up some carne asada for us to celebrate our successes. It was so wonderful to meet a brand new team and see them progress from novice divers to citizen scientists in just a week. It was quite rewarding for me and Dan and I know we very much enjoyed working with the team.

Following the training events, COBI led the data collection efforts in both locations with the newly trained citizen scientists. 2013 is the 8th year of data collection at Natividad and the 1st in El Rosario. Training in our third Baja location, Magdalena Bay, takes place in October. I want to send a huge thanks to both fishing cooperatives, COBI, Leo Vasquez and Arturo Hernandez (both from COBI) and Natalie Low (a graduate student at Stanford, doing field work in Baja). And I can't imagine how it would have been possible without Dan Abbott, who took considerable time off his full-time job and from his family to help me in Baja this year. I know we both had a very rewarding trip and I'm already looking forward to next year!

REEF CHECK HONG KONG RELEASES 2013 RESULTS

BY **REEF CHECK HONG KONG**

In November, Hong Kong's Agriculture, Fisheries and Conservation Department (AFCD) announced that the Reef Check in Hong Kong has continued to yield encouraging results this year, showing that local corals are generally in healthy and stable condition and exhibit a rich diversity of species.

Hong Kong Reef Check 2013, a four-month exercise starting in June, covered the marine areas in the eastern part of Hong Kong extending from Tung Ping Chau in the north to the Ninepin Group in the south, including a number of sites of ecological importance. Among the 33 survey sites, nine are within the Hoi Ha Wan, Yan Chau Tong and Tung Ping Chau marine parks.

A variation in coral coverage, ranging from 20 percent to 78.1 percent, was recorded among the survey sites. Twenty sites, including all those in the marine parks, recorded high coral coverage (above 50 percent). Among all sites, Coral Beach at Hoi Ha Wan recorded the highest coral coverage of 78.1 percent.

Most of the sites were found to have high species diversity. Wrasses, groupers, butterflyfish, sea urchins, sea cucumbers and cowries were species commonly found in the survey sites. Most of the groupers, sweetlips, snappers and wrasses were found in survey sites at Port Shelter and north-eastern waters including the three marine parks.

Coral bleaching and some coral damage were observed at a few sites but the impact was minor and localized. Fifty dive teams comprising more than 580 volunteer divers from different sectors of the community took part in the Reef Check this year. The AFCD awarded souvenirs and certificates to the teams and the participating scientists to recognize their contributions.

The first Reef Check was held by the Hong Kong Reef Check Foundation in 1997. The AFCD has collaborated with the Foundation to conduct the survey since 2000. The AFCD will continue to organize Reef Check activities to collect important information necessary for devising conservation and management measures to protect the precious corals as well as to raise public awareness on the ecological importance of corals and the need for coral conservation.

REEF CHECK ITALIA'S ECOEXPEDITION TO BANGKA, NORTH SULAWESI, INDONESIA

BY **REEF CHECK ITALY**

The Reef Check protocol was designed following the recognition that there were no adequate data to establish a "baseline" of the health of the world's coral reefs. The greatest advantage of the protocol was the involvement of volunteer scuba divers, led by marine biologists, who could make possible the collection of data otherwise not obtainable.

The first global survey of coral reefs took place in 1997. Subsequently, the protocol has received important acknowledgments both in terms of the number of surveys collected and in data quality; many researchers have confirmed their value and published works citing the database of Reef Check. The protocol has proved to be very effective not only in the involvement of passionate volunteers eager to cooperate in the preservation of their favorite reefs, but also of young students and graduates in marine biology who have been able to take advantage of a suitable method to perfect their skills as specialists of the marine environment. Very often degree courses end without a student acquiring firsthand knowledge on coral reefs although they possess a sound basis to understand the functioning of these unique ecosystems.

The expeditions organized by Reef Check Italia Onlus at the Coral Eye Research Outpost on the island of Bangka (Indonesia) have confirmed the value of this experience in their training of young Italian marine

biologists. By using three different kinds of transects, participants have been able to learn the useful basics to measure the percentage of seabed cover by different substrate types, like live and dead corals, sponges, ascidians or algae, and to identify several kinds of fishes and invertebrates. These are useful indicator species of impacts both of anthropogenic or natural origin.

During the two expeditions held so far, the most recent being in October 2013, data were collected that have provided for the first time a baseline of the health status of the coral reefs of Bangka. The involvement of Reef Check Indonesia and their Program Manager Derta Prabuning, has also inspired the launch of a partnership that in the future could lead to the involvement of the local population in education programs aimed at the formation of young Indonesians to gain awareness of the value of their reefs. With a more aware generation we could intervene and prevent the practices causing destruction of reefs that are still widely used throughout the area.

For more information on the activities of Reef Check Italy, visit **http://www.reefcheckitalia.it/**

REEF CHECK LAUNCHES ADOPT-A-REEF PARTNERSHIP WITH EDISON INTERNATIONAL

PHOTOGRAPHY **CHRIS GLAESER**

Reef Check recently partnered with Edison International to launch the Catalina Adopt-A-Reef partnership to help survey and protect the reefs and kelp forests at Casino Point Reef, Catalina Island, one of Southern California's Channel Islands. An Edison International grant of $20,000 helps to fund the program's ocean surveys and educational outreach. This is the latest in a growing list of Adopt-A-Reef partnerships, which continue to highlight the importance of our partnerships with local communities, other non-profits and corporate supporters to conserve reefs around the world. "If our reefs are not healthy, then ultimately we will have problems," said Colleen Wisniewski, Reef Check Southern California regional manager. "Even if you don't eat seafood, if our reefs are suffering, this will have a cascade effect and will have a negative impact on our lives. Our planet is mostly covered by water and we need to take care of our coastal resources."

Reef Check and Edison International held the Catalina Adopt-A-Reef launch event on Saturday, November 16th. A group of 35 volunteer divers – including 15 employees from Edison International – dipped into the waters off Catalina Island for two dives to help survey and collect data from this beautiful California reef. During the first dive, Edison staff had the opportunity to learn firsthand how Reef Check volunteers collect data and enter them into Reef Check's database. The data are analyzed and used to improve the health of California's oceans. During the second dive, Edison volunteers were given the opportunity to collect their own data and count the various fish, invertebrates and seaweed they found. "Edison International has a very strong presence along the coast of California," said Kim Anthony, Southern California Edison (SCE) senior marine biologist, who attended the Catalina dive. "We want to make sure that at the same time that we are using these resources, we are giving back and mitigating for any impacts that we may have on the Coast."

Over the past few years, the California State Fish and Game Commission has created Marine Protected Areas along California's coastline. Each year, Reef Check monitors about 80 sites both in and outside of these protected areas. Edison employee Evan Birenbaum has loved the ocean since he was a kid and first learned to scuba dive at Casino Point Reef. So far he's gone on over 170 dives. As president of EcoIQ – an Edison International employee resource group that helped to organize the dive – and a board member of Reef Check, Birenbaum is putting his diving knowledge to good use. "I always wonder what I might find living on these reefs when I dive," he said. "Every time I dive I have a new experience, whether it's seeing a new type of fish or plant life." As a project manager for SCE's Environmental Strategy and Corporate Responsibility division, Birenbaum is grateful to be able to work for a company that believes in the importance of protecting the environment. "By working with and supporting organizations such as Reef Check, Edison is protecting vital ecosystems that will help sustain life making the world a better place to live in, not only for our generation, but for future generations to come."

Reef Check is seeking more corporate partners to adopt reefs anywhere in California. "Being a good example of marine stewardship will hopefully ignite the interest of other corporate partners," said Wisniewski.

For more information on Reef Check's Adopt-A-Reef program, please visit **http://reefcheck.org/join/adopt_reef.php**.

FEATURE CREATURE
REEF MANTA RAY (*MANTA ALFREDI*)

FEATURE **IUCN RED LIST 2013.2** PHOTOGRAPHY **GUY STEVENS**

Reef Manta Ray surface feeding in Hanifaru

RED LIST CATEGORY & CRITERIA: VULNERABLE

Scientific Name: *Manta alfredi*

Common Name/s: Reef Manta Ray, Prince Alfred's Ray, Inshore Manta Ray, Coastal Manta Ray, Resident Manta Ray

Justification: The Reef Manta Ray (*Manta alfredi*) has a circumtropical and sub-tropical distribution, existing in the Pacific, Atlantic and Indian Oceans. Within this broad range, however, actual populations appear to be sparsely distributed and highly fragmented. This is likely due to the specific resource and habitat needs of this species.

Overall population size is unknown, but subpopulations appear, in most cases, to be small (about 100-2,000 individuals). A proportion of the individuals in some populations undertake significant coastal migrations, crossing national boundaries or entering into international waters. Although the degree of interchange of individuals between subpopulations is unclear, it is assumed to be low as there are currently no data that support such interchange despite active investigations. As such, declines in small subpopulations may eventually result in regional depletions or extirpation with the reduced possibility of successful recolonization. To aggravate this situation, this species has a very conservative life history with an extremely low reproductive output. In the wild, females bear on average a single pup every 2-3 years. These biological constraints would actively contribute to its slow or lack of recovery from population reductions.

The rate of population reduction appears to be high in several regions, up to as much as 80% over the last three generations (approximately 75 years), and globally a decline of 30% is strongly suspected. Currently this species has a high value in international trade (its gill rakers are used in Chinese medicines) and directed fisheries exist that target this species in what is certain to be unsustainable numbers. Artisanal fisheries also exist that target this species for food. Individuals are also taken as bycatch in everything from large-scale fisheries to shark control programs/bather protection nets. As a result of sustained pressure from fishing (both directed and bycatch) certain monitored subpopulations appear to have been depleted, such as in Indonesia. Of particular concern is the targeting of this species at critical habitats or well-known aggregation sites where, with relatively high catch-per-unit effort, numerous individuals can be targeted simultaneously or with relative ease.

Dive tourism involving this species is a growing industry and it has been demonstrated that sustainable tourism significantly enhances the economic value of such species in comparison to short-term returns from fishing. Tourism related industries can also negatively impact individual behaviour, entire populations and critical habitat for this species, thus the responsible development of these industries is recommended.

Range Description: This species has a circumglobal range in tropical and sub-tropical waters. This species is widespread in the Indian Ocean, with images and sightings of the Reef Manta Ray from the Sinai Peninsula in the Red Sea to Durban, South Africa in the Western Indian Ocean, and from Thailand to waters off Perth, Western Australia in the Eastern Indian Ocean. In the eastern and south Pacific, the Reef Manta Ray occurs from southern Honshu and islands on Ryukyu Arc, Japan in the north to the Solitary Islands (New South Wales), Australia in the south and is sighted as far east as French Polynesia south of the equator and the Hawaiian Islands north of the equator. Two verified reports and photographs of the Reef Manta Ray from the North Atlantic off the Canary Islands and the Cape Verde Islands, and historical reports and photos of

the Reef Manta Ray off the coast of Senegal in northwest Africa (Cadenat 1958) are the only evidence of populations of the Reef Manta Ray in Atlantic waters.

The Reef Manta Ray is often resident in or along productive near-shore environments, such as island groups, atolls or continental coastlines. This species tends to inhabit warm tropical or sub-tropical waters. Passive and active acoustic tracking in several areas, including Japan, Indonesia, Mozambique, the Maldives, Australia and Hawaii, suggest that individual Reef Manta Rays do not commonly venture from coastal waters, often moving between inshore cleaning stations and feeding areas (Homma et al. 1999, Dewar et al. 2008, Marshall et al. 2009, Deakos 2010a, M. Bennett unpubl. data 2011, T. Clark pers. obs. 2008, G. Stevens unpubl. data 2011).

Native: Australia (New South Wales, Northern Territory, Queensland, Western Australia); British Indian Ocean Territory (Chagos Archipelago); Cape Verde; Christmas Island; Cocos (Keeling) Islands; Cook Islands (Cook Is.); Djibouti; Egypt (Egypt (African part), Sinai); Fiji; French Polynesia (Society Is., Tuamotu); Guam; India (Andaman Is.); Indonesia (Bali, Irian Jaya, Jawa, Sulawesi); Japan (Nansei-shoto); Madagascar; Malaysia; Maldives; Marshall Islands; Micronesia, Federated States of ; Mozambique; New Caledonia; Northern Mariana Islands; Oman; Palau; Papua New Guinea (Bismarck Archipelago, North Solomons, Papua New Guinea (main island group)); Philippines; Saudi Arabia; Senegal; Seychelles (Seychelles (main island group)); South Africa (KwaZulu-Natal); Spain (Canary Is.); Sri Lanka; Sudan; Thailand; United States (Hawaiian Is.); Yemen

Population: The Reef Manta Ray is often encountered in large numbers when feeding and individuals are sometimes seen travelling in schools. Overall, divers encounter the Reef Manta Ray with far greater frequency than the Giant Manta Ray. Due to the global nature of their individual distributions, absolute population sizes will always be difficult to assess. Currently, the overall total global population sizes of both these species are unknown, but some regional populations have been estimated.

Subpopulations of the Reef Manta Ray appear, in most cases, to be small (less than 1,000 individuals). The degree of interchange of individuals between subpopulations is unclear but is assumed to be low, as there are currently no data that support such interchange, despite active research efforts to investigate this (A. Marshall et al. unpubl. data 2011). Photo-identification studies at aggregation sites in Hawaii (Deakos et al. 2011), Yap (B. Acker pers. comm. 2009), Japan (Ito 1987, Homma et al. 1999, Ito 2000, Kashiwagi et al. 2008b), and the east coast of Australia (M. Bennett and F. McGregor pers. obs. 2011) have produced sighting records of approximately 85 to 400 individuals, despite some being active for many decades. A semi-exhaustive study of Japan-wide photographic records confirmed that the known main aggregation in Yaeyama Islands (300 known individuals since 1977) represents a part of a fairly isolated population (Kashiwagi et al. 2010). Only monitoring programs in Tofo Beach, southern Mozambique (n=630 in April 2011) the Maldivian Islands (n1,500 in early 2010) and Ningaloo in Western Australia (n=530 in early 2010) have registered sightings of more than 500 individuals from a single aggregation site (Kitchen-Wheeler 2010, A. Marshall unpubl. data 2011, F. McGregor unpubl. data 2011, G. Stevens unpubl. data 2011). A mark-recapture population study in southern Mozambique over four years from 2003 to 2007 estimated the local population during that time to be about 800 individuals (Marshall et al. 2011).

Preliminary studies at major aggregation sites suggest resident population sizes are generally small, with some areas having large seasonal influxes. There appears to be a tendency for rays to visit/occupy specific sites of restricted geographical extent, in part for interactions with cleaner organisms, for social and reproductive behaviours, and for feeding (O'Shea et al. 2010). Results also suggest a high degree of separation between subpopulations.

Movement patterns are likely site-specific and correlated with cycles in productivity. Individuals have been documented to make seasonal migrations of several hundred kilometres as well as daily migrations of almost 70km (A. Marshall et al. unpubl. data 2011). The annual migration range in Japan has been documented to be up to 400km (Homma et al. 1999, Kashiwagi et al. 2010) and up to 270 km in the Maldives (Kitchen-Wheeler 2010, Anderson et al. 2011, G. Stevens unpubl. data 2011), while along the east coast of Australia, Reef Manta Rays have been documented to travel distances of up to 500km (Couturier et al. 2011).

Populations are likely to be stable in locations where they receive some level of protection, such as Australia, Hawaii, Japan, the Maldives and Yap, but are likely to be in decline in areas where they are fished, or are under threat from anthropogenic influences e.g., Indonesia (Dewar 2002), Thailand (A. Marshall unpubl. data 2011) and Mozambique (A. Marshall unpubl. data 2011) where encounter rates have dropped significantly over the last five years or anthropogenic mortality has been elevated.

Overall, the rate of population reduction appears to be high in several regions, up to as much as 80% over the last three generations (approximately 75 years), and globally a decline of 30% is strongly suspected.

Population Trend: Decreasing

Habitat and Ecology: Commonly sighted inshore, but also found around offshore coral reefs, rocky reefs and seamounts. Long-term sighting records of the Reef Manta Ray at established aggregation sites suggest that this species is more resident to tropical waters and may exhibit smaller home ranges, philopatric movement patterns and shorter seasonal migrations than the Giant Manta Ray (Homma et al. 1999, Dewar et al. 2008, Kitchen-Wheeler 2010, Anderson et al. 2011, Deakos et al. 2011, Marshall et al. 2011). Residency is thought to be related to areas of high primary productivity (e.g., upwelling events), which may vary in time and space. Site fidelity to specific areas may also vary by sex and age-class. Seasonal migrations in this species likely correspond with cycles in productivity (Anderson et al. 2011, Couturier et al. 2011).

Reef Manta Ray, Lankan Reef, North Male Atoll, Maldives

Individuals in Australia, Japan, the Maldives and Mozambique have been documented making seasonal migrations of several hundred kilometres between well-established aggregation sites, directional movements of up to 500km, or daily migrations of 70km (Homma et al. 1999, Kashiwagi et al. 2010, Kitchen-Wheeler 2010, Anderson et al. 2011, Couturier et al. 2011, A. Marshall unpubl. data 2010). While evidence is still being gathered, this is likely to include cross border migration in areas such as Mozambique and South Africa; Egypt, Saudi Arabia and Sudan; and, Australia, Papua New Guinea and Indonesia. Satellite tagging results from northeastern Australia have tracked the Reef Manta Ray for periods of up to 110 days, during which individuals moved up to 780km in total. During these tracks, individual rays moved into offshore waters up to 190km from the coast, travelling over waters more than 1,000m deep. During these tracks individual rays were making periodic dives of up to 300m (F. Jaine et al. pers. comm. 2011). However, in Hawaii, the Reef Manta Ray exhibits more limited movements, with no documented movement between islands 48km apart despite extensive photo-identification and acoustic telemetry research (Deakos et al. 2011).

The Reef Manta Ray appears to be a relatively long-lived species. Although the actual longevity of the species remains unknown, photographic databases have re-sighted individuals up to a 30 year period (Ito 2000, Kashiwagi et al. 2010, G. Stevens unpubl. data 2010, T. Kashiwagi and T. Ito unpubl. data 2011). Natural mortality is thought to be low (other than in juveniles), although limited predation from large sharks and Orcas does occur (Visser and Bonoccorso 2003, Marshall and Bennett 2010b).

Generation time is suspected to be 25 years based on conservative estimates of life history parameters. Female mantas are thought to mature at 8-10 years of age and longevity is estimated to be at least 40 years. Generation time is the average age of adults which can be approximated as halfway between age at first maturity and maximum age. Thus female mantas may be actively breeding for 30 years and the age at which 50% of total reproductive output is achieved would be approximately 24-25 years.

The Reef Manta Ray has very low fecundity. The production of a single pup appears to be the normal situation for these rays, although two pups are conceived on occasion (Marshall et al. 2008, Marshall and Bennett 2010a). In southern Mozambique, the Reef Manta Ray gives birth in the austral summer period after a gestation period of approximately one year (Marshall and Bennett 2010a). Reproductive periodicity in the Reef Manta Ray is commonly biennial (Deakos 2010a, Kitchen-Wheeler 2010, Marshall and Bennett 2010a) or longer (Ito 2000, G. Stevens unpubl. data) in the wild, but this species has an annual ovulatory cycle


Dorsal shot of Reef Manta

(Marshall and Bennett 2010a) and individuals can and have reproduced annually in the wild (Marshall and Bennett 2010a, M. De Rosemont pers. comm. 2009) and in captivity.

Four captive breeding events and births in consecutive years (2007-2010) have been reported from a pair of Reef Manta Rays in Churaumi Aquarium, Japan. A mating by a male (350cm disc width (DW), in captivity since May 1992) and a female (420cm DW, in captivity since August 1998) was observed in a display tank (34m x 27m x 10m) on 8 June 2006. Chasing behaviour by the male started in March and peaked between May and September. This period was reported as "unnaturally" long (Matsumoto et al. 2008). A female (190cm DW, 68.5kg) was born 374 days later on 16 June 2007 but died four days later. Attack by the father was suspected as a cause of death. The same couple mated immediately after giving birth and produced a male (182cm DW) 366 days later on 17 June 2008. The baby was transferred to an open-sea pen. The couple mated on a same day and produced a female (192cm DW, 70kg) 372 days later on 24 June 2009. They again mated on the same day and produced a pup (182cm DW, 66kg) 367 days later on 26 June 2010 (Anon 2007).

The Reef Manta Ray reaches disc widths of at least 500 cm (Marshall et al. 2009), however, in most populations the average disc widths of mature individuals do not exceed 400 cm. Physical and sexual maturity appear to vary according to region. Males in southern Mozambique mature at approximately 300 cm DW, while females appear to mature at slightly less than 400 cm DW (Marshall and Bennett 2010a). However, males in the Republic of Maldives mature at sizes of 250cm DW, while the females mature at 300cm DW (G. Stevens unpubl. data 2011). In Hawaii, the largest female and male were reported at 362 and 303cm DW, respectively, and size at sexual maturity was estimated at 335cm DW for females and 280cm DW for males (Deakos 2010b). Males have been observed mating as early as six years of age (T. Clark unpubl. data 2010). Age at maturity in females is unknown, but is likely to be over eight years of age.

Major Threat(s): The main threat to both Manta species is fishing, whether targeted or incidental. Manta rays are currently killed or captured by a variety of methods including harpooning, netting and trawling. These rays are easy to target because of their large size, slow swimming speed, aggregative behaviour, predictable habitat use, and lack of human avoidance.

Manta ray products have a high value in international trade markets. Their gill rakers are particularly sought after and are used in Asian medicinal products. This market has resulted in directed fisheries for manta rays, which are currently targeting these rays in unsustainable numbers. Over 1,000 manta rays are caught per year in some areas (Alava et al. 2002, Dewar 2002, White et al. 2006, Anderson et al. 2010). Artisanal fisheries also target both species for food and local products (White et al. 2006, Marshall et al. 2011).

Aside from directed fisheries, manta rays are also incidentally caught as bycatch in both large-scale fisheries and small netting programs such as shark control bather protection nets (Young 2001, C. Rose pers. comm. 2008).

As a result of sustained pressure from fishing (both directed and bycatch) certain monitored subpopulations appear to have been rapidly depleted (e.g., Indonesia and the Philippines; Anon 1997, Alava et al. 2002). Targeting either species of Manta at critical habitats or aggregation sites, where individuals can be caught in large numbers in a short time frame, is a particular threat. Regional populations of both species appear to be small, and localized declines are unlikely to be mitigated by immigration. This situation is exacerbated

by the conservative life history of these rays, which constrain their ability to recover from a depleted state.

Cryptic threats such as mooring line entanglement and boat strikes can also wound manta rays, decrease fitness or contribute to unnatural mortality (Marshall and Bennett 2010b, Deakos et al. 2011, F. McGregor pers. obs. 2010). In Maui, Hawaii, 10% of the population has amputated or non-functioning cephalic fins, most likely caused from entanglement in monofilament fishing line (Deakos et al. 2011). Many other threats have been postulated and identified such as habitat degradation, climate change, pollution (from oil spills), ingestion of micro plastics and irresponsible tourism practices.

Dive tourism involving this species is a growing industry and it has been demonstrated that sustainable tourism significantly enhances the economic value of such species in comparison to short-term returns from fishing (Anderson 2002, Anderson et al. 2010). However, rapidly growing tourism (including in-water interactions and recreational boating traffic) if unmanaged, is likely to affect localised use of and visitation rates to critical cleaning and feeding habitats (Osada 2010, Deakos et al. 2011). Their natural behaviour can also be affected by excessive ecotourism (F. McGregor unpubl. data 2010, A. Marshall unpubl. data 2011).

KNOWN DIRECTED FISHERIES:

Reported World Catch

Manta and devil ray catch increased from 900 tonnes to over 3,300 tonnes between 2000 and 2007 (FAO 2009, Lack and Sant 2009).

Trade-driven Fisheries

Manta rays, including the Reef Manta Ray, are currently taken in fisheries that have transitioned from bycatch fisheries into directed fisheries, with the birth of a market for manta ray products in Asia.

Mobulid rays are directly fished in large trap nets set in important migratory channels such as in the Tangkoko Nature Reserve in the Manado region of North Sulawesi, Indonesia (Anon 1997). A study of the catch composition in a single year between March 1996 and February 1997 included 1,424 manta rays (unspecified species but likely Reef Manta Ray). While this practice was banned for a while, it started back up illegally in late 1997 and fishing efforts have moved to new unmonitored locations (Anon 1997).

Directed fisheries for manta rays exist in the Alor region of eastern Indonesia. A study of this fishery in 2002 (during the fishing season from May-October) revealed that the traditional whale shark fishery had shifted its focus to manta rays (predominately Reef Manta Ray), which were being harvested for trade to Asian markets, specifically Hong Kong. Estimated annual catch was thought to be 1,500 individuals (range 1,050-2,400 mantas). This was a considerable increase from the traditional 200-300 manta rays taken annually in historical fisheries in the area (Dewar 2002).

Artisanal Fisheries

Reef Manta Rays are caught in artisanal fisheries in southern Mozambique for consumption. Manta rays are typically harpooned but also caught in nets with motorized boats. Approximately 50 individuals are taken per annum from a 50km stretch of coastline (Marshall et al. 2011, A. Marshall unpubl. data 2011).

Bycatch fisheries

Manta rays are caught in gillnet and purse seine fisheries as well as netting programs throughout their distribution. Specific cases are outlined below:

Unspecified manta rays, likely Reef Manta Ray, caught as non-target species in purse seiners from associated sets in the waters of Papua New Guinea. Catch rates monitored from 1995 until 2006 showed a distinct and significant rise in the number of manta rays caught (both tonnes per annum and kilos per day) in these fisheries in 2001, which steadily rose until 2005/2006, when sharp declines were noticed in the catch (C. Rose pers. comm. 2008). On average, from 1994 until 2006, manta rays comprised 1.8% of non-target catch from the surveyed purse seiners in the waters of Papua New Guinea (C. Rose pers. comm. 2008).

Manta rays, including Reef Manta Rays, are regularly caught as bycatch in drift nets in Malabuhan, Siatian Negro Island, Philippines (Dolar 1994).

Incidental catches of manta rays in the protective shark nets off the beaches of KwaZulu-Natal, South Africa, peak in the summer months (49% of the total annual catch), although the species is caught throughout the year (Young 2001). Manta rays comprised 16.9% of the total historical batoid catches from these nets, with a mean annual catch of 60 individuals and an overall 33.7% mortality rate (Young 2001).

Conservation Actions:

United States: In 2009, the Governor of Hawaii signed House Bill 366 creating Act 092(09) establishing criminal penalties and administrative fines for knowingly killing or capturing manta rays within State waters. This makes Hawaii the first state in the US union to protect manta rays. There have never been fisheries for manta rays in Hawaii, but this Bill will protect all Manta species living in or passing through the island group from future fishing pressure.

Republic of Maldives: Since June 1995, there has been an export ban on all ray species and their body parts, effectively preventing any commercial fisheries from arising in this country which has never targeted manta rays for local use in significant numbers. Furthermore, in June 2009 the Maldivian Government announced the creation of two new marine protected areas (MPAs), specifically identified for protection because of their importance as areas of critical habitats for the Maldives population of Reef Manta Rays and the occasional transient Giant Manta Rays.

Philippines: Fishing of manta rays was banned in 1998, but this ban was lifted in 1999 due to pressure from fishermen and lack of data on the fishery. During a year-long survey, from March 2002 to March 2003, 156 manta rays (the Giant Manta Ray) were caught, mostly in the months from November to January. Since the study, the ban has been re-established for manta rays, which would offer protection to both species. Mantas are now reported to be rare in the Philippines, especially around the Bohol Sea where the fishery was focused.

Yap: An MPA for manta rays has been created in Yap under the approval of Governor Sebastian Anefal. The sanctuary, which covers 8,234 square miles, taking in 16 islands and 145 islets and atolls, out to 12 miles offshore, will protect the Reef Manta Ray from being targeted by fishermen.

Western Australia: Manta rays whilst not targeted, are protected from any fishing (Fisheries Act) and disturbance or harassment (DEC Act) within marine parks only.

Reef Manta Ray chain feeding in Hanifaru, Maldives

Citation: Marshall, A., Kashiwagi, T., Bennett, M.B., Deakos, M., Stevens, G., McGregor, F., Clark, T., Ishihara, H. & Sato, K. 2011. *Manta alfredi*. **In:** IUCN 2013. IUCN Red List of Threatened Species. Version 2013.2. **www.iucnredlist.org**

Gymnodoris impudica

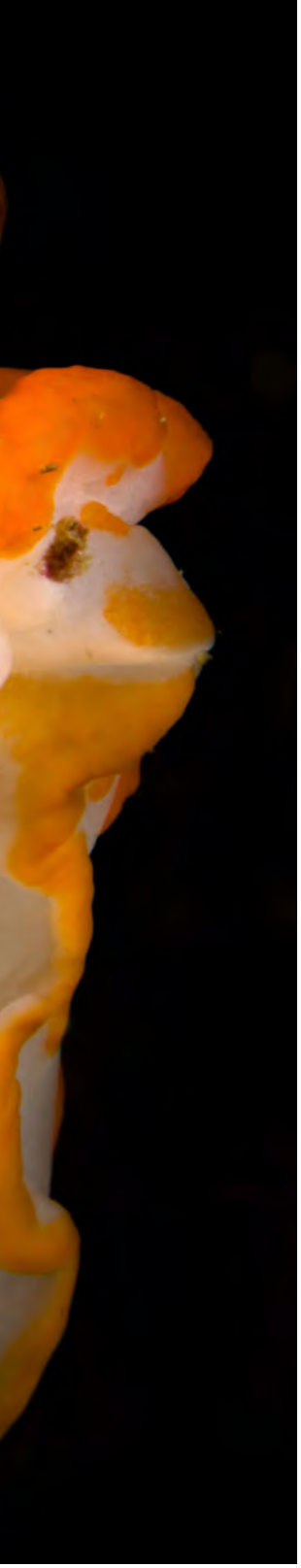
UAE BRANCHERS

FEATURE AND PHOTOGRAPHY **STEWART CLARKE**

It has now been a year since my last article concerning Nudibranchs and my obsession with these amazing little critters shows no sign of abating. I'm still receiving strange looks in polite company whenever I mention my passion for slugs, but luckily my friends and family are becoming a lot more understanding.

So what has been happening in the last year? Well firstly our efforts to record the species in the UAE is going from strength to strength. By January of this year we had reached a total of 138 species across all of the UAE waters, with 102 of those being found on the Eastern coastline alone. The reason why the numbers are so skewed towards the East coast is primarily that is where we do most of our exploratory dives. We are entering the height of the Nudibranch season in the coming months so hopefully we will continue to add to this figure.

The Inchcape II wreck is still proving to be extremely productive with a good variety of slugs being found on it. Unfortunately we are also witnessing an increased level of destructive diving practices that is causing damage to this wonderful dive site. We can only hope that some of the East Coast dive operators control their



Favorinus sp

guests more closely and dissuade them from standing and lying on the guardrails and deck.

What is becoming more apparent is that the number of species we are seeing are invasive in nature and are not thought to be naturally found in our waters. The bryozoan species that a number of them feed on is also thought to be invasive, as are a number of soft corals that are in abundance at the various dive sites. This is surely further evidence of the impact of ballast water on our marine environment.
It is not just on the wrecks that we are finding new species, a few of us have been going off piste and scrabbling around in the sandy areas away from the reefs. These areas may look somewhat barren to the untrained eye, but if you take your time and look carefully, there is a complex ecosystem in microcosm out there. These marine deserts are scattered with little oases of sponges and soft corals, upon which several species of slugs and shrimps have set up home. These species tend to be quite well camouflaged and spend most of their time buried under the sand and make an appearance once darkness descends, but they will come out during overcast days as well.

Over the next few months a few of us are planning to start looking in the mangrove areas surrounding Abu Dhabi. I've always suspected that the mangroves would be a rich hunting ground but until now I haven't been able to properly explore them. Elsewhere in the world many species are found in this type of environment and there is no reason the UAE mangroves would be any different.

One thing I am often asked is how I go about actually finding Nudibranchs, especially some of the more camouflaged ones. Well firstly the trick is to look properly, this may sound obvious but it's amazing how many divers think that the more they move about, the more stuff they will see. This is counterproductive. On some dives I may spend the entire 50 minutes not moving more than 10m from my original starting point.

HERE ARE MY TOP TIPS FOR FINDING OUR LITTLE SLUG FRIENDS:

1. **RESEARCH** – There are many resources online that list Nudibranchs and provide basic information regarding locale, size and diet, there is one that is even geared to the UAE (**https://www.facebook.com/#!/uaebranchers**)
2. **FOOD** – Once you have figured out what sort of stuff they eat then try and look for it on the dive site. They tend not to stray too far from their food so it's always the best place to start.
3. **EGGS** – Nudibranchs lay some very distinct egg ribbons. They come in a variety of colours but generally appear in the form of expanding spirals. Find the eggs and the Nudi is not normally too far away. These will often be laid on or very close to their food source. There are even some species that feed exclusively on Nudibranch eggs, namely Favorinus.
4. **LIGHTING** – A torch is essential for picking out those hard to see species. Under normal conditions a lot of Nudis look drab to the naked eye, but shine a decent light on them and the colours can really pop out.
5. **ODDITIES** – Some species of Nudibranch are brightly coloured and quite frankly stick out like a sore thumb. However some are very well camouflaged and so small they look like tiny bits of dust or weed. They may be moving in a slightly different way to the rest of their surroundings or just be a slightly different shade to whatever food they might be located on. I tend to just scan a potential area and if anything doesn't quite look right, I zoom in for a closer look. Sometimes, if you can't quite figure out if it is a slug or not, then just take a picture and zoom in later on the computer to check.
6. **GET CLOSE** – For those hard to spot species, you really need to get close, however never get so close that you might end up damaging your surroundings. Some Nudis live on stuff that stings, so it's even more important to make sure you don't touch anything.
7. **FELLOW NUDI LOVERS** – Try and dive with others who share your interest, two sets of eyes are better than one.

Next time you are out on a dive, take your time and have a really good look at the small stuff, you might just be surprised at what you find. If you find anything you are not sure of, then just visit the UAE Branchers Facebook page and we'll do our best to help identify it.


Dermatobranchus sp


Eubranchus mandapamensis


Armina semperi


Aplysia oculifera

SHARK DIVE AT THE DUBAI AQUARIUM

THE ULTIMATE SHARK EXPERIENCE IN DOWNTOWN DUBAI

FEATURE **NICOLA DE CORATO** – ADMINISTRATOR OF DUBAIBLOG, DIVER AND HELI RESCUE SWIMMER

For many people, divers or snorkelers, a shark dive is the ultimate experience or a childhood dream. Seeing sharks on a dive is the first desired attraction among divers, according to surveys. Diving with sharks, being few centimeters away from a perfect, elegant, intelligent, awe-inspiring, unpredictable predator is a wonderful experience. Jacques Cousteau once said, "The only predictable thing about sharks is that they are unpredictable". That's why, probably, shark dives are such an exciting experience.

Shark tourism is an act of conservation because it creates a strong economic incentive to protect sharks rather than kill them. That's because sharks are increasingly rare. There are not so many places left where people can still go to experience the magnificence of large, charismatic sharks. A growing number of shark species are approaching extinction, with millions of sharks killed every year, and we are thankful that special places around the world enable humans to experience them.

Without going too far from home or experiencing it directly in open water, shark dives in an Aquarium help you prepare, learn basic shark behavior and understand that myth, media and sensationalism have created and perpetuated an irrational and inaccurate fear that sharks are ruthless killing machines.

The statistical reality is, that sharks do not want to eat people. Sharks are predators and they can only hunt successfully if they are healthy and uninjured. For this reason, sharks are generally very reserved and cautious about approaching something large they do not recognize as prey. They tend to stay away from divers. What sharks luckily do not know is, that despite our size, we're pretty vulnerable in the water and we can't bite them back – so they will naturally be wary of us.

So, if you do want to share a few wonderful moments with these beautiful creatures by diving with sharks, read on.

The Dubai Mall Aquarium is a purposely built shark aquarium, with a capacity of 10 million litres of salt water, home to over 33,000 creatures from more than one hundred species. There are over 400 sharks and rays in the tank, including the world's biggest collection of sand tiger sharks. Other shark species include black-tip and white-tip reef sharks, zebra sharks, wobbegongs, grey reefs and nurse sharks. There are also many ray species in the aquarium including cow-nose rays, fan-tails, eagle rays, leopard rays, shave-nose rays and bowmouth guitarfish. Other fish in the tank include tropical species such as napoleon wrasse, batfish, big-eye trevally, giant trevally, clown fish, faint grouper, moray eels, snappers and unicornfish.

The Dubai Aquarium offers certified divers the chance to have a recreational dive in the tank, getting up close with sharks, rays and other species with the constant supervision of a dive master and dive instructor to assist you throughout the experience. All equipment is provided (including towel and swimming wear if needed). A training presentation is given before the dive to prepare you for the specialist environment of the tank. The maximum depth of the tank is 11 metres and it is kept at a constant temperature of 24°C.

If you are not a certified diver, you can do a Discover SCUBA Diving experience directly in the Dubai Aquarium or for those wishing to experience the shark tank without being submerged under the water, you can also snorkel in the purpose-built cage.

What to do after your shark dive? Go shark diving again! Divers who apply for the Master SCUBA Diver certification, have a chance to attend the Dubai Aquarium Distinctive Specialty: a three-dive course consisting of a shark-dive orientation, photography dive and a shark identification dive during the shark feed. This distinctive specialty credits towards the Master SCUBA Diver certification. The course can be completed in one day or on different days, at your convenience. Or you can plan a dive in open water.

Ready to dive, Nico

NICOLA DE CORATO

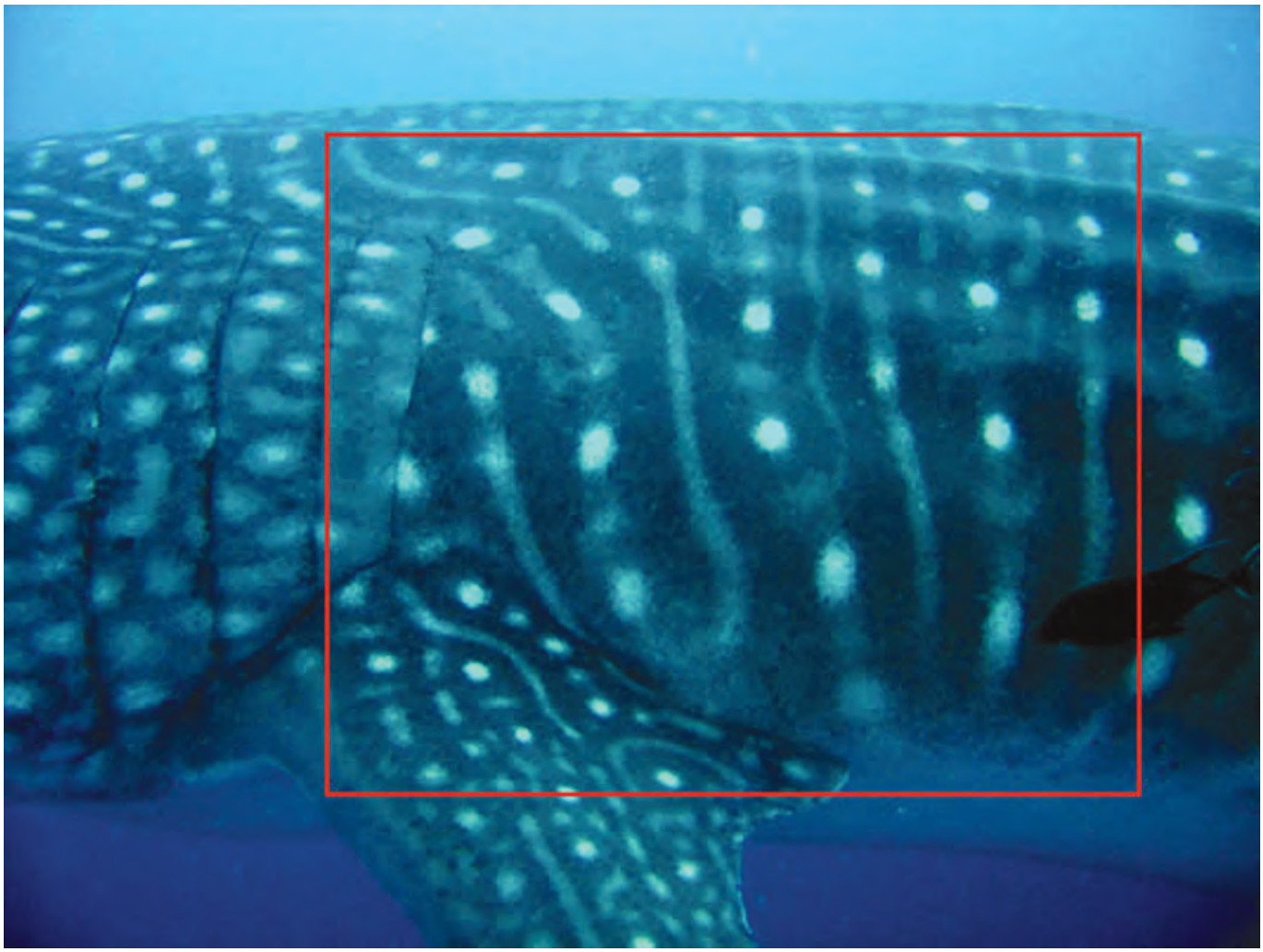
Blogger, marathon runner and triathlete, diver and heli rescue swimmer with Bergamo Scuba Angels. You can read my blog www.dubayblog.com, contact me on social networks or via email at admin@dubaiblog.it or ndecorato@bergamoscuba.com for information about dive destinations, to schedule a training or a dive together, or just to say hello.

SPOT THE DIFFERENCE

RESEARCHING WHALE SHARKS IN ARABIA

FEATURE AND PHOTOGRAPHY **DAVID ROBINSON**

A lot of speculation has been made over the years about whale sharks in our region, yet before 2010, very little research had ever been conducted.



This image shows the correct area of the whale shark that is used to identify individual sharks; this is he same for the left or the right side of the shark.

A lot of speculation has been made over the years about whale sharks in our region, yet before 2010, very little research had ever been conducted. I am a marine biologist and I moved to the UAE in 2006 for work. Growing up, I always had a passion for sharks which is reflected in my choice of career. When I first arrived in the UAE, I was surprised to hear of divers encountering whale sharks on quite a frequent basis. I knew of areas where whale sharks were found, but this region was not somewhere I associated with whale sharks.

In 2009, Natural History Film Maker, Jonathan Ali Khan, organised the first Arabian Seas Whale Shark Research Symposium & Workshop that was held in Fujairah. During the conference, the lack of research and information on whale sharks in this region became apparent. At the time, I was looking to start a research project and as I sat there listening to researchers from all over the world talking about their whale shark research projects, I knew that I wanted to attempt something similar here and possibly contribute to the conservation of whale sharks in this region.

A few months later, I was enrolled at Heriot-Watt University in Edinburgh and my research project investigating the ecology of whale sharks in the Arabian Gulf and Gulf of Oman had started. Initially there were concerns that there would not be enough whale sharks in the region to gather enough data, but luckily, that wasn't the case. In early 2010, together with EDA, Jonathan Ali Khan and Underwater Photographer Warren Baverstock, we started a citizen science initiative we called 'Sharkwatch Arabia' to collect information on whale sharks for one part of the project.

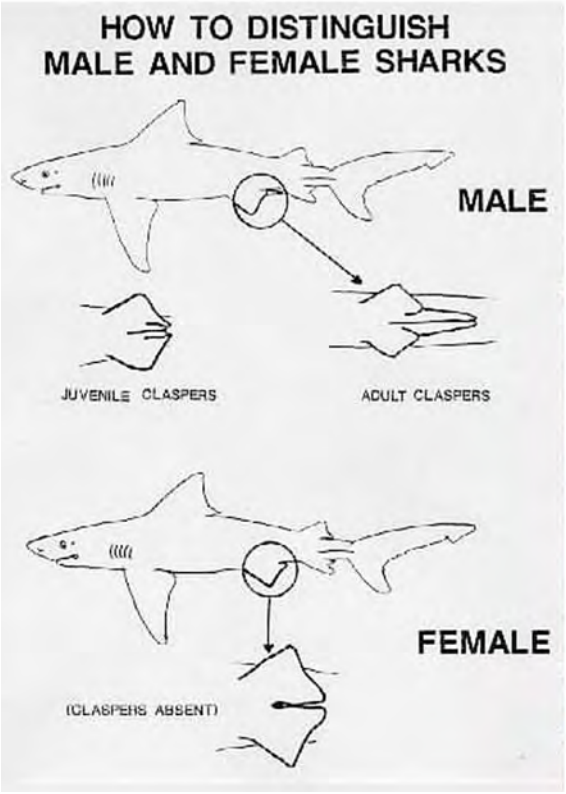
Sharkwatch Arabia is a community based research project that aims to utilize the regional diving and sea faring community to collect information on sightings and behaviour of whale sharks found within the Arabian Gulf and Gulf of Oman. The aims of the project include determining the population dynamics, movements and areas of importance and identification of individuals within the study area. The goal of the project is to better understand the ecology of the whale shark with a view to helping provide increased conservation.

Diving and in particular underwater photography is a growing industry within the region and there are many great photographers and frequently used dive sites, given a small amount of training, any diver can become a researcher. Our aim is to turn our Gulf wide dive community into a powerful data collection tool as collectively, they spend more time underwater and cover more area than any dedicated research project could ever hope to achieve.

DATA COLLECTION

A global whale shark data collection project called 'Ecocean' was already in existence but from our region there had only been 10 sharks identified between 2004 and 2010, so it was clear that people were either not aware of the project or simply not uploading their encounters. We took the initiative to start up a regional database and to collect data through a website (**www.sharkwatcharabia.com**) that we could promote regionally through EDA and our dive centres. This seemed to work and the encounters and sightings started to come in, some from as early as 2003 that had not been recorded before. The diver simply uploads any images he or she has or emails the encounter through the website and we then analyse the images to see if the shark can be identified. Once the analysis is complete, we then upload the information onto the global database on behalf of the diver with their details so that if their shark is seen again anywhere in the world, they will be contacted.

Feedback for all encounters is always given as we think this an important aspect of the



This image shows how to identify the claspers and distinguish between a male and a female shark.

project, to let everyone know what they are contributing to and how they have helped. The project has so far been a success and we have now identified over 100 individual whale sharks from the UAE and Oman in only 4 years. The Sharkwatch Arabia Facebook page where any reported encounter is shared with the community as well as any interesting regional and global news on whale sharks has now reached more than 1,000 active members from the region.

HOW TO IDENTIFY AN INDIVIDUAL WHALE SHARK

The whale shark is a large spotty fish, early research into the whale shark in Australia found that the spots on the left and the right side of the shark in the area behind the fifth gill slit and above the pectoral fin, were unique to each animal and stable over time and could be used to identify individuals throughout their lifetime. We use images of this area of the shark and run it though a special software package that was originally by NASA, designed for mapping and identifying clusters of stars. This software maps the spot pattern of each shark and saves it into a database. If an image of the shark is run through the database again, it will identify that individual and bring up all of the previous information. Identifying individuals is important, but also, just simply logging an encounter, without a photo is also important.

IS IT A GIRL OR A BOY?

We ask divers to try to record as much information about the shark such as where it is, what it is doing and the gender of the animal. The gender of the whale shark can be identified from the presence or absence of claspers that are found between the pectoral fin. Claspers are found in male sharks and are their equivalent of a penis, in mature sharks they extend past the ends of the pectoral fin and become 'cauliflowered' which means they resemble the head of a cauliflower. In juvenile sharks, the claspers are small and can be hard to identify and a lot of people misidentify a juvenile male as a female. Male whale sharks are thought to reach maturity between 8 and 9m in length and female whale sharks between 9 and 10m but this estimate seems to differ at different locations around the world.

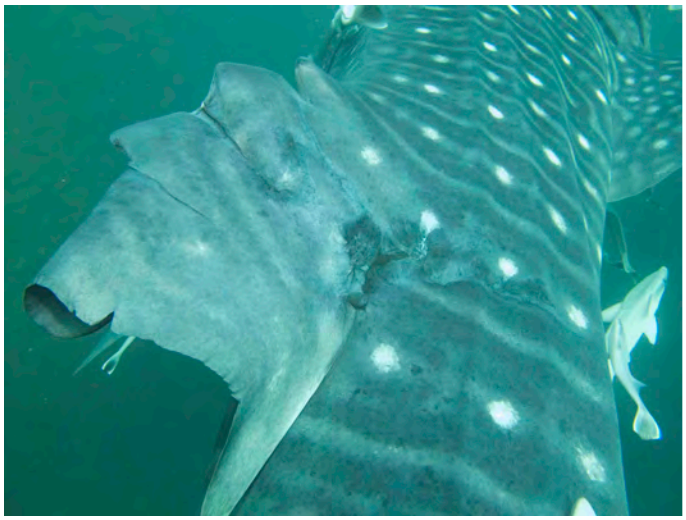
THE BIOLOGY OF THE WHALE SHARK

The whale shark (*Rhincodon typus*) is the largest fish currently known to science and can reach sizes of up to 18m in length. They are classified as belonging to the order Orectolobiformes which is compromised of mostly small, bottom dwelling sharks. The whale shark is a filter feeder that feeds primarily on zooplankton and inhabits tropical and sub-tropical waters around the world. The whale shark is currently classed as vulnerable to extinction by the IUCN.

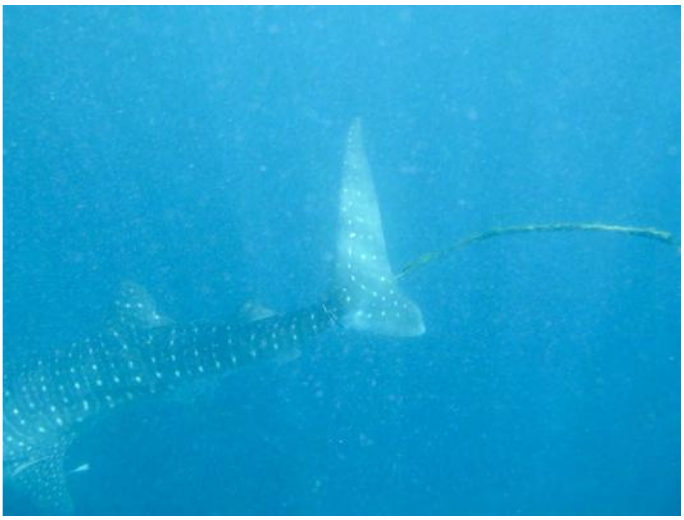
Little was known about the reproductive biology of the whale shark until a 10m pregnant female was caught off the coast of Taiwan. Before this animal was studied, there was only speculation about the reproduction of whale sharks and some thought them to be egg layers, like their closest relative, the zebra shark. This was not the case and during the postmortem, 300 baby whale sharks were found all at different stages of development. The whale shark was then identified as being ovoviviparous which means that the female lays eggs inside her, the young hatch inside her body and she then gives birth to live young. A few of the babies were still alive during the examination and were taken to an aquarium. These individuals are where our current estimation of whale shark growth rates come from. A whale shark at birth is pretty much like a tiny adult whale shark, with a total length of around 64cm. Few juveniles have been found around the world which suggest they may head to deep water where there are less predators. Juvenile whale sharks have been extracted from the stomachs of other larger fish showing that during their early years, they are indeed part of the food chain.

Nobody has ever witnessed whale sharks mating, but I imagine this would be a clumsy and difficult affair. Genetic analysis of all the young from the female in Taiwan were conducted and it was found that they were all sired from one father even though there was a large time difference between the developmental stages of the pups. In zebra sharks, the gestational period is around five months, but this is temperature dependent; to date, nobody knows the exact gestation period for a whale shark. Multiple matings with a single male were considered unlikely and so sperm storage, which is demonstrated by other shark species and is the ability to store sperm over time, was considered to be the most plausible explanation for the single paternity.

The sex of the pups examined from the Taiwan female were 50% male and 50% female which suggests that whale sharks give birth to an equal number of male and female pups, yet at



A juvenile whale shark showing propellor damage to the dorsal fin.



A small whale shark that has escaped a fishing attempt but still has the tail rope attached.

most study sites around the world, significantly more male than female sharks are found and these are usually juvenile or recently mature animals above 3m and below 9m in length.

SO WHERE ARE THE BIG SHARKS, THE FEMALES AND THE PUPS?

The truth is that nobody really knows; the largest whale shark on record was 18m and recorded in Taiwan. There have been large sharks up to 18m recorded off Gujarat in India, where, before the year 2000, one of the largest whale shark fisheries in the world existed. Large female sharks and possible pregnant individuals have been recorded on a regular basis from the Galapagos Islands and studies are ongoing to collect more information.

Whale shark pups have been recorded from several locations including Pakistan, the Philippines and a more recent finding close to the Caribbean. It is not known whether or not breeding and pupping grounds actually exist for whale sharks or if they mate opportunistically and give birth on a frequent basis.

THE WHALE SHARK AND ARABIA

The whale shark can be encountered all year round in the Arabian Gulf and North-West Gulf of Oman. Whale sharks are known to aggregate at specific sites at certain times of the year within the Indian Ocean for feeding such as the Seychelles, Djibouti, Maldives, Mozambique and more recently closer to home in Qatar. All of these aggregations are made up majority of male sharks and have been related to feeding. Further information about the Qatar aggregation can be found in a recent paper published at **www.plosone.org**.

Historically, on a global basis, very little data on whale sharks has ever been collected because it was not considered commercially viable. In recent years this status has changed with the increasing demand for shark products from the Asian market. There are increasing reports of whale sharks being taken for their fins as other species of shark become less abundant.

Whale sharks, along with the sawfish are protected by law within UAE waters which means that it is illegal to target them for direct catch, this is the highest form of protection for a species. Trade of whale sharks and whale shark products is controlled under CITES but this only relates to international trade and does not protect the shark against direct catch and utilisation within a country. More recently the UAE Ministry of Environment signed an MoU with several other countries together with the Convention of Migratory Species (CMS). This is not a legally binding agreement but an agreement between countries and relates only to migratory species of shark listed on the convention, but this does include the whale shark. The signing of this agreement is definitely a positive step forward for shark conservation in the UAE and hopefully will encourage other countries to join.

Whale sharks certainly have threats within this region and as no previous demographic baseline data on the species has been recorded, it is not known if the number of sharks found in the region is stable or in decline. All threats relating to our whale sharks are anthropogenic in origin and the majority of sharks encountered bear scares or injuries from boat impacts.

Whale sharks are sometimes caught accidentally in nets, but they are also taken as direct catch. Tail ropes have been recorded on several sharks, including one in the Musandam, but it is not known where these tail rope incidents are occurring regularly and if this is happening outside our region or within.

Throughout the study, several whale sharks a year end up in the fish markets or stranded on the beaches after accidental capture and drowning in fishing nets. The most recent incident was of a shark known to us and that we identified from a diver who encountered him in the Daymaniyat Islands in September 2013. This shark was caught by a fisherman and landed alive in a port in Fujairah but died soon after. Upon learning of the catch, the UAE Ministry of Environment acted fast and confiscated the shark before it could be sold. Although a sad occurrence, gaining access to a dead whale shark is a rare occurrence anywhere in the world. Working with a team from the MOE, samples were taken from the carcass and are currently been analysed to help us learn more about the sharks.

There is a target fishery for whale sharks in Taiwan where the shark livers are utilised for their oil content and the meat is consumed. Recently a large undercover operation was exposed in China where 600 whale sharks were being processed and the prime reason seemed to be for liver oil and their skin. In Asia, the fins tend to be used as decoration for shark fin shops rather than actually in shark fin soup itself as apparently it doesn't have the desired texture. In India, up until the year 2000, there was a huge fishery for whale sharks with hundreds of individuals being landed on an annual basis. The sharks were processed for shark liver oil to waterproof the local fishing boats but the meat wasn't commonly consumed. This came to an end when the Indian government placed the whale shark high on the protected species list and the fishery came to a halt, almost overnight. Today, government teams collect data from whale sharks and also have a release and compensation program in place if the sharks become entangled in fishing nets.

FINDINGS SO FAR

The project will continue to run until 2015 when the data and information will be analysed and compiled as a complete study which will provide baseline data for future studies to compare against. From spot pattern analysis, we have identified individual sharks from inside the Gulf and seen them again in the Musandam, we have also frequently encountered sharks from the Daymaniyat Islands in the Musandam and vice versa showing that the sharks do move between these two hot spots. As more and more sharks are identified, more re-sightings are occurring and recently we had a shark spotted in the

A 4.9m male whale shark that was accidentally caught in a fisherman's net in RAK and brought to the Dubai fish market where it failed to sell.

Musandam that was first encountered in 2009! Satellite tags have also been placed on sharks to build up a better picture of movements within the region and beyond.

I am often asked what is the best place to encounter a whale shark and without a doubt, the most frequenting encounters with whale sharks takes place at Lima South in the Musandam. Although whale sharks are found here all year round, they are certainly encountered more frequently in the warmer summer months from April to October so this is the time to don your wetsuits and head out for a diving trip…

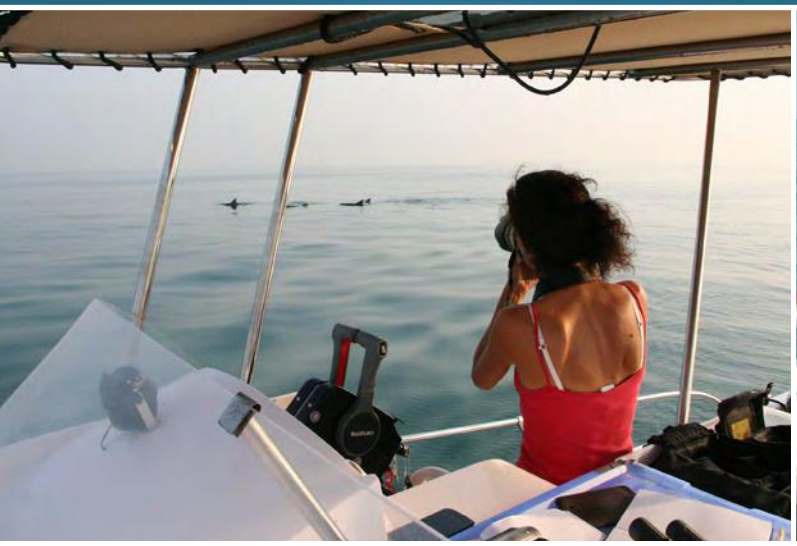
HOW CAN YOU HELP OUR WHALE SHARKS?

Report any encounters! If you have a photo, great and if you have one of the identification area shown in the images, then even better! If you don't have a photo, it is still important to report your encounter as every bit of information collected really does help.

You can report your encounter and upload your images online at **www.sharkwatcharabia.com** or join our Sharkwatch Arabia Facebook page where we regularly post whale shark related news and interesting findings. Once you report an encounter, we will always provide feedback and also let you know if your shark is seen again, which seems to be happening more and more frequently as more sharks are added to the database.

Many thanks go out to all the individuals, organisations and dive centres who have contributed to the study so far by helping with logistics or by sending in their sightings and photos. Thanks to EDA and Al Ghurair Foods, the Save Our Seas Foundation, Le Meridien Al Aqah Beach Resort & Spa in Fujairah and the Emirates Natural History Group for sponsoring satellite tags for whale sharks.

We are positive that the data collected will make a difference for our regional whale sharks, so please report any encounters at **www.sharkwatcharabia.com**.



UAE DOLPHIN PROJECT IS ONE YEAR OLD:
A GIANT LEAP FOR DOLPHIN RESEARCH IN THE REGION

FEATURE **ADA NATOLI**

It is exactly one year since our first appearance in Divers for the Environment. Back then, the project was just starting out. The project website, **www.uaedolphinproject.org** had just been launched and our target was to engage as many people as possible in reporting sightings and see if there was any interest in local cetaceans from the public.

So we got down to business: we promoted the project at the Dubai International Boat Show, we were at the First Dubai Marine Heritage Festival, we presented at the World Wetland Day event organized by the Environmental Department of Dubai Municipality, we celebrated the World Environmental Day participating at the Paddle for the Planet Initiative. We made contact with the local dolphinariums that have been very supportive on several occasions. We presented to diving centers, beach clubs and hotels, major stakeholders like Trakhees and shipping companies, the Rotary Club Jumeirah. We went to schools and Universities and found many interested students of all ages and teachers eager to know more about dolphins in UAE waters.

Now, counting back, our Facebook page is hitting 400 likes, over 850 students have

attended our presentations and now know more about dolphins and whales and more importantly, that these species can be found in UAE waters and everyone can report their sightings. Students from the American University of Sharjah were so interested and are now starting to join our research activities.

And what of the sightings? Our "Report a Sighting" system now lists 154 sightings, some of them from as far afield as Kuwait and Oman. Some groups have provided us with their whole database of sightings diligently collected throughout the years. Some people dug into their photographic records as far back as 2008 and sent us their information. Thanks to all these efforts, we have identified the first bottlenose dolphin individuals that now have names; Paso and Trigger. We now know that humpback dolphins frequently enjoy the waters in front of Saadiyat Beach, that false killer whales pass in front of Dibba, finless porpoises in front of Dubai are not so infrequent and that killer whales occasionally pass by the Palm Jumeirah! We also had strandings reported of finless porpoises, bottlenose dolphins, a whale and a killer whale in Sir Bani Yas. We have been fortunate enough to conduct necropsies on some of the carcasses to collect key data.

When we started just over a year ago, our second target was to start a research survey that could provide the first scientific baseline information on the local coastal dolphin population. On the 26th of October, we inaugurated the start of the field-work with the arrival of the research boat, Harman, a 30 foot Duretti Sportfisher at the Dubai Marina Yacht Club. The club organized a great community event for the occasion that received great coverage in the press. The field-work research is now finally underway. This would not have been possible without the invaluable support of our sponsors: Duretti Boat Manufacturing, Dubai Marina Yacht Club, ITP Publishing, a construction company and two private supporters.

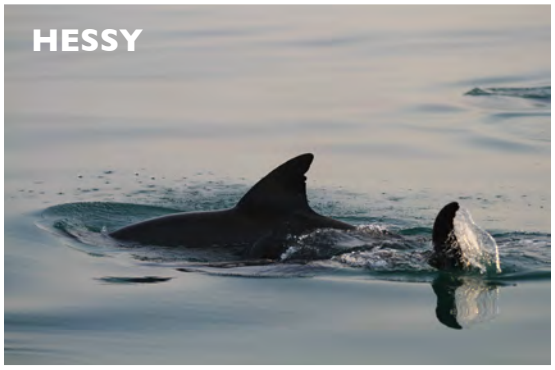
The first results are already exciting! We confirmed the presence of three species of dolphins in Dubai waters, including the elusive finless porpoise of which we already had two sightings. We also started a photo-identification catalogue for the bottlenose and the humpback dolphins and we have now counted 23 identified individuals from the first species and 10 from the second. We have already had re-sightings of the same individuals. Perseverance, determination and hopefully some good weather is now needed to carry on collecting data that will enable us to get some more precise estimates of the local populations.

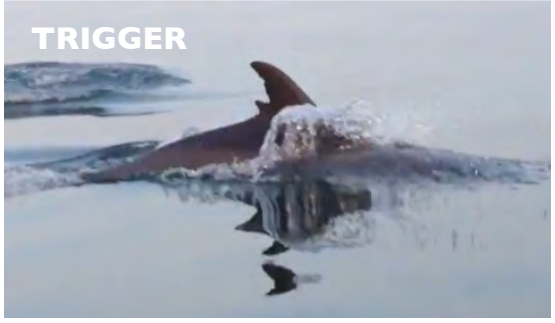
Most importantly, we have built up a small team of assiduous volunteers: Traill, Valerie and Cristyn that provide invaluable help at so many occasions! And many other volunteers that help us during many events. We are now welcoming new young energy and enthusiasm: Uso, Lauren, Camilla and Fatma from the American University of Sharjah.

It has, on reflection, been a great first year for the project. We couldn't have achieved what we have without the input and support of everyone that has contributed. Even with just one sighting, organizing one presentation, spreading the word among friends or making a dolphin drawing. Now we face a challenging year ahead to consolidate what has been done and project it forward into the future and more than ever, we need everyone's support!

Keep reporting sightings and spread the word!

UAE Dolphins all have a name! These are the first bottlenose dolphin photo id's from Dubai waters. Names were given to each of them by members of the public that provided the first photgraphic evidence of them or that participated to our "Draw a Dolphin" competition and won the prize for the best drawing.





WHAT DOES IT TAKE FOR YOU TO STAND UP AND BE COUNTED?

FEATURE **PAUL WARWICK**

Photo by Jon Fisher, www.drr.net/Marine Photobank

What will it take for you to stand up and be counted in the "battle" to save our oceans and seas and the diversity of life that inhabits them? What tragedy or catastrophe will spark your soul or conscience to stand up and speak out for those who are unable speak for themselves? Let us hope that it is not the "not so outlandish or outrageous" scenario I set out below?

IMAGINE IF YOU CAN:

"The atmosphere begins to thin as the Oxygen (O2) levels reduce – breathing becomes difficult, land based plants and animal life begins to die. Carbon Dioxide (CO2) and other greenhouse gas levels increase and raise temperatures across the entire world. The ice shelves and glaciers in our Polar Regions melt uncontrollably releasing huge quantities of fresh water which have been locked into the ice for millennia into our oceans upsetting the delicate balance of salinity, currents and temperature affecting climate, weather and migrations. Symbiotic marine ecosystems systematically collapse creating huge "Dead Areas" of ocean which in turn initiate a similar effect to land ecosystems. The ability of the oceans to add their huge contribution to the Global Oxygen, Carbon and Water Cycles ceases and our weather patterns become erratic, more severe and ever more destructive. Air pollution, man's wastes and excesses and increasing atmospheric contaminants cause the breakdown of our all protective Ozone Layer and then what? Unprotected our Ocean's waters begin to boil and the Seas evaporate as our atmosphere begins to disintegrate – then???"

Alarmist, maybe – Realistic possibly – Activist perhaps we should all be if we value the precious gift we and all life have been given – water – and in particular our oceans and seas. This is not from a Science Fiction Novel but a potential reality, if not for us, for our children or their children if we carry on abusing our oceans and seas by pillaging and polluting in the same selfish self-centred, uncaring way we are currently.

INTRODUCTION

Here is a paradox "Where does it start, the end of life in our oceans?", perhaps it has already started and we just do not know it or we choose to ignore it? More importantly, what impact will this have on the rest of our world, our own lives and the lives of our children and their children? There are many prognoses for the future health and well being of our oceans and seas depending on which side of the ecological argument you lean towards.

FOR THE PESSIMISTS:

- Is it the melting of our ice caps through global warming or the accompanying rise in sea levels swamping huge swathes of low lying lands or,
- does the fresh water from the melting ice caps upset the delicate balance of the oceans and throw our weather into chaos taking us into another ice age or,
- worse still, permanently change the weather patterns and severity of weather on a global scale, or,
- does man's actions in depleting our oceans of life mean we end up with an airless, lifeless and cold planet just like the Moon and Mars or,
- are we just swamping our oceans with pollutants such that they will be unable to support any life at all or life as we recognise it?

FOR THE OPTIMIST:

(generally the capitalist as well), "all is ok and the overwhelming scientific evidence is all "bunkum" – besides as long as it does not directly affect me (or my business) why should I do anything about it?" Then there are the realists, which I believe makes up the majority of "sane" people who consider "that there is definitely something amiss but do not fully understand what is going on – perhaps no one really does?" That being the case, then perhaps we should press our elected officials to find out what is happening, seek global consensus and do something about it – NOW before it is too late!

Governments argue that the cost of change is too great, or that change would damage the global economy or that change will affect the lives of their citizens – it really depends from which standpoint you are looking. An African Tribesman is concerned with feeding his family and providing fresh water and shelter, in the West we take this for granted. Danish Eco-Economist Bjorn Lomberg argues in his book, "The Skeptical Environmentalist", that environmental change is inevitable and is part of the cyclic nature of life on this planet. He proposes a straightforward economic argument to the management of environmental change (whether proven or not) and that the current mechanism of green taxes and carbon credits are not the solution to the problem but merely a stop gap.

HE ARGUES THAT THROUGH:

- Research into developing financially competitive alternative energy technologies
- "Adaption" by reducing man's vulnerability to the changing chemistry and physics of our world

- Geo-engineering by influencing weather and climate artificially to reduce the impact of global change

- Improving the quality of life for everyone, through education, health, fresh water, secure food supplies

We can successfully and effectively manage any geo-climactic change and influence and improve the lives of future generations. The cost he calculates at $250 Billion per year for the foreseeable future. His economic logic is sound, but implementation requires global consensus, a surrender of some national autonomy and global effort especially in the emerging economies for whom growth is paramount and the future cost(s) of current growth is the last thing on their minds. That said, his proposal does not include the management of global inorganic and organic resources which we now accept are "finite and with limits" and difficult to replace. This is especially evident in the organic resources of our ocean and seas.

OUR OCEANS AND SEAS

Our oceans and seas are the "life blood" of our planet, they are the circulatory system which regulates weather, global climate, temperatures and shapes the geography and chemistry of our world. They provide balance which is critical to our continued existence and that of the other species on this world. But the future must be about balance, we are all connected to the oceans and seas, after all we came from them having crawled out onto the land millennia ago, they are our spiritual home. We must learn to live in harmony with nature not dominate it because eventually it will "bite back" at some point and that reaction could be catastrophic. Human and Geological History has shown that Nature does not tolerate excess and we as the intelligent species are becoming that excess!

As well as being the engine which drives our planet, the oceans are home to 97% of all the species on this planet – perhaps in this part of space? Bio-diversity is a cliché which is often used, but little understood. Nowhere is this more visible than in our oceans and we actually know less about them, the life they support and how important they are to us and all that we know about deep space. What we do know now is that they are not limitless as we had first thought and that our excesses are creating effects which we have yet to fully fathom.

THE LAST 50 YEARS HAVE SEEN THE RECORDED LOSS OF:

- 90% of all large fish in our oceans (Sharks, Tuna, Sailfish etc)
- 50% of recorded Coral Reefs destroyed
- 90% of the remaining Whale population (after the excessive overhunting in the 19th Century) killed
- A large number of species made extinct by overfishing and pollution

What are left of these species are weakening as the natural "laws of selection" are overturned and the gene pool which historically assured only the strongest survived to propagate their kind is immeasurably reduced. We are effectively killing bio-diversity and attacking the "fabric" of nature itself.

Can you imagine oceans and seas devoid of not just the diversity of life required for a balanced, healthy and self perpetuating global environment, but no life at all? No fish, no crustaceans, no marine mammals, no corals, no marine plants (seaweeds, sea grass, plankton) nothing? Nothing to "fire" the oxygen, carbon and water cycles of our world which are required to sustain and maintain all life!
What we do know is that Mother Nature is both robust and responsive and will attempt to react to changing the organic chemistry of our world in order to maintain the all essential balance. Perhaps the increase in the number of plankton blooms is Mother Nature's reaction to increased organic carbon in the atmosphere and an attempt to restore balance, yet we look upon it as a plague? What she cannot do is replace the natural resources of the sea at the rate we are depleting them.

WHAT DO OUR OCEANS AND SEAS DO FOR US?

Many of the ignorant or ill-informed will ask, "what do our oceans and seas do for us"? Well the answer is simple – everything and more, our oceans and seas underpin life on this planet! Without healthy oceans and seas, we would not enjoy the benefits of a habitable planet with a relatively benign environment and largely accommodating climate. The oceans and seas are the "engine" which drives

Photo by Dieter Tracey/Marine Photobank. Ocean currents wash large quantities of marine debris and rubbish ashore at Chili Beach, Iron Range National Park, Cape York, Australia.

Photo by Claire Fackler, NOAA National Marine Sanctuaries/Marine Photobank. Pelagic seabirds are impacted by marine debris, although they are in the Papahanaumokuakea Marine National Monument located in the remote Northwestern Hawaiian Islands.

climate and weather, stabilises temperatures and shapes earth's chemistry and geography. They are an essential part of the "complex life cycle" harvesting organic carbon from the atmosphere and in return providing life giving oxygen and effectively acting as the "circulatory system" for our water world.

AS IF THIS WERE NOT ENOUGH, THE OCEANS PROVIDE SO MUCH MORE:

- **FRESH WATER.**
  - Through weather cycles which creates rain, sleet and snow that fills our rivers and streams, lakes and seas.
  - In many parts of the world, sea water is desalinated to produce fresh water for consumption and to support land based farming. However, effective management is reliant upon clean, uncontaminated sea water.

- **FOOD.** Our oceans and seas provide us with the largest proportion of protein in our global diet and over 60% of the population relies on protein derived from the ocean and seas.

- **CLOTHING.** Clothes us and provides organic materials to make synthetics.

- **HEALING.** Heals us by providing the opportunity for marine based pharmaceuticals and medicines. It is also wide accepted that the oceans hold the key to many future "cures" for man's ills.

- **ENERGY.** The oceans and the depths are no longer an obstacle to the search for energy as fossils fuels are being extracted (But at a price!) from our continental shelves and deep oceans. But wind, waves and the salinity of our oceans are opening up other opportunities for other potential renewable energy sources.

- **MINERALS AND ORES.** Industry is now looking at the deep oceans to harvest minerals and ores from the ocean's floor and the natural geo-thermal vents.

The relationship of all life in our world is that of symbiosis and the oceans and seas are a critical part of that relationship. The worst thing – we are not keeping our part of the bargain in maintaining the balance in that symbiotic relationship.

WHAT ARE WE DOING

Essentially we are spending our children's inheritance and that of future generations. We all thought the "fruits of the oceans" to be limitless as was its ability to support man's proclivities, but we are sadly and potentially catastrophically wrong. We are only just now beginning to discover just how serious a problem we have created by our uncontrolled excesses and lack of understanding of the complexity of life and the physical interaction between our oceans and the rest of our planet.

- **POLLUTION.** We continue to pollute, contaminate and infect our water systems with man's ever growing demands:
  - Heavy metals are still being released into waterways which eventually ends up in the oceans and in such strength that it is now part of our marine food chain and indirectly the land food chain.
  - Plastics, the wonder of modern science and the apparent panacea to the problems of everyday living, but the bane of our environment. We continue to "dump" huge qualities of plastic in our oceans on an annual basis (estimated at 6 million tons) in the full knowledge of its impact to marine wildlife and the food chain. How "sane" is that?
  - Marine debris from our marine activities litter the shores and sea beds.
  - Despite international legislation, shipping continues to "dump" all manner of pollutants in our oceans.
  - Then there are the "accidents" which generally involve large vessels or equipment releasing oil into our oceans and destroying ecosystems which may be unique or which support the local subsistence economy. All in the name of progress and money!

- **DESTROYING HABITATS.** We are destroying marine habitats in the name

Photo by Aaron O'Dea/Marine Photobank. A Nurse shark is washed up onto rocks in Jamaica after swallowing a considerable amount of plastic fishing net.

of progress, both directly and indirectly with no consideration for the implications the loss of these habitats will have on the marine food chain or the future of endangered species.

- Excess free carbon in the atmosphere is increasing the acidity of our oceans and affecting the delicate balance required to sustain fragile ecosystems.
- Global warming, if it is indeed a "man made" effect rather than a cyclic change in the earth's weather, it could result in the Arctic being ice free in our life time. The resultant release of fresh water into our oceans could:
  - ° Upset the balance of salinity which in turn may affect climate and weather.
  - ° Change the "flow" of the deep oceans affecting the entire marine landscape and "confusing" marine species who rely on such patterns for migration, spawning and breeding.
  - ° Destroy the optimum conditions for marine food production of plankton and krill which underpin the food chain.
- The continent of Antarctica is protected under international law, but the seas around it are not and as a result they are literally being pillaged of everything from marine natural resources to fossil fuels.
- The Sargasso Sea (a unique environment) of kelp forests and marine life although designated as a marine reserve, is being savaged to produce feed for cattle?
- Use of poisons (arsenic) and to catch tropical fish, destroying stocks of fish and the precious reefs which are the nursery for almost all marine species.
- Methods of fishing are also destroying the marine landscape – trawling in particular has a major impact upon our ocean's floors and each of the unique habitats they support.
- Through increased numbers of vessels transiting our oceans we seem to be supporting an active emigration process as non indigenous species "holiday" in other parts of the world and in some cases upset the natural balance within the ecosystem they "infect".

• **OVERFISHING.** We harvest the bounty of our oceans on an industrial scale with mechanical efficiency and electronic accuracy and a complete disregard for the need for balance between production and procreation – we are taking out more than the oceans can produce and sustain. Even more traditional fishing in the Third World has been supplemented by technology to reduce the element of "chance". Then having depleted a particular fish stock, either by type or area, these fishing automatons move on until there is nothing left to catch, all stocks of all fish are exhausted?

- **SHARK FINNING.** Perhaps the most visual and current issue which has attracted global attention, but estimates are still running at 80-100 million sharks each year being massacred for their fins alone. Many species are critically endangered and some we may lose altogether in our lifetime. But beautiful and serene giant manta rays and mobula rays are also being killed only for their fins not for food!
- Whales were hunted almost to extinction and despite international bans and protection we still attempt to hunt these incredible creatures allegedly in the name of science and research. Surely the best way to study these wonderful creatures is alive in their natural habitat?
- In Japan they have an annual slaughter of Risso's Dolphins and Pilot Whales (almost 17,000 each year by estimates), where these highly intelligent, social animals are herded into a cove, corralled and butchered for their meat. Meat that is so contaminated with mercury and other heavy metals so as to make it unfit for human consumption, yet the slaughter still goes on – why?
- Tuna Hunting is perhaps a perfect example of industrial fishing. Tuna fetches huge prices in the Far East markets and having hunted the Yellow Fin Tuna almost to extinction, they are now turning towards the Blue Fin Tuna. However, they are corralling the tuna in huge nets and fattening up the fish for market so as to

Photo by Steve Spring/Marine Photobank. The greatest volume of waste discharged into the ocean, by far, is sewage. Sewage contains a wide range of pollutants including toxic chemicals, natural and synthetic hormones, pharmaceuticals, pathogens and organic matter. Nutrients and decaying organic matter can lead to eutrophication and facilitate the formation of harmful algal blooms.

increase their value. Other Fishing Fleets support this method by catching sardines, the staple food of the tuna, however it takes 7kgs of sardines to produce 1kg of tuna! The arithmetic simply doesn't work out in the medium to long term. If what we need is protein, then what is wrong with the sardines or vegetable protein?

- Cod stocks have almost been wiped out in the North Sea and North Atlantic because of overfishing.
- We have even begun to harvest Krill in the Arctic Ocean – the cornerstone of the marine food chain – to support cattle feed.
- To bring the problems "closer to home" the Locally Orange Spotted Grouper (Hamour), Golden Trevally (Zuraidi), Kingfish (Kanaad), Goldline Sea Bream (Qabit) have all been so overfished within the Gulf Region that they are on the endangered list.

- **BI-CATCH.** As if overfishing was not enough, most methods of fishing involve Bi-Catch – the unintended victims of fishing whether by net, trawl or long line. For every 1 kilogram of fish brought to market, it is estimated that anything between 10-100 kilograms is dumped as Bi-Catch and generally dead. This is especially endemic in areas where fishing quotas are established and checked against fish species in the name of conservation – commendable but narrow minded and self serving. This does not include illegal fishing which goes on unmonitored and unchecked in many parts of our oceans. Bi-catch does not just include fish, most turtles, whales and dolphins and other marine mammals such as seals and seas lions are killed as a result of current fishing techniques.

So what does this mean? Well we are systematically, destroying, killing and harvesting almost every marine species in the oceans for varying reasons from food to cattle feed to fertiliser. With ever decreasing stocks and so reducing catches, we then look at alternative species to fill the gap until…? Where do we stop and take stock of our situation?

If we carry on at current rates of consumption our oceans and seas could be devoid of piscal life within the next 50 years!

WHAT CAN WE DO

The first step is the global realisation that our oceans and seas are not without limits, that the oceans resources are not limitless and that its ability to regenerate and support the planet's circulatory system is not boundless without effective management. Permanent damage has and is being done on a daily basis because no one, or no organisation is taking ownership and responsibility. So, it is now time for you as a citizen of this world to speak out, loud and clear – that is if you care?

Stewardship of our oceans and seas means looking after them so that they in turn can look after us. Keeping a balance between, need and want, keeping them clean and healthy, managing production and procreation and policing our oceans and seas so that we can maintain a stable, sustainable relationship between people and the use of and needs from our oceans.

THERE ARE LOTS OF "TOOLS" AT OUR DISPOSAL TO REDRESS THE SITUATION:

- **INTERNATIONAL COOPERATION AND LEADERSHIP.** Conflicts, "spats", "cat fights" and "street brawls" between countries in the future will be about access to and availability of resources with oil being the most obvious. But as our global market and population grows ever bigger, it will be more about fresh water, food, raw material and energy. To avoid such conflicts, the International Community needs to come together to manage the issue of increasing demand versus reducing resources and even more so in the case of our most important resource – our oceans. There is a strong case for an International Organisation to take ownership of the open oceans which are currently not covered by international convention.

- **CONSERVATION AND MANAGEMENT.** Conservation and management on a global scale requires international sponsorship and support (United Nations). More than that, it requires empowerment, independent authority, resources to police effectively and the willingness to act in a manner which is enough to make the difference that is needed. We should be looking at a global effort which is aimed at protecting important tracts of the open ocean, unique ecosystems such as the Arctic and Antarctica which provide the cornerstones of the marine food chain and monitoring the use of and the consumption from our oceans as well as abuse. The "lone voices" such as Sir David Attenborough, Paul Rose and Dr Sylvia Earle are gradually being heard but the cataclysm may already be upon us? All Scuba Divers will have heard of Project AWARE and the attempt to bring to the attention of the public what is happening to our oceans and the life they support.

- **MARINE PARKS AND PROTECTED MARINE AREAS.** There are currently some 4,000 marine parks in the world but this represents only 0.8% of the oceans. To have real effect and impact on the ability of our oceans to regenerate this need to be elevated to 20-25% within the next 10-15 years. Efforts and initiatives on a national basis alone cannot achieve this – international recognition that there is a problem needs to be agreed upon and measures taken to allow the oceans and seas to cleanse and repair themselves and also to provide:
  - Havens for endangered species to regenerate
  - Protect migration routes of large fish and mammals
  - Protect spawning grounds
  - Allow species numbers to recover

  All to ensure that we have the diversity of life required for healthy abundant oceans which will be able to support us into the future.

- **TECHNOLOGY AND NEW SCIENCES.** Technology should not just be seen as an adversary in the battle to save our oceans, it can be an ally. "Necessity is the Mother of Invention" – Technological innovation can provide alternatives and solutions to many of the dilemmas which we face in making best use of the resources we have:
  - New sciences can look at improving on the already existing work done by many countries in marine cultivation and farming, namely:
    - Fish farming
    - Farming shellfish beds
    - Growing and harvesting edible vegetable proteins from seaweeds and other fast growing marine plants
    - Synthesising marine vegetable and animal proteins for human consumption
  - New technologies should be developed to provide the equipment to explore the possibilities which may be afforded by the deep oceans, especially in terms of alternative clean and renewable energy sources from global currents, geothermal vents etc and alternative sustainable protein sources which may exist.
  - Technologies already exist to harness the power of the wind, waves and currents to produce clean "energy" and so reduce our dependence on fossil fuels and the need to transport them across the globe with all the inherent associated dangers to the environment.
  - The oceans have boundless potential for pharmaceuticals and medicines to defeat disease and illnesses. But rather than harvest the chemicals from animals and plants, we should be finding the means to cultivate them to ensure sustainable production.
  - Technologies exist to harvest carbon and other greenhouse gases from the atmosphere and use them to produce

hydrocarbons (ostensibly fuels). This would relieve some of the pressure from our oceans.
- We will still need to supplement fresh water supplies from the oceans in certain parts of the world. But this production needs to be balanced against "need" and "waste" to avoid the requirement for excess production and the creation of "harsh marine environments". The Gulf seawater is almost 4% saltier than the rest of the oceans and seas and this can be directly attributed to increased desalination and ill advised disposal of the bi-product – salt and minerals!

- **POLLUTION AND WASTE.** Millions of tons of rubbish are dumped into our oceans every year, most of it inorganic taking millennia to degrade and be absorbed. We also dump pollutants, many dangerous to all life in the name of progress and the reduction in costs for materials and goods. This cannot and must not continue, we should be looking at:
  - **RE-USE, RECYCLE, REPLACE.** Why should we carry on the way we are going, why are we continuing to dump all manner of things into the oceans. Effective use can be made of reused materials, including organic waste, recycling (and it has been proven that there is money to be made from this activity) or replace items altogether (get rid of plastic cartons and use paper which are easier to reuse or recycle).
  - Technologies already exist which can process certain plastics back into useable oils for heating and lubrication. Plastics can also be made that are biodegradable which whilst not a perfect option is much better than the current alternative.
  - There is no reason for dumping chemicals, waste products or materials into our oceans and seas apart from cost(s) and that in itself is no excuse. Technologies exist albeit at a cost which will eliminate the need, but the systems of national fines and penalties are "laughable". The option for non-compliance should be so severe as to ensure that the implementation of these technologies removes the option of a "cost risk analysis".

- **FINANCE.** They say that "money makes the world go around"? The Global Economy and International Community have signed up to a reduction in free carbon emissions. There is already global legislation and Accords which cover contamination and pollution and fishing quotas and bans, but no one polices these outside of their own borders, especially in the open oceans. Perhaps the way to raise funding for our "International Marine Patrols" is to charge people a levy for the use of the oceans depending upon the impact they create and the benefits they accrue from being able to transit this free medium, after all, aircraft pay a premium for flying (Carbon Tax) and landing fees and transit fees, why shouldn't shipping?

WHAT DOES IT TAKE TO CHANGE

We try to achieve peace in the world by eliminating wars and conflicts, hunger, pestilence and plague, but what if we do not have a world either worth living in or capable of supporting life? The future of our oceans is as important if not more important than the search for peace, commerce and trade and the elimination of poverty and disease. The dangers of our continued abuse are hidden and not as transparent as other "physical threats", but they are real, they are significant and they will impact upon all those other global issues which have been highlighted.

The "green revolution" is here whether we like it or not and we all have both an individual and collective responsibility in tackling this vitally important issue, through personal actions and choices, through our voice and vote and by educating those around us to the reality of what is going on. This is not someone else's problem, not where the potential consequences will affect every one of us. Sustainable living is no longer a cliché thrown around – the current "buzz word" – it has to mean something to us all and we must all play our part!

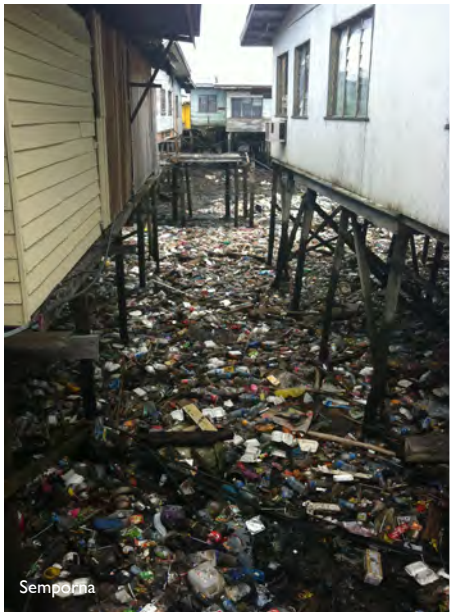
All is not lost and there is hope for our future, but we have to act and act now to take control of an ever deteriorating situation before we do "tip over the precipice". We do still have bio-diversity in our oceans and some species seem to have displayed incredible resilience in adapting to changing conditions within habitats, whether this is salinity, increased pollutant levels or a reduction in traditional food sources. But this recovery cannot happen without the active participation of everyone no matter how small your contribution. It could be your choices which "tip the scales of change".

Let your voice be heard now – When will you take your stand to protect our oceans – protect our future?

Photo by Malik Naumann/Marine Photobank. Sea floor close to a coral reef covered with debris from a jetty.

PAUL AND MARIA'S GREAT ESCAPE 2013

FEATURE AND PHOTOGRAPHY **PAUL TOMLINSON AND MARIA CARBALLO**


Semporna


Komodo National Park


Nepal

It was June 14, 2013 we had both packed our backpacks and were on our way to Dubai's Terminal 2 with one intention, escape the rat race for 6 months. Having discussed our trip over a relatively short time, Maria and I decided to explore Asia over land and being divers, beneath the ocean as much as our budget would allow us.

Our first stop was Sri Lanka which we thought was a great place to start. And it was. The country now out from the grips of conflict was much more accessible, so we headed to the interior and northern regions.

Whilst travelling to Ella from Kandy, we were happily talking with an elderly gentleman and his wife who kindly offered us tea, but after finishing his, he promptly threw the plastic cup out of the window into the stunning country side. Having seen the shocked expressions on our faces, he said to us that although he understood in Europe we don't do this, in his country, there is so much space it's not a problem!!!

This was to be the first of many such experiences exposing us to unbelievable levels of pollution throughout most of the countries we travelled to. Having seen the documentary 'Plastic Oceans' with EDA at VOX Cinemas, we got a very disturbing personal taste of how bad the situation is and the lack of education there is available in these countries.

This trip for us wasn't just about sight seeing, we wanted to get involved in projects wherever possible. Sebastian, a lad we met in Trincomalee, told us of the Turtle Conservation Project on Rekawa Beach in Tangala, so we hatched a plan (sorry) and made our way back to Columbo and then to Tangala. We got in touch with David the project coordinator who having discovered I was a graphic designer, promptly arranged a laptop so I could produce 12 educational posters for the centre. Everyone there worked incredibly hard and thankfully there seemed to be a good turn around of volunteers to help out.

At night and under red lights, so as to not disturb the nesting turtles, we would guide visitors to the centre in small groups to see the laying of the eggs. This not only aided the protection of the turtles, but also gave an income to the local villagers and an insentive to protect the 2km beautiful stretch of beach from poachers.

The centre had just recently been handed back to the villagers by the NGO and was unfortunately already facing issues with poaching, but there were thankfully only small levels of pollution which were taken care of with regular clean ups. We stayed for just over a week and it was great to work with David, Sebastian, Emily and Daniel. If you are ever in Sri Lanka, TCP would benefit from any help that can be given.

From Sril Lanka, we headed south through Thailand and Singapore to Indonesia and Sumatra. Having explored the main land and the Idilic Lake Toba, we headed to Pula Weh, our first real chance at getting wet. We stayed at Lumba Lumba, a five star Padi Dive Centre, which when you look at the centre, you can clearly see the level reached by the tsunami that was caused by the Banda Aceh earthquake in 2004.

The diving is excellent and very rich in life, but there had been very strong currents on most of the dive sites. Steves Dive Shop on Long Beach was a great little setup, although some may consider a little too relaxed, but our guides were great and the fan corals at Canyon were incredible.

After 3 great weeks on Pula Weh, we set off for Banda Aceh and were overwhelmed by the devastation caused by the tsunami, evident by the huge cargo ship dumped 5km from the coast into the city. Our taxi driver Ronnie, lost all 10 members of his family who were never found, a very sobering experience.

Our next destination was to be Bali and then on to Lombok, but we decided not to dive the Gili islands due to dynamite fishing which naturally not only scared off the inhabitants, but destroyed a lot of the corals which was really sad but far too common a sight in Indonesia. Lombok offers a more sedate pace of life and much less hectic than certain other parts of Bali. We headed to Flores next and Komodo National Park by sea which involved spending 4 days on a rickety boat where all 20 of us felt like refugees. Rinca and Komodo islands are not only home to the amazing and very big komodo dragons, but some incredible dive spots, all of which can be accessed from either Kanawa island which is situated in the park itself, or from Labuan Bajo on the island of Flores. The clarity, life and health of the coral was excellent, although sadly on Rinca, a national heritage site, the shoreline was littered with plastic waste, washed up from the 5,000 or so villagers dotted throughout the park.

As we continued on from Flores back to Lombok by bus, the amount of pollution and disgarded waste became more and more apparent in river systems and cities, which as we all know of course, ends up in the ocean. We could see this with more clarity having spent

one part of the journey perched on the top of the bus with the luggage as there was no room left inside. At least we had better ventilation.

By now everywhere we went, we could see rubbish in alarming amounts from Malasia, Cambodia's Mekon River with its plastic bag trees, to the most shocking evidence of human's disregard for our environment, in Borneo. Not all was bad, the river systems around Sandakan were surprisingly clear, but when we reached Semporna to dive Sipadan island – one of our diving bucket list entries – we were left with jaws wide open and our chins on the floor.

The level of pollution in and around the coastal villages was disgusting, there was so much in the water it was waste deep in most areas. We witnessed the local people brushing or throwing absolutely all of their waste straight into the sea, every single day!!!

This was the worst example, despite the excellent diving on Sipadan and Mabul island where we were fortunate enough to see the Flamboyant Cuttlefish (*Metasepia pfefferi*) and huge Green Turtles (*Chelonia mydas*). We chose to dive with Scuba Junkie who have an excellent operation, running from Semporna and Mabul island and from Mabul they regulaly organize clean ups and inspire the local population on Mabul to collect rubbish for proper disposal. Unfortunately, with the incredible amount of waste being tossed into the sea everyday, it seemed like an impossible task. The children on Mabul island – approximately 700 of the little tikes – were rewarded for collecting as much plastic as they could, which was a great initiative and seemed to work.

The hotel in Semporna where we stayed, was over the water and the waste would often collect around the pillers and the fish and crab pens, which surprisingly seemed to be

of little concern, hence we decided not to eat from the hotel. I think the photographs we took clearly illustrate the levels of pollution in some of these countries, but what is more worrying, is whether or not it is possible for these countries to change their ways – seemingly without a government backed solution for correctly disposing or recycling their plastic waste.

From our journey's start in Sri Lanka, through to the amazing experiences Asia led us on, we headed over to our final destination, Nepal. A country we had briefly visited before and had fallen inlove with.

Our reason this time however, involved offering our time to help out at the Eco Farm and Orphanage, situated in Kathmandu Valley, approximately 2 hours from the city.This facility was created by 2 top blokes, Jai and Bibhu who spear headed the project from a dream, to purchasing the land, building the property and locating the 15 orphaned children who now live at the Farm.

We had about 2 weeks and getting our hands dirty, helping in the garden, was our first task there. We decided to show the children the underwater photographs we had taken from our dives as we thought this was probably something they had not seen before and an unfamiliar world to them. It was and they were so excited to see the turtles, fish, corals and of course the sharks, that we thought maybe the school they attend in the village would be equally as interested.

Nepal of course has its own issues with pollution, which are very evident, especially when rafting in the rivers which ultimately will end up…in the ocean.

We thought maybe we could make a small presentation to the children and faculty members about both topics and the

connection and dependency us land dwellers have with our oceans and how the effect of our pollution is having on food sources.

The School of Divine Lights Principal, Mr. Gopal Karki was very happy to oblige and before we knew it, we found ourselves guided by his wife Mrs Karki to the main hall with a projector and an audience of around 70 or so students patiently waiting for us.

Although somewhat taken by surprise and unprepared, we set up with the use of the projector which promptly lasted about 2 slides before a power cut put a kibosh on the use of it, that's Nepal.

The children were extremely interested to know about the oceans and even more so, the effect pollution is having on it, its inhabitants and ultimately us. Also, it was nice to see they weren't scared of the sharks, but then again, I think most have never seen 'Jaws' due to the probable, fortunate lack of access to a television. Now, neither myself or maria are used to public speaking, but we just felt talking about our experiences and sharing some of the knowledge we have gained with help from EDA, would be nice to share.

The children of the orphanage with our help, pulled out their paints and pencils and got to work, drawing what they had been shown. The younger ones, around 6 years of age naturally needed a little more guidance, but the results we think, were just great and given their reactions and interest, they also learnt something about a very large part of their world they know little or nothing about.

Reading back, it may seem that all we saw was pollution, but that's not the case at all. Asia is a stunning part of the world with so much diversity and beauty to experience. But during the 6 months we were traveling, it did however became very apparent through our own experiences, that there is a serious issue as documented in 'Plastic Oceans'.

With all that said, we both look back upon all the adventures we have encountered on this trip and the time we spent at the orphanage sharing our own wonderful experiences from under the ocean, it was by far, one of the most gratifying experiences of all.

Asia, we will be back soon! There is still so much more to see and experience on land and especially under the waves.

If anyone would like further information about the orphanage, please email me at **paul@2candesignme.com**, Maria at **maripeaceful@yahoo.com** or email Jai Rajbhandari and Bibhu Thakur at **ecofarmnepal2012@gmail.com** or visit **www.missionhimalaya.org**

ecoFARM & orphanage home
Panauti, Kavre, Nepal

Mission Himalaya
... Embrace

TURTLE TEST IN DUBAI

TWO PILOTS FROM THE NICOLINI OFFSHORE TEAM, CARRY OUT THE TURTLE TEST BEFORE THE XCAT POWERBOAT COMPETITION IN DUBAI

FEATURE **NICOLA DE CORATO** – ADMINISTRATOR OF DUBAIBLOG, DIVER AND HELI RESCUE SWIMMER
PHOTOGRAPHY **DANIELE PERLETTI**, HELI RESCUE SWIMMER WITH BERGAMO SCUBA ANGELS

The turtle test is a mandatory certification for all the drivers running in powerboat formulas where the boats have enclosed cockpits. Before obtaining a license to drive a powerboat, drivers undergo a stringent medical test and the turtle test; this involves being strapped into a cell simulating the cockpit, which is flipped over. The driver has to make his escape while being judged by safety officials (during the test, one or more scuba divers are in the water ready to act in case of any problems; if the driver is not able to get out of the cockpit, for example).

Harnessed in his seat, upside-down and disoriented from the flip, after an accident a pilot has to remain calm and focus on previous training for extradition from enclosed cockpit canopies. The goal of each turtle test is to check pilots are ready for this circumstance; the driver has to pass the test twice. During the first test, he has to escape holding his breath; after the cockpit has been flipped over, he has to open the cockpit, unfasten the seat belt and get out of the cell. In the second part of the test, he has to use the emergency oxygen present in the boat; after the flip he has to take a couple of breaths from the regulator then perform the escape, opening the cockpit, unfastening the seat belt and getting out of the cell.

The test can be performed in a pool or in confined water (in the harbor for example). At least one scuba diver has to be present in the water assisting the pilot in case of any problems and one or more scuba divers have to be ready on the dock/edge of the pool. None experienced drivers can have problems in opening the cockpit or unfastening the seat belt, especially if they are not used to breathing underwater from a regulator, they may experience some problems such as inhaling salt water on the first breath.

The hard composite cockpit capsule is designed to break away from the rest of the boat in a crash. This also inaugurated the practice of securing the drivers to their seats with a harness. This system was optional for a time due to the opposition of the drivers but, after it saved several drivers in major crashes, the UIM mandated it for all boats. In the early 1990s, F1 boat builder Dave Burgess introduced a canopy that fully enclosed the cockpit to protect the driver from the full force of water in a nose-dive. In the late 1990s, boat builder DAC introduced an airbag situated behind the driver that prevents the cockpit from completely submerging if the boat flips.

To help sustain life, most canopy-equipped boats carry emergency oxygen, at least one source for each crew member including a built-in system with a SCUBA regulator and a small, backup air cylinder. Thanks to the turtle test, the organization is able to verify pilots are able to use them in case of problems. Bergamo Scuba Angels' rescue team, before each event inspects cylinders and regulators inside the boats and recharges the cylinders when needed.

The turtle test is also used as part of the training for the rescue team, during the periodic mandatory training, each member of the team is trained on the extrication of the pilot from the cockpit in case of an accident, both with flipped and none flipped boat scenarios, keeping the pilot's neck and spine in a stable position in order to avoid or to not worsen the possible injuries occurred during the accident.

Ready to test, Nico

For more information about the turtle test, do not hesitate to contact me at ndecorato@bergamoscuba.com or visit www.bergamoscuba.com

SCUBA DIVERS AS CITIZEN SCIENTISTS

FEATURE AND PHOTOGRAPHY **GAYENOR ROSIER**

The marine environment is the largest, most important, and yet most mysterious habitat on our planet. It produces half of our world's oxygen, plays a critical role in regulating its climate, and supports a remarkably diverse and exquisitely adapted array of life forms, from microscopic viruses, bacteria and plankton, to the largest existing animals. Without human interference, it is a self-regulating system that finds its own fine balance between predator and prey.

For the majority the undersea world is out of sight and out of mind. As scuba divers we have the privilege to explore and enjoy this underwater realm, within recreational or technical diving limits and we are in a unique position to observe changes as a result of human impacts upon marine ecosystems.

The term "Citizen Science" has been coined to describe the growing need for natural science data to be collected by ordinary people where researchers do not have the resources or time to spend on detailed surveys. This is especially true with underwater data gathering, which is becoming increasingly important as human impacts are having significant effects on the life-blood of our planet.

The destruction of coral reefs by unsustainable fishing methods, invasive species, and ocean acidification is now well documented. Equally important are the seagrass habitats that once surrounded most coastal regions, keystone species providing the basis for a rich biodiversity. For example, *Posidonia oceanica*, which is unique to the Mediterranean, has been found to support up to 700 species per square meter. It is a breeding ground and nursery for commercially important fish species and performs other important services.

Seagrasses are amongst the most powerful carbon sinks in the world, meaning that they can capture and store carbon from the atmosphere, thereby mitigating climate change. Their efficiency is remarkable: burying carbon into the seabed at a rate 35 times faster than tropical rainforests and where rainforests bury carbon for decades, seagrasses are capable of storing carbon for millennia. However, due to human impacts seagrass beds are declining at an alarming rate, potentially causing the release of thousands of years of ancient stored carbon into the atmosphere.

Posidonia oceanica beds are known as "the lungs of the Mediterranean" because they also release large amounts of oxygen, providing an oxygen-rich environment in and above the leaf canopy. Recent research has found that this has the effect of moderating pH on the sea bed in Posidonia meadows, thereby providing a refuge for marine life that is most susceptible to the effects of ocean acidification, i.e. those with hard shells.

As Posidonia meadows are being destroyed the Posidonia pipefish, a relative of the seahorse, is suffering. The Posidonia pipefish is perfectly adapted to the seagrass habitat and has evolved to resemble a blade of seagrass. It is virtually impossible to see unless it swims above or outside the seagrass beds – a rare occurrence as it is a poor swimmer and rarely ventures out of the safety of the Posidonia meadows, spending it's time head down within the shoots searching for tiny shrimps to eat. It is totally dependent on the Posidonia habitat for daily food and shelter, and as a seasonal breeding ground and nursery.

Posidonia oceanica and the Posidonia pipefish are just two of the indicator species being studied by volunteer scuba divers assisting Kenna Eco Diving with underwater surveys for the SILMAR Project.

The Mediterranean has a very rich biodiversity, with a total of 10,000 to 12,000 recorded marine species, and new species still being recorded. The basin supports some of the richest fauna and flora in the world and the habitat-level diversity is extraordinary. It is recognised as one the world's 25 top




biodiversity hotspots, defined as areas with rich biodiversity, a large number of endemic species – species unique to the region – and critical levels of habitat loss (Meyers et al. 2000).

Jacques Cousteau first studied the archipelago of the Medes Islands, off the coast of Catalunya, and found that every species in the Mediterranean was represented within the different habitats and complex ecosystems. The islands have now been strictly protected for over 20 years and are most famous for the mature and friendly Dusky groupers that hang around the many caves and tunnels.

Each dive at the Medes Islands is spectacular, Eagle rays glide over seagrass meadows that harbour huge scorpionfish and ancient fan mussels, great shoals of bream and damsel fish hang out in open water with sea bass and large hunting barracuda, and walls covered in beautiful gorgonian corals shelter colourful sea perch. Mediterranean moray and conger eels are plentiful and huge Mola mola visit during summer.

Since the 94 hectares have been strictly protected, this marine reserve brings the local economy €6 million per annum from dive tourism, 20% more than fishing. The whole region has also benefitted from species migrating out from the reserve to replenish the Montgri coast, where Kenna Eco Diving carries out its research with volunteer divers. However, despite their important function, the creation of marine reserves and protected areas are often insufficient as many of the negative impacts upon habitats such as *Posidonia oceanica* are not of local origin.

Kenna Eco Diving is a not-for-profit marine conservation research center where scuba divers from all over the world can help with marine surveys as part of a diving holiday – making a difference, rather than just being a dive tourist. Marine biology students can also spend several weeks volunteering and gaining valuable fieldwork experience. Indicator species data is shared freely with other conservation projects and researchers at Barcelona University and underwater clean ups help us to monitor the level of debris, especially plastics, in the marine environment.

Volunteering with Kenna Eco Diving on the Costa Brava is open to international divers to spend a few weeks or months, during May to October, collecting key species data for the SILMAR Project, aimed at conserving Mediterranean coastal biodiversity via citizen science.

Marine life provides a fifth of the animal protein we eat. It maintains the climates that our civilizations and economies are built upon. Marine life reduces pollution and protects low-lying coastlines from storms. Our fate depends on life in the sea and we scuba divers are in a prime position to contribute to marine conservation and to give something back to the environment that we love.

A FEW WORDS FROM A PARTICIPANT, NEFERTARI EGARA

When I first began my Open Water diving course, PADI Online kindly suggested that I begin to explore, plan and book diving trips immediately lest I put it off for so long and in doing so, never actually dive at all. Who goes through the course and doesn't dive, I remember thinking. Turns out, the answer was me. The subsequent year was just busy enough that the months passed without a single dive or plan to do so. So in August 2013, thanks to Kenna Eco Diving, I fulfilled four holidaying goals: dive trip, trip to Spain, contribute to a cause and learn.

The contrast of my short and shallow dives at the Jumeirah Open Beach compared to the diversity I encountered in the waters off the eastern coast of Spain is immense. Every dive was incredible, from the cliff jump entries and my first Posidonia meadow, to the intense variety and colours of the nudibranchs and the incredible passion of my host, Ms. Gayenor

Rosier. The place, the people and the cause made for the most inspirational two weeks of my summer.

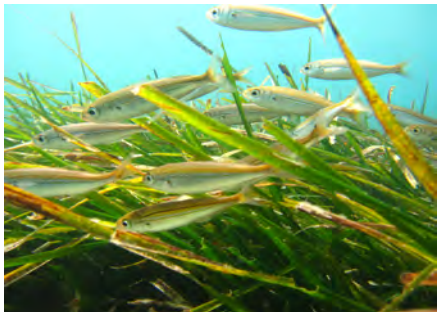
I began my stay with classroom and observational training. Having discussed key species, their characteristics and methods of observation and recordings, I soon joined the divers for daily dives counting, measuring and identifying along the two transects. As often as weather would permit, we descended twice daily, and each time I was hoping to see that monster of a starfish in its usual spot, wondering how many nudibranchs the keen-eyed would point out to the rest of us, or simply hoping to get as far along down the transect as I could per tank.

At first, I was intimidated by my lack of experience, but Gayenor and all the other transitory divers at Kenna Eco Diving quickly dispelled any worries I had. Their support gave me the peace of mind to concentrate on my tasks. Their experiences provided a lingering inspiration for travel. And their enthusiasm dissolved my laziness; for two weeks I never struggled to get out of bed and get ready for work. Of course it helped that our office was the ocean.

Although every dive was impressive to me, the most memorable are ones that highlighted the impact of human negligence by lack thereof; the Medes Islands have been protected for decades and its unsullied state was breathtaking. Since then, too many of my dives have been heartbreaking, filled with floating debris, tangled lines, and broken coral.

Diving at Costa Brava with the people that I met, the cause they dive for and the understanding that was passed on to me, I have learned a respect for the ocean that would have taken me longer to realize on my own.

Gayenor Rosier runs Kenna Eco Diving in Costa Brava, Spain and invites, hosts and leads travelling divers to participate and contribute to the ongoing baseline research in the area. She specialises in Posidonia study and conservation, however her involvement has gone far beyond and as a contributor to the SILMAR Project, the latest reports (2013) of which are now available online (http://www.kennaecodiving.net/eco-sea-life/eco-survey-data), presenting data on the present state of the environment.



RAJA AMPAT'S MANTA RAY POPULATION

FEATURE **BEX LYNAM** PHOTOGRAPHY **SIMON MARSH**

Bex Lynam, Manta Trust Expeditions Manager and Raja Ampat Project Leader, Becky Pilkington-Vincett recall their week spent collecting data on manta rays. As part of their on-going work for the Manta Trust, a charity dedicated to the global conservation of manta rays, the team came aboard a week long liveaboard trip to collect data on the Raja Ampat manta ray population. The charity has dedicated research projects in several manta 'hotspots' around the world. Working with dive operators to provide educational trips to the general public in some of these areas allows the Manta Trust to improve awareness of the threats faced by this charismatic gentle giant. Let's hear about their extremely productive week…

'A jewel in the crown. That's how I'd best describe this group of islands tucked away in the far east of Indonesia. In recent years Raja Ampat, situated in West Papua, has been revealed as a diver's paradise. Sitting firmly at the top on Indonesia's list of spectacular dive locations, Raja Ampat showcases one of the dwindling examples of highly diverse, spectacularly colourful reefs. This is perhaps illustrated best by Dr. Gerry Allen's assessment of the reefs in the area twelve years ago. An international authority on coral reef fish, Dr. Allen was asked to visit Raja Ampat with a multinational team of scientists and dive numerous sites. In just one dive the team counted over 1,000 species!

And it seems little has changed as my recent trip here proved. Leading an expedition to conduct research on the manta ray population in the area, I was firmly focused on collecting data. But as soon as I hit the water, I was distracted by the sheer number of different creatures to look at. From blue ringed octopus to tassled wobbegong sharks, to vividly coloured nudibranchs, there was something to fascinate you in every square metre.

But the mantas did still manage to steal the show. When we teamed up with a local liveaboard operator, Dive Damai, we had great expectations to see a handful of mantas at some of Raja Ampat's most famous 'manta sites'. As the name suggests, Manta Sandy has long been a reliable site for seeing mantas being cleaned over the reef. A handful of other well-known sites have also allowed our researchers to regularly collect identification shots of manta rays to add to the ever growing database. But we were certainly not prepared for one of the most spectacular wildlife encounters anyone can ever hope to have.

Project Leader Becky Pilkington-Vincett, who began the regional manta project in 2011, suggested we visited Manta Ridge, a site not normally included in the itinerary of our hosts. As we approached, the surface water looked to be bubbling. A closer look confirmed the bubbling was in fact the flapping of not just one but tens of manta ray fin tips. With shouts of excitement from the crew, our half kitted up guests rushed to prepare themselves and jump onto the smaller support vessel. From the boat we back rolled into a swarm of feeding mantas with their mouths open wide collecting the zooplankton which makes up their diet.

This was more than we'd ever expected – our great expectations were well and truly surpassed! Our guests didn't know which way to look as the mantas came gliding in all directions, some barrel rolling and others forming feeding trains below. On the surface with my snorkel (the dive gear had been ditched by this point), I could hear screams of excitement as the mantas sailed within touching distance of everyone. For Becky and I, our priority was collecting data and so we energetically swam around with our cameras collecting as many manta ray belly shots as was possible before the feeding frenzy ended. Luckily, having already given our Manta ID Masterclass presentation, our guests were equally willing and prepared to collect data, leaving us with literally thousands of ID shots to sort through and add to the database back on board.

Nearly two hours later, our guests reluctantly dragged themselves back on board, exhausted but grinning from ear to ear. The excitement was palpable as everyone recalled their experience of being surrounded by so many of these animals. It's one thing to witness the huge form of a manta ray passing overhead but to be engulfed by tens of them at one time is a truly unforgettable encounter.

With so many photos, it took us a couple of days to sort through just half of them, but by the end of the trip we were able to update guests on exactly how many different mantas we'd seen. The database of mantas in the Raja Ampat area is still only around 350 strong, unlike our Maldives database which has recently reached 3,000 individually identified manta rays! So when we found that 41 of the 57 manta rays we'd seen during the trip were new to the database, we were blown away. To be able to add so many new manta rays to our collection is incredibly valuable to this regional project and will go a long way in telling us more about their behaviour and ecology.

I think it would be true to say that for our guests, they have witnessed something very few people will ever get to see and will certainly never forget the experience. Plus they've learned a little on the way. The guests' contribution to the trip is invaluable – without their help we would have been unable to collect so many positive ID shots. Here's to many more productive trips and special manta experiences.'

If you'd like to know more about the work of the Manta Trust, take a look at our website – **www.mantatrust.org** – which gives full details of our project areas, the threats that are faced by manta rays and much more.

If you have any pictures from your own encounters with manta rays and are unsure as to whether they could be an ID shot, take a look at our 'ID the Manta' page – every sighting counts! **www.mantatrust.org/make-a-difference/id-the-manta**. Don't worry if it's not a picture from Raja Ampat; wherever taken in the world, we'd like to know about it.

Finally, if you're interested in learning more about our expeditions, please take a look at our Expeditions page **www.mantatrust.org/make-a-difference/expeditions** to find out where we run trips, who with and when they take place. We hope to see you on a trip with us soon.

SHARK GUARDIAN

FEATURE **LIZ WARD-SING**

Shark Guardian is a UK registered Charity for shark and marine conservation founded by Brendon Sing, an experienced scuba diving instructor trainer with a great passion for sharks. Brendon has been focusing on shark conservation, education, supporting shark conservation efforts and leading scuba dives for shark encounters since 1998. The Shark Guardian presentation was created by Brendon to be used as an inspiring, fun and visually stimulating slide show to be viewed by dive centers, resorts, international schools, diving enthusiasts and the general public.

Shark Guardian aims to advance the conservation of shark species worldwide for their sustainable management and to protect the natural environment. They do this through education, conservation, developing skills, and promoting research and projects. Since February 2013, Brendon and his wife Liz have committed themselves to Shark Guardian full time. In 2013 alone, more than 20,000 people, mainly school children, saw the Shark Guardian presentation in Thailand, Malaysia, Brunei, East Timor, Hong Kong, and Indonesia. Recently in the UK they presented to more than 2,000 people and now they have just embarked on a 12 day tour of Dubai.

Starting on Monday 3rd February at VOX Cinemas in Mercato Mall with the support from Emirates Diving Association (EDA) and VOX Cinemas partnership, presenting to the DUNEHA home school group, Shark Guardian visited 13 more schools and presented to over 5,000 children plus more adults. Ages of children ranged from Grade 1 through to sixth form students. Schools visited were Dubai English Speaking School, Al Khaleej National School, Our Own English Boys School (Sharjah), Gems Westminster (Sharjah), Gems Royal Dubai School, Jumeirah English Speaking School (Arabian Ranches), Gems Winchester Jebel Ali, American Academy in Al Mizhar, Raffles International School, Raffles World Academy, Jumeirah Primary School, Dubai International Academy and the Lycee Libanais Francophone Privee.

On Wednesday 5th of February, the Shark Guardian presentation was made to EDA members at VOX Cinemas in Mercato Mall (pages 8-9).

Feedback from the presentations and workshops has been extremely positive. Liz and Brendon noted a huge number of children admitting they were scared of sharks plus a big misunderstanding about great white sharks being the largest shark. This has been much more noticeable than in other countries visited. They certainly felt the education was worthwhile and fortunately managed to change the opinions and views of children. The presentation includes

- The role and importance of sharks in the marine ecosystem
- Perceptions of sharks, misunderstandings and the media
- Shark Evolution
- Shark biology and species with a focus on local sharks
- Threats to sharks
- Shark conservation and action

To reinforce the childrens' learning, Shark Guardian are running a competition in association with the sponsor of this trip, Global Ocean. Children from each group are invited to create a picture or poster highlighting the importance of sharks, things they have learnt and why sharks are special to them. Winners from each school win items from Shark Guardian and IFAW, plus one selected winner from each school will win an Ipod shuffle donated by Global Ocean and their poster will be put in a book to be presented to Sheikh Mohammed. The children have been hugely excited about this prospect and entries have already been sent to Liz and Brendon.

'We always try and suggest ideas for followup projects and activities so that teachers and children research more about sharks and marine life. By creating a competition, this gives extra motivation for further learning', said Brendon. Liz went on to say, 'We know our presentations work with feedback from teachers telling us they have never seen some students as engaged as when learning about this topic. Plus we have had so many reports of children dragging parents away from shark fin restaurants, as well as teaching other students about the importance of sharks and why we must look after them'.

Liz and Brendon believe that with the right information and understanding of sharks, people will be inspired to get involved in their conservation. They also know that people make better choices when armed with the correct knowledge, so this means people will stop buying any shark related products. Brendon says 'Shark conservation and making

a difference starts with a better understanding and increasing knowledge of sharks and the vital role they play for all life on earth. Shark Guardian delivers this essential information for the next generation'.

The Dubai schools visited have already requested another Shark Guardian presentation when Liz and Brendon return to the UAE in the future. This is the first time Shark Guardian have been fully sponsored for a school tour, normally using their own funds, plus selling their merchandise or receiving donations in the form of taxi/travel/accommodation expenses. They wish to thank Global Ocean for their support as well as EDA for their help organizing and promoting events. They also wish to thank IFAW and Rima Jibado for the resources supplied which Shark Guardian have distributed to the schools, as well as VOX Cinemas for donating their venue for the 2 events there.

Please visit **www.sharkguardian.org** and **www.globalocean.org** for more information and the ways to get involved in shark conservation.

A HISTORY OF SCUBA DIVING: PAST AND FUTURE

FEATURE AND PHOTOGRAPHY **PATRICK VAN HOESERLANDE**


The Belgian Daveral private collection

Is it because we feel freed from gravity in water? Or is it because we return to the 9 months we had felt so secure? Or are we bitten by a drive to discover other worlds? Or do we want to push our limits? Who will tell? One thing is for sure, from the evolutionary phase we came crawling out of water to develop further on land; we have as human beings, kept an adventurous outlook when it comes to water. Throughout the history of humanity, we find evidence of continuous desires to get closer to the world we know so well as divers.

WHO INVENTED DIVING?

Somewhere in a distant past, a bearded ancestor dressed in deer skins was scraping mussels off a rock when his knife fell into the water. The knife whirled to the bottom. Only by jumping in the water could he recuperate it. And so he chose to dive in. At that moment, he opened up a whole new era, that of the 'homo aquatica'. Whether it's for salvaging valuable objects or for fishing, from that moment on the genie was out and the desire to dive was no longer oppressed. The diver wanted to go deeper and stay down longer, but unless he could find a way to breathe underwater, his explorations were short.

The most famous diver from antiquity is the Greek, Scyllis. 2,500 years ago, he was taken prisoner aboard the ship of the Persian King Xerxes I. There he learned that Xerxes was planning to attack the Greek fleet. He grabbed a knife and jumped overboard. Despite their efforts, the Persians could not find him. After a while they considered him drowned. Under the cover of night however, he came back. Using a hollow reed as a snorkel, he swam from ship to ship and cut all the anchor lines. This made the entire fleet drift away and thwarted the Persian victory.

You could snorkel with a hollow reed, but it was soon clear to forefathers that a hollow tube longer than 50cm did not work well. At a certain depth our lungs cannot overcome the water pressure and ventilation becomes ineffective. Breathing using a bag did not meet expectations, the bag was emptied too soon and the inhalation of the same air created problems with too much CO_2. How could one go deeper and stay underwater longer?

In the 16th Century, some enthusiasts began to experiment with dive bells. These were infact nothing more than a large, reversed bucket that contained an air bubble. The bell served as an air pocket for a free diver to refresh the air in his lungs after every short stay outside the bell. He could repeat this procedure until the compressed air supply was no longer usable. Later, the air was refreshed or replenished via a pump system on the surface making longer dive times possible. After a while, the divers got a suit to sustain the cold and the bell was getting smaller until it fit over the diver's head. That was the start of helmet diving ('scaphandre') or diving with an air hose. The next step was to get rid of the air hose, the diver's lifeline from the surface. Some people found helmets and suits to not be enough and decided to close the bell and by doing so invented the submarine.

This evolution shows the 4 ways invented to immerse and explore the underwater world in a more or less comfortable way: apnea, with an air supply from the surface, with an independent air supply and in a submarine. Although the development of these four methods occurred independently of each other, they do influence each other. Apnea diving, followed by diving with a hose laid the foundations for our scuba diving of today. It is not surprising that these two disciplines play an important role at the very beginning of the scuba diving timeline. To produce a complete list of important data is nearly impossible, so I propose a quick, short dip into history:

1535 – Guglielmo de Loreno develops the first real diving bell.

1650 – Guericke invents the first, effective air pump.

1667 – Robert Boyle, English physicist and 'father' of the law of Boyle, detects a gas bubble in the eye of a viper after putting it under pressure, followed by a decompression. The scientist observed the very strange behavior of the snake, making this the first written report of a decompression bubble and disease ('bends').

1691 – Edmund Halley claims a patent on a weighted diving bell with an air hose to the surface.

1715 – John Lethbridge builds an oak diving cylinder placed under pressure through a pipe. The operator is able to work with his arms free through holes in the cylinder.

1825 – The race for the first workable piece of scuba equipment is won by the English inventor, William James. His system consists of a cylindrical air tank with a pressure of 30 bar. There is no trace of a successful dive.

1826 – Charles Anthony and John Deane introduce a patent for a firefighter's helmet. Connected with belts to the body and equipped with a hose, this helmet is also used for diving.

1828 – John Deane and his brother use the helmet in combination with a diving suit.

1837 – The German inventor Augustus Siebe, who lives in the UK, connects Deane's diving helmet with an air filled, rubber suit. This fully closed diving suit connected to an air pump at the surface, is the first reliable diving suit and is the prototype of the contemporary models. In his eulogy, Siebe is called the father of diving.

1839 – Seibe's diving suit is used in the salvaging of the British warship HMS Royal George at a depth of 20 meters. During this salvage operation, the divers complain of 'cold and rheumatism'. This is one of the first reports on symptoms of decompression sickness during diving operations. Another first, is the use of the buddy system.

1843 – After the experiences gained during the salvaging of the HMS Royal George, the Royal Navy opens the first diving school.

1865 – The French mining engineer Benoit Rouquayrol and the Naval Lieutenant Auguste Denayrouse, patent the 'Aerophore'. This device consists of a horizontally placed steel tank (pressurized to15 to 25 bar) on the back of the diver which is connected through a valve system to a mouth piece. The diver only gets air when he breathes. A membrane controls the breathing pressure as a function of the ambient pressure. In normal situations, the low pressure tank is connected with a hose to an air pump at the surface, but the diver can disconnect the hose to dive 'unconnected' for a few minutes. The 'Aerophore' is the first 'on demand' underwater breathing apparatus and is the forerunner of our modern scuba equipment. It is also the first application of the 'bail out' safety feature. For years, it's the standard equipment in various navies. In his "20,000 miles Under the Sea', Jules Vernes equips his heroes with the 'Aerophore'.

1876 – The English merchant Henry A. Fleuss develops the first workable, independent diving equipment based on the use of oxygen. This device is a closed system in which the exhaled carbon dioxide is absorbed by a rope soaked in caustic potash and is the basic design for our modern rebreathers. Although limited in workable depth (the toxicity of oxygen at great depth had to still be determined by trial and error) this bubbleless device allowed an autonomy of almost 3 hours.

1878 – The Frenchman Paul Bert (the Paul Bert effect!) publishes his book 'La Pression Barométrique', a 1,000 pages long description of his studies of the effect of changes in pressure on the body. He demonstrates that decompression sickness is caused by the formation of nitrogen bubbles and suggests a gradual ascent as a preventive measure. Bert explains the relationship between the observation of Boyle and the symptoms of decompression sickness diagnosed with caisson workers. He also suggests recompression as a cure.

1893 – Louis Boutan invents the first underwater camera.

1906 – The British government asks the leading scientist, John Scott Haldane to research the prevention of decompression sickness. 2 years later, he and two others publish the fundamental work 'The Prevention or Compressed-Air Illness'. Thanks to their studies on goats, the scientists argument to use decompression stages. The dive tables based on this fundamental work, are very quickly adopted by the British Navy.

1911 – The German Draeger introduces a reliable oxygen rebreather.

1912 – The US Navy tests tables published by Haldane. This leads to the first US Navy dive tables which will protect many divers from the bends.

1920 – In the USA, research starts on the use of helium-oxygen mixtures for deep diving.

1923 – W. H. Longley becomes famous for the first underwater colour photographs.

1924 – The US Navy and the Office of Mines lead the first experimental helium-oxygen

dives. Until the start of World War II, the USA retains the monopoly of helium.

1930 – The American ex-pilot and author, Guy Gilpatric residing in France, experiments during spearfishing with rubber pilot goggles. The modern version of the dive mask that covers nose and eyes is the result of a combination of ideas from the Russian, Alec Kramarenko and French, Yves Le Prieur and Maxime Forjot.

1933 – The Frenchman Louis the Corlieu patents the first dive fins, the 'Swimming Propellers'. The snorkel completes the basic diving equipment.

1933 – The French captain at sea, Yves Le Prieur, fits the 'Aerophore' (see the year 1865) with a specially developed valve in combination with a high pressure tank (100 bar). This gives the diver a certain degree of autonomy while he is not hindered by all kinds hoses and lines. However, the device has no regulator. The diver gets air by manually opening a valve. The expired air escapes along the edge of the mask. Three years later, this device is in the inventory of the French navy.

1936 – Le Prieur starts the world's first scuba diving club, called the 'Club des Sous-l'Eau'.

1938 – After years of successful writing for The Saturday Evening Post about his adventures in the Mediterranean, Gilpatric publishes the first book on amateur diving, 'The Complete Goggler'. One of the readers is the French Naval Lieutenant, Jacques-Yves Cousteau.

1938 – Edgar End and Max Nohl make the first scheduled saturation dive. Together they stay 27 hours at a depth of 30 meters in a hyperbaric chamber. Although the decompression lasted five hours, Nohl suffered from the bends.

1941-1944 – During World War II, Italy uses scuba divers with midget submarines and closed systems to sink British warships and merchant ships. Later in the war, the British use a similar tactic to sink the German battleship, Tirpitz.

1942-43 – Jacques-Yves Cousteau and an engineer from the Parisian firm, 'Air Liquide' – Emile Gagnan, work together on an expansion valve that provides the diver with air on demand. Until then a diver received air continuously, or after manually opening a valve. Why the 19th Century invention of the 'Aerophore' was forgotten, we do not know. But in January 1943, they connect this regulator with a double air tank and a mouthpiece and test the configuration in the Marne. After placing the intake and the exhaust valves at the same height, they patent the 'Aqua Lung'. This system represents a milestone in the history of diving.

1943 – Cousteau and two friends, Frederic Dumas and Philippe Tailliez, make more than

500 dives with the 'Aqua Lung'. Hereby they go deeper with every dive. In October in the Mediterranean Sea, according to the plan Dumas dove to 70 meters and experiences 'l'ivresse des grandes profondeurs', better known as depth narcosis. In 1947, he reached 94 meters.

1946 – Cousteau's 'Aqua Lung' is sold on the French market.

1951 – The reserve valve, later known under the name "J" valve, has been developed.

1953 – Cousteau, Dumas and Dugan publish their book, 'The Silent World'. This book tells about the development and the first tests of the Cousteau-Gagnan 'Aqua Lung'.

1955 – Al Tillman and Bev Morgan create the first formal certification program for diving instructors.

1956 – Scientists at the University of California design the first wetsuit. Ted Nixon uses the 'red-white' flag for 'divers in the water'.

1958 – Sherwood Manufacturing announces the invention of the piston regulator.

1959 – On January 11th in Monaco, Cousteau founded the 'Confédération Mondiale Des Activités Subaquatiques' (CMAS).

1962 – In September, the first underwater habitat experiment, Conshelf One ('Continental Shelf') starts. Under the leadership of Cousteau, Albert Falco and Claude Wesley live for seven days at a depth of 10 meters. They use their underwater house 'Diogenes' as a base for their dive explorations.

1970 – The system of certification as an indication of the level of training and experience wins popularity in the world of divers.

1971 – The firm ScubaPro introduces the first BCD on the market.

1983 – The first commercial dive computer, the 'Orca Edge', is put on the market. Several manufacturers follow and a few years later, the dive computer becomes part of the standard diving equipment.

1990 UNTIL NOW – Each year, hundreds of thousands of people start to dive. Encouraged by a growing market, new developments that make diving easier and safer, find their way to the public. To distinct themselves from the recreational diver groups, specialized divers are formed. An example is the 'Technical Divers', non-professional divers who use advanced technology such as oxygen, helium, 'full face' masks, propulsion, etc.

AND THE FUTURE?

After running through the history, let us now focus on the future. It is not without risks to predict how diving will look over a number of decades. I will nevertheless make an attempt.

Unless space travel will be within everyone's reach, diving will still be the only way to discover a completely different world. The human desire to explore unknown things will further increase the popularity of diving; the market is not saturated yet and will stay so for long. This, of course provided that humanity is in time aware that the oceans need our protection and that we will actually need to do something about it. It gives little satisfaction to dive below the water's surface to go to see some bleached coral reefs and fields of fish bones filled with mud. In that kind of future, we will admire the few rescued marine species that will be protected only behind glass in an aquarium as part of our natural history. We must work together to ensure that in the future, fish are not something strange to discover in a place called Aquatopia.

Let us leave this pessimistic idea of the future behind. I'll take you on a diving holiday somewhere in a brighter future. For this diving trip, we are in 2030 where we have booked a nice hotel. No, not the type that we know nowadays, but a hotel underwater (you can find them near all the beautiful dive sites). An under sea boat or a hyperbaric elevator brings us as hotel guests, down to 30 meters from which our daily dive trips will begin. If we open the shutter of our window, the miraculous colours of the house reef lighten up our room. Looking around, we discover some lovely spots for our next dives and in the distance we perceive the shape of a whale. Magnificent. But you should see the scenery at night. Stimulated by exterior lighting, there is marine life everywhere. The visual spectacle is simply inconceivable. Fortunately, they turn the lights off around midnight; otherwise we would never go to sleep.

Thanks to new materials and product developments, almost everyone can enter the underwater world. The combination of micro-electronics, atmospheric diving suits and mini

submersibles makes it possible that somebody can, without theoretical or pool training, enjoy the marine fauna and flora.

However, we are interested in the contact with the water and prefer classic diving to all that touristic high-tech stuff. Although we like to call it 'classic', our equipment is not what it was 15 years ago. Our suit is made from a substance that despite its thin layer, quasi completely isolates us from the water. This suit keeps our skin and our whole body at a constant, comfortable temperature. The very smooth outer coating lets us glide frictionless through the water and dries immediately once we get out of the water. No wet suits to stow anymore. Through an ingenious system, it is very easy to put it on and move around, but as soon as we go in the water, the suit becomes 'glued' to our body.

Our fins look like those of the old models, because despite all efforts, no significant improvements were introduced. Although we still wear them, we use them only for small movements and for our own convenience. Miniature propellers provide us now with the necessary propulsion for covering long distances (other propulsion systems were either too expensive or too noisy). Scuba diving in a strong current is no longer a problem and the limitation of 0.5 knots is something of the past.

The biggest changes are found in the pack that we carry on our backs. The very compact and light backpack is a wonder of high technology. Some fifteen years ago, the two stages were replaced by an electronically controlled rebreather. It's only in the pool that we sometimes train with the old, mechanical regulators to show them to the new generation divers or out of pure nostalgia for the old days. The composite tanks contain oxygen and helium under extremely high pressure. Despite their limited size, they give us a very large autonomy. In addition, our rebreathers are equipped with a membrane that filters oxygen out of the water. This gives us an almost unlimited bottom time. A network of four small supercomputers control this system meticulously and projects useful information on our full face mask.

By a network of sonic beacons in the vicinity of the hotel, we can perfectly orient ourselves. Direction and distance are continuously projected on our full face mask. If we go outside this sonic zone, our integrated compass and inertial platform provide us with the necessary navigational data. This system is so refined that wreck and cave divers abolished the reel long ago.

Through an underwater communication system, we cannot only talk to each other, but also with our computer and in the case of an emergency, with an emergency station for divers.

In addition to our mask there is a mini camera allowing instantaneous identification of fauna and flora. The computer detects marine life faster than us; projecting all information on the species, lifestyle, hazards…This camera runs continuously to record our dive and to adjust our dive torches in relation to visibility and the surrounding light. The light intensity of the latter is minimal because our masks are equipped with night vision technology. The camera has landscape recognition software that makes it possible to find our way back in the rare event we get lost.

And there are more perks in our backpack: the system ensures that we always have neutral buoyancy. Although the button still exists, manually inflating or deflating is rarely done. Sensors detect our intention to go up or down and manage the BCD accordingly. In the unthinkable situation something goes wrong, all biomedical functions are carefully and permanently monitored, the backpack activates the emergency procedure. As a perfect buddy, it brings you safely to where help is available (even in a closed environment). Once there, it warns the emergency services and keeps them informed.

The system is not only our buddy, but it also takes care of the other divers in the group. The computer follows our buddies and tells (yes, you not only get visual, but also auditory information) you where they are. The buddy line together with the buddy concept was deserted years ago as it was no longer needed. We dive with two because we like it, not because it is a rule (an attempt to send robots as buddies was too expensive, cumbersome and unnecessary for the modal diver).

Our diving equipment is capable of doing so much more, but I find those so normal that I have forgotten them.

If you think this vision is exaggerated? Let's talk again 15 years from now. Or better, let's meet and dive then.

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Design: Mind the gap, Beirut 2014

DIGITAL ONLINE 2014

EDA'S UNDERWATER PHOTOGRAPHY AND FILM COMPETITION

OPENED: WEDNESDAY, 1st JANUARY 2014 | **ENDS:** WEDNESDAY, 30th APRIL 2014 @ MIDNIGHT
AWARD CEREMONY: WEDNESDAY, 28th MAY 2014 | 19:00-22:00 | AMERICAN UNIVERSITY IN DUBAI
EXHIBITION OPEN TO THE PUBLIC: 29th MAY – 7th JUNE IN AUD'S ROTUNDA GALLERY | 9:00-17:00

DIGITAL ONLINE'S MAIN OBJECTIVES ARE:

- To discover new promising underwater photographers in the UAE.
- 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 (both professional and amateur).

Digital Online is open to UAE Nationals and all people living in the UAE under a valid Residence Visa and of any diving qualification with a valid EDA membership status.

SPONSORS AND PRIZES

Winners will get to choose their own prize from the list below which will be awarded to them by Digital Online's Prize Sponsors at the Awards.

EVENT BY EDA

EDA Emirates Diving Association

EXHIBITION VENUE

AUD | AMERICAN UNIVERSITY IN DUBAI
School of Architecture, Art and Design

PRINTING SPONSOR

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PRIZE SPONSORS

BFC TRAVEL MANAGEMENT · TOURISM MALAYSIA · DESERT ISLANDS RESORT & SPA BY ANANTARA · AL MAHARA DIVING CENTER · Al Boom Diving · AL MARSA Musandam · NOMAD OCEAN ADVENTURES · MTM Marine LLC · MILLENNIUM RESORT · SEAOMAN Discover, Explore, Experience · OMAN SAIL · OUTDOORUAE MIDDLE EAST'S OUTDOOR, ADVENTURE, TRAVEL & LIFESTYLE MAGAZINE · the seychelles islands · FREESTYLE divers · GULF MARINE SPORTS · Le MERIDIEN AL AQAH BEACH RESORT FUJAIRAH · DIVE RITE · It's more fun in the Philippines · ASIA DIVERS DIVE RESORT · EL GALLEON

OUTDOORUAE'S OFFER TO DIGITAL ONLINE PARTICIPANTS:

- A 3 months free subscription for all Digital Online participants for the digital version of OutdoorUAE – Middle East's Outdoor, Adventure, Travel & Lifestyle Magazine.
- OutdoorUAE will be showcasing all the Digital Online video entries on Friday 13th of June on the TV screens and projector screens of OutdoorUAE's Beach Party in DIFC at The Gramercy.

1. BFC TRAVEL MANAGEMENT (3 packages sponsored)
1. Destination Package – 4 days/3 nights in Tioman Island, Malaysia
2. Destination Package – 4 days/3 nights in Sharm El Sheikh, Egypt
3. Destination Package – 4 days/3 nights in Aqaba, Jordan

2. TOURISM MALAYSIA (2 packages sponsored)
1. Destination Package – 5 days/4 nights in Sipadan, Malaysia
2. Destination Package – 5 days/4 nights in Perhentian Island, Malaysia

3. KUNGKUNGAN BAY RESORT (1 package sponsored)
Destination Package – 7 nights/6 days in Indonesia
Includes 7 nights in a beach front accomodation, 3 meals a day, 3 day dives a day for 6 diving days, free internet, tax and service, airport transfers between the hours of 8am-5pm are complimentary, but a surcharge applies to early or late transfers.

4. DESERT ISLANDS RESORT & SPA BY ANANTARA AND AL MAHARA DIVING CENTER (1 package sponsored)
Two night complimentary stay on Sir Bani Yas Island for two at DIRS (including breakfast) with a two tank boat diving excursion with Desert Islands Watersports Center. (Terms and conditions apply)

5. AL BOOM DIVING (1 package sponsored)
One day dive trip for 2 on East Coast with Al Boom Diving.

6. AL MARSA MUSANDAM (2 packages sponsored)
2 Night Livaboard Trip in the Musandam starting Thursday evening to Saturday evening.
Includes all meals, tea, coffee water and soft drinks, 6 dives, tank and weights, diving equipment and diving coupons, swimming, snorkeling, kayaking and fishing.

7. NOMAD OCEAN ADVENTURES (4 prizes sponsored)
1. A Pair of INON Strobes 2000
2. A Pair of Nauticam Floating Arms
3. Weekend Package in Dibba for 2 people (2 days/2 nights)
4. Weekend Package in Dibba for 2 people (2 days/2 nights)

8. GULF MARINE SPORTS (2 prizes sponsored)
Bigblue 170 Lumens Aluminum LED Light – FF1x5W w/flash-off LED

9. OUTDOORUAE (1 prize sponsored)
OutdoorUAE Magazine yearly subscription, an off-road guide book and an Outdoor UAE T-Shirt package.

UW PHOTOGRAPHY

10. MILLENNIUM HOTEL MUSSANAH OMAN AND THE OMAN SAIL DIVE CENTRE (1 prize sponsored)
One Weekend Stay at the Millennium Hotel Mussanah with a two tank Dive Package to Daymaniyat Islands.

11. PAVILION DIVE CENTRE (3 prizes sponsored)
1. PDI Dive Propulsion Vehicle Course
2. PADI Nitrox Course
3. 2 Dubai dives with hotel access to Jumeirah Beach Hotel

12. LE MERIDIEN AL AQAH BEACH RESORT AND SPA (2 prizes sponsored)
1. A weekend night stay in a Superior Room inclusive of breakfast buffet for 2 persons at Views Restaurant.
2. A summer two night stay in a Superior Room inclusive of breakfast buffet for 2 persons at Views Restaurant.

13. MTM MARINE (3 prizes sponsored)
1. Mares Regulator Carbon 52
2. Mares Flexa 5.4.3 Wetsuit
3. Mares X-Stream Fins

14. SEYCHELLES TOURISM OFFICE MIDDLE EAST (2 prizes sponsored)
1. Big Blue Divers | 1 x 10 Dive package including normal distance boat trips, tank and weights.
2. Dive Seychelles | 1 x 6 short distance boat dives including tank and weights.

15. FREESTYLE DIVERS (1 prize sponsored)
Weekend Stay at Royal Beach Hotel, Dibba with Freestyle Divers diving package.

16. THE DIVE CENTRE (1 prize sponsored)
A Sidemount Course

17. SHEESA BEACH TRAVEL & TOURISM (3 prizes sponsored)
1. 2N/2D sharing Liveaboard Trip for two people to the Musandam
   Includes all meals, fruits, tea, coffee, water and soft drinks, 5 dives, tanks & weights, diving equipment & diving coupons, swimming, snorkeling, kayaking & fishing.
2. Speed Boat Day Trip for two people (2 dives)
   Includes tanks and weights, diving equipment and diving coupons, sandwiches, fruits, water and soft drinks.
3. PADI Nitrox course, based on E-Learning

18. DIVERS DOWN AND DIVE RITE (1 prize sponsored)
The TravelPac is a recreational BCD for warm water diving where minimal weight is required. At 25lbs/11.3kg of lift, the TravelPac will support one 80ft3/12L aluminum tank with additional weight not to exceed 10lbs. The TravelPac is a highly streamlined; back inflate BCD that has the advantages of putting buoyancy where it is most needed for horizontal trim throughout the torso supporting the weight of the tank. The 360-degree, donut wing provides even inflation and won't tip divers while floating at the surface. Extremely rugged, the TravelPac is designed for long-term use based on a hybrid design of our TransPac harness and Travel EXP wing. We have used the same materials and craftsmanship that goes into our technical BCDs, yet simplified the TravelPac to have less hardware, making it a lighter weight BCD that is ideal for travel, plus its design allows it to pack flat in a suitcase. Its ruggedness is enhanced with a heavy-duty, 210 denier nylon laminated bladder, backed by our WORRY-FREE LIFETIME GUARANTEE. Weight pockets are optional, depending on diver preference. Made in the USA.

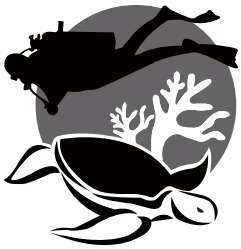
19. PHILIPPINE DEPARTMENT OF TOURISM (2 prizes sponsored)
1. Dive Package in Anilao, Batangas
   5D/4N Single Accommodation with meals and 3-4 dives/day.
2. 2N stay in Poolside Room at El Galleon Resort Puerto Galera
   Valid for travel period of June 15- September 15, 2014.

20. EMIRATES DIVING ASSOCIATION (6 prizes sponsored)
A Selection of Underwater Photography Books to choose from.

HOW TO ENTER THE COMPETITION

DIGITAL ONLINE

- Submit underwater photos and\or video for the 2013 categories, entering them in the Local section (UAE and Musandam) or International section (taken anywhere in the world).



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

- Winners choose their own prizes.

- Open to all photographers and videographers with a valid EDA membership status. Must renew EDA membership in order to take part.

PHOTOGRAPHY SECTIONS

Photographers will be classified into DSLR and Compact camera sections. Please state the camera used when entering your submissions.

DSLR SECTION: Digital SLR camera users with or without external strobes.

COMPACT CAMERA SECTION: Point and shoot photographers only (compact cameras).

Photographers can enter one photo into each category. You must choose either the DSLR or the Compact camera section; you cannot enter both.

PHOTOGRAPHY CATEGORIES

1. MACRO LOCAL:
   UAE and Musandam

2. MACRO INTERNATIONAL:
   Taken anywhere in the world.

Definition: Photographs taken with close up-equipment, portraying underwater flora and/or fauna. The photographer may not crop the original more than 20%. The original image may be requested.

3. WIDE ANGLE LOCAL:
   UAE and Musandam.

4. WIDE ANGLE INTERNATIONAL:
   Taken anywhere in the world.

Definition: Photographs taken with a wide-angle lens (or adapters that provide an equal field-of-view), with or without human presence, portraying the natural beauty of the underwater environment.

5. MARINE LIFE PORTRAIT LOCAL:
   UAE and Musandam.

6. MARINE LIFE PORTRAIT INT'L:
   Taken anywhere in the world.

Definition: A portrait shot of an animal underwater such as a fish, shark, octopus, marine bird, etc. focusing on one subject. It could be a full body shot, or focus just on face/head.

VIDEO CATEGORY

1. LIFE UNDERWATER LOCAL:
   UAE and Musandam.

2. LIFE UNDERWATER INTERNATIONAL:
   Taken anywhere in the world.

Definition: Show off your creative editing skills showcasing life underwater. Macro, wide angle, wreck, etc are allowed. Maximum duration including credits: 5 minutes.

THE RULES

- 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 winning images in the 'Divers For The Environment' magazine, EDA's Facebook page and on the EDA website. Winning 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.

- Competition organizers will take the utmost care in handling digital files submitted to the competition. However, competition organizers will not be held responsible for any loss of the submitted material at the time of uploading images. No media such as CD's, DVD's, memory cards and sticks will be returned to the participants.

- Images must not have already been submitted to previous Digital Online Competitions.

- Photos and film must be taken underwater.

- Manipulation is restricted to colour correction, brightness, contrast, sharpening and cropping. The Digital Online judges reserve the right to examine untouched images 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.

- Participants are obligated to follow environmental conservation regulations and to share respect for the underwater world during the process of taking their stills and film. Be advised that any damage to the protected 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.

- The final deadline for submitting images and video for the competition categories is Wednesday, 30th April 2014, at midnight.

- The finalists will be announced and their work displayed at the exhibition and award ceremony on Wednesday, 28th May 2014. Participants who do not make it to the evening of the event will be asked to collect their prizes from the EDA offices. Venue and prizes will be announced in March.

- We pledge to run this photography and film competition ethically and with integrity. Our judges have volunteered their time to help and to some it might be important to note that the photographers' details remain hidden to the judges during the judging process.

- All judge's decisions are final.

REGISTRATION & IMAGE UPLOAD

- Registration and submission is open from Wednesday, 1st January 2014 and the deadline is on Wednesday, 30th April 2014, at midnight. Registration and submissions to Digital Online is free.

- The participant must be a UAE Resident and an active EDA member. To enter, send details, images and film via email to photo@emiratesdiving.com with the following information:
  - Full Name
  - EDA Membership Number
  - Camera Model
  - Mention Dive Site Location

- Images must be submitted by email as high resolution jpeg files for final exhibition print purposes.

- File names should include photographer's name and the category. (eg. JSmith-M.jpg, JSmith-WA.jpg and JSmith-MLP).

- Video submissions must be in mp4 format and sent via Yousendit or Dropbox with file name of the Videographer.

- You will receive an email to confirm your registration and image/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.

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 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 hightest points will get first choice. 1st place winners will be able to choose before all other winners, 2nd place winners before 3rd place winners, etc.

DIGITAL ONLINE AWARDS

The Awards night is being held at the American University in Dubai in the Rotunda Gallery at 7pm. Prize sponsors will be present to award prizes to the winners and press and media will be capturing the evening's event.

DIGITAL ONLINE EXHIBITION

The exhibition will be open to the public at the American University in Dubai in the Rotunda Gallery from the 29th of May through to the 7th of May. The gallery will be open from 9:00-17:00 & 14:00-17:00 on Fridays. Visitors will be asked to show their ID at the main gate to get an entry pass.

AUD | AMERICAN UNIVERSITY IN DUBAI
School of Architecture, Art and Design

Goodluck to everyone taking part in Digital Online 2014! Be safe!

EDA CONTEST JUDGES

REEMA ABBAS | EMIRATES DIVING ASSOCIATION
Projects Manager

Reema is a UAE national who has an insatiable passion for life. She paints, practices yoga and travels extensively in search of adventure. An enthusiastic diver; she quotes, 'Diving gives you a feeling of exhilaration as well as tranquility'. Her work with EDA as Projects Manager gives her a sense of fulfillment, knowing that she's with like-minded people working together for a positive cause.

ALLY LANDES | EMIRATES DIVING ASSOCIATION
Events Coordinator, Graphic Designer, Photographer and Videographer

Ally has worked with EDA since December 2004 as magazine Editor, when she created and introduced the quarterly magazine, 'Divers for the Environment'. She branded and helped foresee the development of Digital Online – The UAE's Only Underwater Photography and Film Competition from its launch in 2009 and has since managed the event. Ally keeps busy within her fields of passion always looking to fill gaps with new improvements, developing EDA's brands, designs and managing all the EDA media material and FAM trips. As a qualified PADI Instructor, she utilizes the experience within everyday life at EDA.

DIGITAL ONLINE GUEST JUDGES

Ali Khalifa Bin Thalith, Warren Baverstock, Jonathan Ali Khan and Nuno Sá will be judging Digital Online 2014 entries in addition to Ally and Reema. We're honoured to have such amazing people and photographers/videographers be a part of this event.

ALI KHALIFA BIN THALITH | DOCUMENTARY FILM PHOTOGRAPHER

Secretary General of 'Hamdan Bin Mohammed Bin Rashid Al Maktoum International Photography Award' (HIPA)

Born in Dubai, Ali Khalifa Bin Thalith Al Humairi is a professional documentary film photographer and he is the Secretary General of 'Hamdan Bin Mohammed Bin Rashid Al Maktoum International Photography Award' (HIPA). He holds diplomas in Documentary Photography (London Academy); and French and Literature (Montpellier University, South of France).

His career journey began in 1995, since which he has participated internationally in numerous exhibitions and specialized courses. He has collaborated in the coverage of many major events globally in: Heidelberg – Germany; Phuket – Thailand; Sipadan – Malaysia; Barcelona – Spain; as well as in the UAE.

In 2010, he won the 'Mohammad Bin Rashid Award for Young Business Leaders' for the best marketing and promotional project. Bin Thalith's rich portfolio of documentaries and films includes: 'Journey to the Green Mountain'; Four episodes of the 'Masirah Island', Oman; 'Alyasat and Alhalaniyat Island', Oman; and 'Sipadan', Malaysia (known for its ecological diversity). Utilizing his extraordinary talents he produced a unique short documentary film titled "Gaza Diver", which narrates the journey and hopes of a poor young man who travels to Dubai for medical treatment – at the behest of a noble gesture by Sheikh Hamdan Bin Mohammed Bin Rashid Al Maktoum, the Crown Prince.

WARREN BAVERSTOCK | UNDERWATER PHOTOGRAPHER

Aquarium Curator – The Burj Al Arab

Warren has been involved with a number of filming projects within the region such as the popular television documentary "Arabia's Cycle of Life" and the more recent and ongoing "Sharkquest Arabia". Having a passion for elasmobranch conservation, Warren has gained essential filming experience by joining researchers in Saudi Arabia, Qatar, Djibouti and the Maldives where his filming has included large aggregations of whale sharks and manta rays. With vast experience of working with marine animals within a commercial aquarium environment, Warren specialises in aquaria photography/videography as well as the building and filming of artificial environments for documentaries.

Warren was Digital Online's overall professional winner for 2011 and 2012 as well as 1st and 2nd place winner in British Underwater Image Festival's 2011 competition and was featured in Time magazine, 2011 for his amazing photography on manta rays of the Maldives.

WEBSITE: www.warrenbaverstock.com
FACEBOOK: Underwater Photography by Warren Baverstock

JONATHAN ALI KHAN | WILD PLANET PRODUCTIONS

Managing Director – Natural History TV Production, Underwater filming specialists, video production and photography.

JAK is a topside wildlife and underwater camerman, producer, director and editor with a strong passion for the natural world having worked on a wide range of unique projects in the region and is recognized as an authority on environmental, conservation and diving related issues.

His fascination with filming all started after years of working as a photojournalist and shooting underwater stills. His primary interest is in marine subjects that led to the creation of Ocean World Productions in 2003. In 2008, JAK left Ocean World Productions in order to focus entirely on natural history TV development, leading to the recent creation of Wild Planet Productions.

WEBSITE: www.wildplanetfilms.org
FACEBOOK: Wild Planet Productions

NUNO SÁ | WILDLIFE PHOTOGRAPHER

Professional Photographer Specializing in Marine Life

Nuno has been a professional photographer since 2004, specialized in marine life photography. He is the author of three books and several dozens of articles published in National and International magazines. He is the co-author of the "Azores Diving Guide" – Portugal's first published diving guide, and a regular collaborator of several magazines, such as National Geographic Portugal.

He is the first Portuguese wildlife photographer nominated in some of Europe's major nature photography competitions, such as: Wildlife Photographer of the Year and Asferico International Nature Photography Competition, amongst others.

Nuno is also on the Wild Wonders of Europe's team of top European nature photographers. This is the world's biggest ever nature photography project with an expected public of over 100 million people, a project supported by the National Geographic Society.

WEBSITE: www.photonunosa.com

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

ISLAND HOPPING IN MALDIVES

FEATURE **RAGHDA YUSUF**

Maldives is literally a paradise on Earth, located in the Indian Ocean, embracing 1,190 islands, exquisitely spread around more than 20 atolls. This mesmerizing island is absolutely teeming with rich biodiversity, beautiful sandy shores and surrounded by pristine waters.

After all, who hasn't dreamt of visiting The Maldives? I am not on a honeymoon, but I am travelling solo to Paradise on my first liveaboard experience. After a thorough search, I figured out that the "Stingray" is one of the best and most affordable liveaboards for recreational divers.

Maldives is only about 1.5 meters above sea level, the lowest country in the world. With rising water levels due to global warming, there have been accurate calculations that some of the islands are sinking and will soon disappear. Some communities have already relocated to higher ground. So I guess I have my golden opportunity now to explore this exotic underwater world.

Due to some issues with my flight dates, I had to arrive a day earlier in Male where I stayed at UI Inn at Hulumale, only 10 minutes away from the airport. Nothing fancy over there, but good enough for one or 2 nights. I slept well and walked to the beach the next morning. Hulumale Beach is a stretch of blindingly white sand with waves breaking a few meters away and a small floating barrier before the reef so that everyone can swim freely.

However, the next morning I had to race back to the airport where the Stingray crew were waiting for me. I was met by the local Divemaster who welcomed me warmly and guided me to a coffee place to wait for the rest of the divers to arrive. I sat there blown away by the scenery of the ocean, first thing you see when you come out of the airport at Male is the ocean. Anyways, now I am on board breaking ice with fellow divers. Everyone was so friendly and as excited as I was.

Scuba divers are allured into diving in the Maldives because of the regular sightings of pelagic species such as the dolphins and whale sharks. Manta rays, eagle rays, schools of colourful fish (my favorite are bat fish and sweet lips) and more than 3,000 coral reefs are also abound. It is just overwhelming to explore the magnificent marine life of the Maldives. Every scene, every fish, reef or pinnacle has something special that will blow your mind away.

Due to the Maldives unique location, a moderate to strong current is expected at

most of the dive sites. We were literally flying underwater at the Guraidoo South at 29m. We can agree that Maldives is not a diving destination for absolute beginners.

Liveaboard diving is the best way to fully explore the captivating islands only found in the Maldives. It's easier to tour the atolls and discover the best dive spots without being anchored at one particular resort. Stingray offer guests an exciting itinerary that suits the divers skills designed to get the most out of the popular atolls of the archipelago.

The Stingray liveaboard takes pride in its 31m long motor yacht that can carry up to 18 divers on board. The friendly crew is happy to assist at anytime with tips and guiding endorsements. Moreover, the cook properly feeds the divers with full exotic 3 course meals everyday. When not diving, guests can enjoy hanging out in the spacious shaded area socializing with others or sunbathing on the sundeck on sun mattresses and chairs till the evening program is revealed, which is mostly exploring one of the islands with a tour guide.

A very special arrangement was made one evening on what they call BBQ Island. We arrived right before sunset, no one else was there apart from the guys who arranged the BBQ and they had sculptured a whale shark on the beach to welcome us. I was happy to be on a well preserved local island. You could walk from one end to the other within 5 minutes and play with the plankton in the dark on the shore.

For information on the Stingray, visit:
www.maldivesdivetravel.com

USEFUL INFORMATION

- A free 30 day tourist visa is granted upon arrival.
- Have enough funds to cover the expenses for the duration of your stay in the Maldives. (US $100 + $50 dollars per day).
- Have a confirmation of reservation in a tourist resort or hotel.
- Currency:
  1 US Dollar = 15 Maldive Rufiyaa

STINGRAY LIVEABOARD FACILITIES AND SERVICES:

- Motorised dhoni dive tender
- 50m² dive deck & fresh water shower
- Camera table and rinse tanks
- Air-conditioned saloon with bar, TV, DVD and music centre
- Dedicated airconditioned dining area
- Library with diving magazines, novels and fish ID books

HURGHADA

THE GOLDEN TRIANGLE, EGYPT

FEATURE AND PHOTOGRAPHY **PHILIPPE LECOMTE**

November is the start of good weather in the UAE. Why would anyone leave to go elsewhere when we can finally enjoy the outdoors and the pleasant temperatures after having had a summer with highs of 45˚C? A one week diving holiday can't go amiss though, can it? It's going to be well spent time, especially as it is to dive with sharks in the Red Sea.

November is the start of good weather in the UAE. Why would anyone leave to go elsewhere when we can finally enjoy the outdoors and the pleasant temperatures after having had a summer with highs of 45°C? A one week diving holiday can't go amiss though, can it? It's going to be well spent time, especially as it is to dive with sharks in the Red Sea.

A Swiss diver I had met 2 years ago in Marsa Alam in Egypt had recently invited me on a boat cruise diving trip to the famous, mysterious and mythical Golden Triangle to dive 3 reefs in 7 days. With a plane and boat ticket in my pocket, I headed off to Cairo.

After a 3 hour flight from Abu Dhabi to Cairo, a one hour flight from Cairo to Hurghada, I then made a 2.5 hour drive to my final destination to the marina in Port Ghalib, where the "Betel Gueser", a boat 34m long and 7.5m wide is waiting for for its passengers. The boat can host 22 divers and 11 crew. It is equipped with two 800hp diesel engines and 2 desalination plants. This boat seems perfect for a cruise of 7 days with its huge living room and its 2 storeys.

The following day, we had to wait until 10am before we could make our way on to the Golden Triangle. We had to wait for the customs procedure to clear in order to be on our way. The Egyptian Coast Guards keep a very tight control.

As the boat finally started to make it's way toward the port's exit, a bell rang on board. The dive guide was summoning guests to gather for the "briefing in the living room on the first floor". The safety procedures, meal timings, schedule for the dives and the crews' introductions were all covered. Our two dive guides, Virginie (French) and Nagy (Egyptian) were both very nice and their passion for diving was clearly visible from the instant they spoke. In fact, Virginie has been diving in Egypt for 6 years and Nagy, 11 years.

DAY 1

Adaptation time, a common feature during a Red Sea trip. The first dive is usually a nice easy one. We headed south along the coast,

only 10km from Port Ghalib to a small creek named Ras Shouna.

MARSA SHOUNA
11:00am | Depth: 20m

A one hour dive was planned to get the dive routine going and a compulsory equipment and buddy test was made. A surface buoy practice is compulsory in Egypt as many dives are done on offshore reefs with very strong currents.

During this first dive, we came across a lot of common fish such as scorpion fish, turtles, lionfish, clownfish, surgeon fish, etc. There were even dogtooth tuna and Indian mackerel with their mouths wide open, eating plankton there.

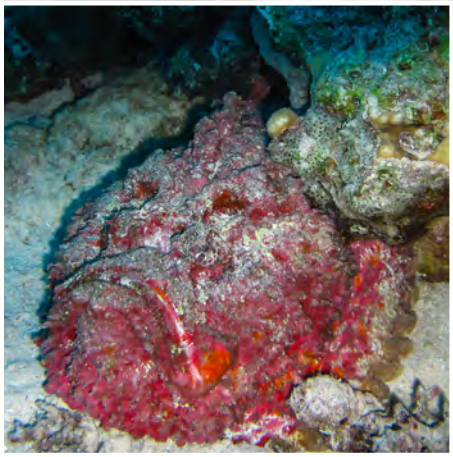
ABU DABAB III
4:00 pm | Depth: 20m

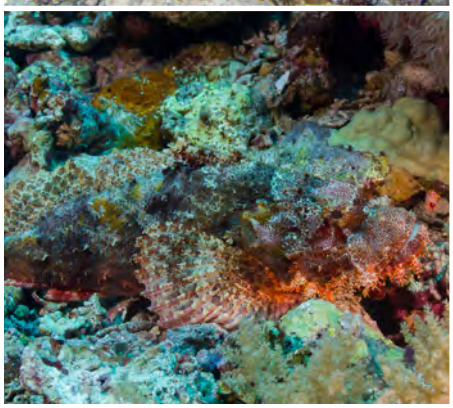
For the second dive, we sailed 20 minutes offshore towards 5 reefs named Abu Abad. We did a Nitrox dive on one of the reefs. There was a multitude of rocks strewn with coral. Soft corals, fire corals and other brain corals are everywhere. Amongst this garden, masked butterflies, lion fish and several species of parrot fish move about. With 20-25 meters visibility, two eyes are still not enough to appreciate and see all that is going on. At the end of the dive, just under the boat in the blue, appears a huge black shape. An adult wrasse Napoleon is watching us at a far and safe enough distance. Below, a green turtle is slowly and gently looking for food on the reef.

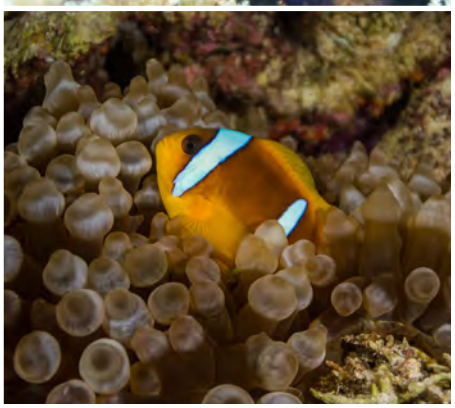
ABU DABAB III: (NIGHT DIVE)
7:00pm | Depth: 15m
Main species: White tip reef, Black tip reef, Napoleon.

Our Divemaster explains that the only occasion to do a night dive would be here at Abu Dabab as the other dive sites on our trip would result impossible as we would be on offshore reefs with 60 meter cliffs.

At 6:30pm, the bell rings to prepare our gear. Due to the great visibility, the shallow water and the two big lights shining from the boat, make the night dive seem almost a day dive.







Most of the fish are steady in the corals or floating in mid water just above the bottom. Suddenly, the sound of a horn from a group of divers strikes our attention. What's in the coral? The big napoleon is sleeping deep inside a little cave. He is unreachable and it's not possible to get a good shot of him. Anyway, the dive continues with some bicolor parrot fish sleeping under the corals, lying on the soft and comfortable sand.

Clown fish are much easier to photograph. They don't move as fast as in the daytime. They are just resting in the middle of the anemone without too much motion. A load of sea urchins go out at night. It is only during this time that you can observe them. The beautiful pencil urchin and the long spine urchins are searching for food on the top of the coral. Nearby, the divers are amazed by the dance of a feather star. They are so graceful and funny at the same time. Suddenly, from the dark, a group of 6 squid swim quickly past into the black of the night. Too fast to get a good shot.

DAY 2

At 4:00am, the boat slowly heads to a well-known Reef, just 10 to 12km from the shore, further south.

ELPHINSTONE REEF, NORTH:

7:00am | Depth: 15-40m

Main species: Oceanic, Scalloped Hammerhead, White tip reef, Grey reef, Thresher.

We did a deep dive on the north of the reef, on the two plateaus. One at 20 meters deep and the other one at 40 meters. On this dive, there is a big chance to see sharks such as Hammerheads, grey reefs or Reef white tips. We only saw a White tip reef shark on the plateau at 20 meters, swimming in the blue and above the reef in circles. Above in the blue, a group of barracudas looked like they were sleeping as there was no movement visible from their fins. Far behind, a great barracuda swam slowly against the current. After 10 to 12 minutes at 34-37 meters, it was time to get to the wall in order to finish the dive in shallow water. Here, groupers, snappers and long banner fish were everywhere. The wall was painted in what looked like red and orange drops. They were thousands of cardinal constantly on the move. It was a magical show.

ELPHINSTONE, SOUTH

10:30am | Depth: 15-40m

Main species: Oceanic, Scalloped Hammerhead, White tip reef, Grey reef, Thresher.

This dive also had the possiblitlies to see sharks out in the blue and during the safety stop, a possible sighting of the famous Longimanus. After Reaching the bottom at 20 meters, we were astonished to see the plateau covered by so many different soft corals with hundreds of little red groupers everywhere. After waiting 15 minutes on the edge of the plateau, looking into the blue, we decide to turn back

towards the wall. On the way to the wall, 3 big dogtooth tuna came in from the blue and followed us. This is one of the top predator of the reef. They overtake us and disappear again. Along the reef, little caves and cracks get our attention with all their shrimps, nudibranchs and other small fish to see. In the tree coral, small crabs and leopard blennies hide together to escape from big predators.

On the way back to the plateau, under a rock, a giant eel and its cleaning fish are watching the divers passing by. And with a good eye, flat head scorpion fish can be spotted well hidden between the rocks.

At the safety stop just under the boat, everybody waited for a Longimanus, but one never came.

ELPHINSTONE REEF, NORTH

2:00pm | Depth: 15-40m
Main species: Oceanic, Scalloped Hammerhead, White tip reef, Grey reef, Thresher.
Aboard the inflatable, we reach the dive site for a drift dive along the west side. There, black corals and huge gorgonians decorate the wall with thousands of Anthias doing their magical dance, in the corals, in the blue, in the corals, in the blue, etc.

Offshore, blue trevally, dogtooth tuna and black snappers are passing by, searching for little fish.

There were no sightings of sharks on this dive unfortunately.

DAY 3

On our way to Daedalus Reef, 90kms from the coast. This reef has an 800m diameter circular shape. In the middle, stands a lighthouse that had been built in 1863. On the island, there are 2 light guardians and 3 soldiers.

DAEDALUS, NORTH

6:00am | Depth: 20-40m
Main species: Grey reef, Thresher, Scalloped Hammerhead.

This dive site is very popular for Hammer heads, grey reefs and other big fish. Only one group got to see one grey and one hammerhead, but very deep. For us, we were lucky to see a huge Manta swimming slowly under us at 60 meters. Against the current, along the wall, big eye trevally and a school of great barracuda swam with us along the drift. Suddenly, in a crack at 8m only, we got to see a great barracuda in a cleaning station. As we approached it, we could see two small cleaning wrasses taking care of the top predator's sharp teeth. In the blue behind it, another 3 smaller great barracuda waited their turn.

DAEDALUS, NORTH

10:30am | Depth: 15-40m
Main species: Grey reef, Thresher, Scalloped Hammerhead.

For this dive, the divemaster decided to do the same to get another chance to see a possible Thresher shark. Unfortunately, there was none. Only a grey reef shark passed in the blue without paying us any attention. So after waiting for 10 minutes at 36 meters, we left the plateau and made our way towards the wall. Along it, a school of big eye trevally, black snappers and barracudas swam with us. A huge napoleon wrasse passed under us on its side. This is a defense position in order to

appear thin and almost invisible to a predator.

DAEDALUS, SOUTH
2:30pm | Depth: 15-40m
Main species: Grey reef, Thresher, Scalloped Hammerhead.

The boat is tied up by the mooring point just above the reef. All the reefs in Egypt have mooring hooks for boats as it is not allowed to anchor on any of the reefs. On the plateau at 20m, just under the boat, a flat head scorpion fish moves only his eyes following us in order to stay hidden for any other little prey. In the blue after the plateau, 2 big coral groupers follow the edge of the reef. These top predators look angry with their mouths open midway. Always a pleasure to see them as they are not so common and tend to be very shy.

On the way back to the boat, 2 napoleons come toward us and suddenly turn to the reef and disappear in the shallow water.

DAY 4
Just after the dive, the captain ordered to head for Small Brother located 7 to 8 hours away. Once at the island, we anchored on the south reef greeted by 2 other boats already there.

LITTLE BROTHER, NORTH
6:00am | Depth: 15-40m
Main species: Grey reef, Thresher, Scalloped Hammerhead.

Ding dong, the bell rings at 6am for the briefing. Nagy starts the briefing with difficulty as the divers are still sleepy.

We drop in by zodiac on the north of the island. The goal of the dive is to descend to 40m, then stop above the plateau and look out into the blue. Here, there are big chances to see the Thresher shark.

LITTLE BROTHER, NORTH
10:30am | Depth: 15-40m
Main species: Grey reef, Thresher, Scalloped Hammerhead.

We drop in at the same point as the first dive. Apparently, the thresher shark is around.

We make our descent and we are back above the plateau where we wait about 10 to 15 minutes, looking out into the blue, but nothing. Unfortunately, a group of 15 divers were here before us, making too noise. No problem, this time we check the current and we go to the left side of the reef.

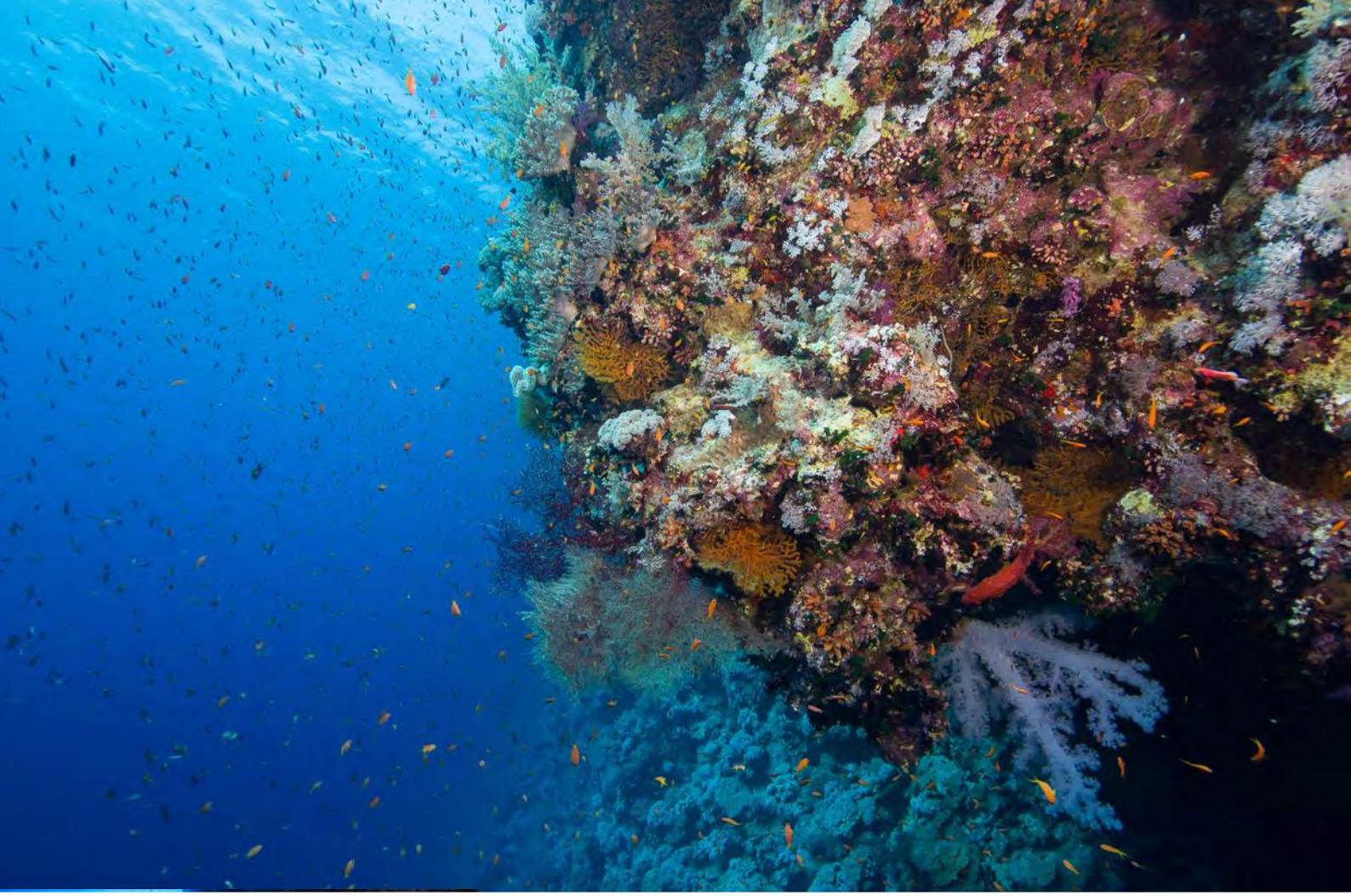
Along the way, a school of big eye trevally and great barracuda stay with us in the blue. Suddenly, as we swim to 15 meters along the wall with the bottom 35-40 meters below us, we see a thresher shark overtaking us and doing a U-turn and coming back in our direction. Thanks to the great visibility of the Red Sea, we witness another magical moment.

LITTLE BROTHER, EST
2:30pm | Depth: 15-40m
Main species: Grey reef, Thresher, Scalloped Hammerhead.

After those 2 great dives, Nagy leads us to the Eastern side in order to dive and visit a large Gorgonian fan forest at 25 meters. During the first dive, we could see it below us but it was too deep to reach due to the first dive's profile. Along the wall, flat head scorpions are hiding in the cracks. Suddenly, a huge gorgonian fan of more than 2.5 meters stands infront of us. Those magnificent gorgonian fans look beautiful. We stay there for several minutes to take it all in and study what macro fish and shrimps live inside to take photos. We saw several Gorgonian fans like these several times during the dive and it's a real pleasure to swim between them. You must be very careful to avoid touching or damaging them as they are very fragile and grow very slowly.

From there, in the blue on our left, a familiar shape slowly moves towards us. It's a huge dog tooth tuna. I leave the wall and swim in his direction in order to get some good photographs of it. The tuna seems very unafraid of me which is great for taking shots. I have decided to continue the dive in the blue, not too far from the wall to have a chance to see other tuna. It was a good decision, 2 grey reef sharks appeared from the blue and swim with me several minutes.

DAY 5
BIG BROTHER, NORTH: WRECK NUMIDIA
6:00am | Depth: 15-40m



Main species: Grey reef, Thresher, Scalloped Hammerhead.

There is a strong current on this dive and we hangout in the wreck at 35m looking out into the blue for sharks. Suddenly, 2 grey reefs turned above our heads and one small one just above the reef at 15m. One of the two from the blue comes in close, close enough to get a good shot, at last. Grey reefs are common in the Golden Triangle, but they are not very curious. They don't come too close like they do in the Bahamas, French polynesia.

BIG BROTHER, SOUTH

10:30am | Depth: 15-42m
Main species: Grey reef, Thresher, Scalloped Hammerhead.

On the way down, we can see a cleaning station with two small barracudas. At 38 meters, three pinnacles on the south plateau stand up before a huge cliff. We wait here for 5 to 7 minutes and decide to come back to 20 meters. Suddenly, on the way back I saw something move on my right. A thresher passed under us and U-turned in our direction before to disappeared into the blue. Along the reef at 20m, 2 small napoleons follow the reef searching for food. On our way back toward the boat at 10 meters, a giant eel swims between the soft corals and stops suddenly in a crack. In a second, a cleaning wrasse turned his massive head and mouth around in order to eat the eel's leftovers.

BIG BROTHER, SOUTH

2:30 pm | Depth: 15-42m
Main species: White tip reef, Thresher.

My buddy and I had decided to repeat the precedent dive in order to have a chance at seeing another Thresher. We headed to the edge of the reef point. As we started our descent to 35 meters, we saw a group of 5 barracudas swimming in the blue toward the reef. Down at 40 meters, on the top of the pinnacle, we begin scouting for moving shapes. Unfortunately, we did not see any Threshers this time. We are obliged to turn back to the reef in order to finish our dive at a safe depth.

DAY 6

On this day, you'll get to do one or two dives, depending on your flight schedule.

SMALL GIFTUM ISLAND

7:30am | Depth: 15-35m

We are now along the coast of Hurghada, next to a small island. The whole area is a protected marine reserve. Maximum depth due to the cruise is 30 meters along a wall that goes down to 60 meters. We are going to dive from the plateau at 20-25m. At the start of the dive there is a wide forest of red gorgonian fans starting from 20 meters and

reaching down down to 35-40m. The scenery looks great with the fans growing vertically or horizontally. We stayed next to one big fan for a few minutes in order to have a chance to spot a long nose hawk fish, but did not see it in the end.

We headed to the reef at 15 meters with a rocky and sandy bottom. Here, life is everywhere. Giant Moray eels, clown fish, blackside hawk fish, coral groupers and blue cheek butterfly fish swim all around us. It's a real pleasure to dive in the Red Sea, it's a real feast for the eyes.

If you think the Red Sea is too common a destination, think again before going to any other place. The Red Sea is still and will continue to be, one of the top 10 diving destinations in the world. There are plenty of colours, plenty of fish, astonishing reefs and cliffs, all surrounded by amazing crystal clear blue waters.

SCUBA DIVING IN CONNEMARA, COUNTY GALWAY

FEATURE **ANDREW ROUGHTON**

When planning a trip to one of the world's top diving destinations, you may consider the Red Sea, the Caribbean, or the Great Barrier Reef. And you'd be on to a safe bet. However, you may not consider Connemara in County Galway, Ireland. And you'd be missing out on a rare treat if you didn't. For me, Connemara is enormous fun for three reasons – dramatic diving, predictable conditions, and lovely people.

The drama of the diving comes more from the topography of the sites and the stunning surface scenery than the marine life. You can certainly expect to see Common and Grey Seals, Dog Sharks, Edible and Spider Crabs, Pollocks, Wrasses, and even the spectacular sight of diving Gannets as deep as almost any commercial dive site. However, the marine life pales in comparison with the drama of a dive site like "Inis Turk" for example. "Inis Turk," which is Gaeilge for "Island of the Boar," is an interesting little island with a population of under one hundred and an uncanny resemblance to "Craggy Island" from "Father Ted." However, below the surface intrepid scuba divers can submerge amongst winding gullies, glide through underwater caves, and wonder at mesmeric caverns. There are sheer, forty-meter drop-offs, swaying kelp beds, and craggy wall faces playing host to a variety of small and large marine life. Thus, if like me you dive for the escapism and the opportunity to delve into an unsullied, other-worldly and awe-inspiring aquatic realm, the majesty and drama of a dive site like "Inis Turk" will not disappoint. Similarly, if you enjoy the surface scenery en route to and from a dive site, the fjord lands around Connemara in County Galway and County Mayo will leave you breathless. The views across to "Clare Island" for example can rival any in the world and will only add to the wonder of your pre and post dive journeys.

If you dive regularly in Ireland, the UK, or anywhere else in Coastal Western Europe you will find that strong winds, unpredictable surface-currents and poor visibility can impact the quality of your diving significantly. However, in Connemara the fjord lands provide a convenient barrier from the elements. Thus, even if one dive site is experiencing poor conditions, you're sure to find another sheltered spot further inland. That is, if you're off-shore at "The Bills," "South Gullies," or "Wreck Cove" and you're being blasted by the Atlantic winds, you can simply venture in-shore to the predictability of "Rusheen Point," "Doneen Beacon," or the "Julia T" wreck. Moreover, due to the lack of coastal craft along this coastline, the abundant marine life is free to roam and behave naturally throughout the region. And to make all these wonderfully predictable dive sites and varied marine life accessible, a splendid Dive Centre called "Scubadive West" is nestled in Lettergesh Cove in the heart of the stunning Connemara coastline.

"Scubadive West" is a perfect example of the region's extremely good-natured, kind-hearted, and quick-witted inhabitants. It is a family run business operated by brothers Cillian and Brefni Gray. Each brother has over a quarter of a century of diving experience, an intimate knowledge of the region's diving, and an extremely personable manner. Their parents, Shane and Olli Gray began scuba diving in 1963 and established Ireland's first diving school in 1974. Eighteen years later they moved to Connemara and established "Scubadive West" as a PADI Five Star Dive Centre offering organized island safaris, guided shore dives, and courses from "Discover Snorkeling" to "PADI Instructor Training." They also offer a full range of facilities from hot showers, coffee machines, and free Wi-Fi to extensive equipment rentals, scuba shop, and full equipment testing. Moreover, at only an hour and a half from Galway and three and a half hours from Dublin, "Scubadive West" is easily accessible by road.

And if, like me, you enjoy a full weekend of diving, the local area is littered with great hotels, pubs and local characters. If you're on a budget, "Seabreeze Bed and Breakfast" is a charming, family run establishment with spectacular views across the coastline, lovely owners, and a terrific full Irish breakfast in the morning. Conversely, if money is no concern, then "Abbeyglen Castle Hotel" offers luxurious accommodation in stunning gardens in the heart of Connemara. The castle was built in 1832 and boasts tennis courts, a spa bath, and gorgeous views of Clifden and the Twelve Bens Mountains.

As with most of Ireland, good pubs in Connemara are ubiquitous. In Oughterard you'll find "Power's Pub," which is a thatched cottage pub with traditional music most nights throughout the summer months. In Spiddal, "An Cruiscin Lan," "An Calad Mor," and "Tigh Hughes," are all good choices. And in Clifden, "Mannion's" is a terrific pub with great traditional music sessions. For food in Clifden, "Mitchell's Restaurant" specializes in local fish and meat. In Leenane, "Blackberry Café and Coffee Shop" offers terrific light bites. And in Moycullen, "White Gables Restaurant" offers an unmissable Sunday Lunch.

Thus, if you're keen to try some world class diving that will probably elude most of the world's top diving lists, enjoy some stunning scenery, and make the most of one of Europe's most hospitable nations, a trip to Connemara, County Galway could be just what you're looking for.

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NUTRITION AND DIVING

FEATURE **ALBERTO FIORITO**

Decompression sickness can be defined as having several symptoms and occurs following a drop in external pressure, usually after scuba diving with an aqualung, generated by the transformation into bubbles of inert gases dissolved in excess in the body. This transformation proceeds at the excessive speed of the variation of pressure, or if the diver does not stick to their planned decompression breaks.

Based on this definition, it is possible, in theory, to identify the causes which lead to decompression sickness. Whether it's the speed of resurfacing, or not having enough breaks, they can be regarded as determining factors in causing this medical problem. In reality, practical experience and medical practice teach us that these are not the only factors. It's not uncommon to hear of medical cases in which, despite the absence of any obvious errors, a problem emerged in the same way that sometimes even serious errors are not necessarily followed by the classic symptoms that one would expect.

For these reasons, so-called additional factors come into play, that is to say pre-existing elements, which contribute to the development of a medical problem. Amongst these additional factors, let's remind ourselves, by means of example, factors such as dehydration, stress, tiredness, other medical conditions which may contribute to the development of illness, lack of sleep, cold and other symptoms. A medical problem could therefore arise with a combination of at least two of these factors, that is to say in the resurfacing phase and the combination of one or several additional factors.

The link between an additional factor and the emergence of medical complications could be identified in the phenomenon of oxidative stress. By oxidative stress, we mean an imbalance of the usual balance which exists inside an organism inbetween the aggressive activity of free radicals and the ability of the body to defend itself, or rather its anti-oxidant capacity.

Free radicals are extremely reactive metabolites which come from the process of transformation of oxygen, but also of other metabolic reactions, which do not have enough electrons in their peripheral orbit. In these conditions, these molecules, have an extremely short life span: within a few milliseconds, they have to react with a substance which produces electrons. To avoid that the free radical interacts with the cellular membrane causing damage to the cell, the organism contains antioxidant substances. These substances consist of elements which have the capacity to give electrons to free radicals before these interact with the vital parts of the organism. This is where the link with nutrition, is, or more generally, the link to lifestyle.

On the one hand, a healthy diet is enough to provide the organism with the appropriate antioxidant substances necessary for cancelling out the action of free radicals. On the other hand, a healthy lifestyle significantly reduces the production of free radicals and the resulting consumption of antioxydants.

Now let's look at a few aspects which can be part of a healthy lifestyle, which, as is obvious, not just for scuba diving:

1. **NUTRITION.** Healthy eating is a key part of ensuring a healthy lifestyle. The rule to apply is not to allow one's body to waste energy fighting against foods which are bad for us. Then in turn you must apply the principles which go hand in hand with healthy nutrition. The following points are part of the WCRF rule book, one of the main international bodies dealing with nutrition.
   - Try to maintain a healthy weight throughout your life.
   - Physical activity everyday.
   - Limit your intake of foods containing too many calories.
   - Opt for vegetables, pulses, fruit and in particular, greens.
   - Try to limit your intake of red meat. Avoid processed meats.
   - Try to limit your alcohol intake. Limit your intake of salt and salty foods.
   - Make sure your intake of essential nutrients comes only from food.
   - Make sure your intake of essential nutrients comes only from food.

2. **SUPPLEMENTS.** A healthy lifestyle should mean that supplements/vitamins aren't necessary. However, most of the time, this is not the case. For this reason, guidelines for using supplements are necessary: for example, they must be high quality, they must be used at the right time and stimulate organs which are tired or diseased.

3. **HYDRATION.** Proper hydration drains toxins which improves communication between cells. These are the most useful guidelines: drink at least 11 half glasses of water per day inbetween meals. This water should not be very high in minerals, that is to say with fixed residue 180° below 50mg/litre.

4. **OXYGENATION.** It may seem banal to remind people to breathe, but it's worth spending a little time on two aspects of this: we must breathe in high quality air. It would not be a bad idea, for us all to learn some breathing exercises to practice everyday two or three times throughout the day. Exercises which help us to use all our breathing muscles are particularly useful.

5. **MOVEMENT.** Regular exercise should be a part of everyone's daily routine, suited to our physique and taking into account any existing problems. Walking for 30 minutes everyday is ideal for staying in good shape. More exercise is required for those who intend to lose weight.

6. **DRAINING OF TOXINS.** Our daily diet and more generally, stress, are just a few of the many sources of poison for our organs. Draining an organ means eliminating accumulated toxins. There are many products available, especially herbal products which are ideal for draining single organs or the body in general.

7. **THE INTESTINE.** The intestine does not only reflect our emotions but also the general function of our entire organism. It is the main point of exit to the outside. It should be able to work by itself. It represents an immunity barrier and a selective filter for foods and bacteria. It is maintained in a natural way, either with diet or with flushing out periods. It is difficult for our body to function and react correctly if the intestine is not working properly.

8. **EMOTIONAL AVAILABILITY.** Health is also an expression of one's ability to relate to others, release one's emotions, get involved, put oneself to the test, to adjust, to accept, to accept oneself, to dream, to communicate, to love, to love oneself, to forgive, to forgive oneself. Given that we are talking about lifestyle in general, reminding ourselves that we are made up of both body and emotions, is never a waste of time, particularly in an article dedicated to a small proportion of the population making sacrifices for a hobby as beautiful as diving, often in search of those simple emotions which make life so enjoyable.

MEDICAL EXAMINATIONS FOR SCUBA DIVING

FEATURE **ALBERTO FIORITO**

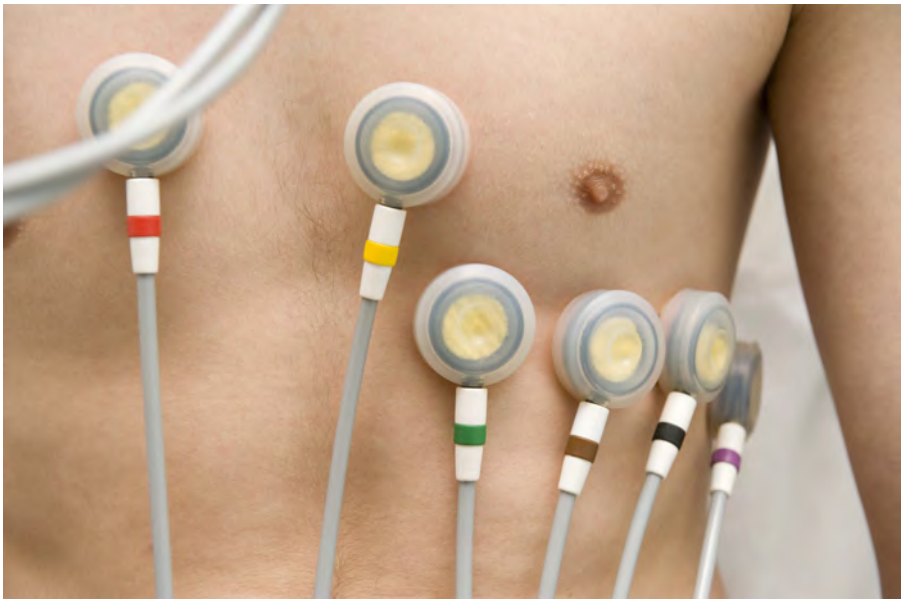
The scuba diving community is diverse in gender, in age and in general health conditions. However, while there may not be a clear set of rules as everyone would like informing us of exactly how things should be, it is now standard procedure for beginning an underwater course, no matter what your level may be, to undergo a medical examination. Usually, this medical examination is considered a problem, a burden, a bother. Actually, it is an important moment not just for one's diving lifestyle, but also as a point of reference in a person's life. It gives the doctor the chance to assess the main physiological aspects of a person and if the doctor is a specialist in the field, they can sum up in specific terms to have an overview of general factors and aspects which could constitute a risk when scuba diving.

Of course, the risk is minimal. We are well aware that even though diving accidents can sometimes be serious, they are very rare and they are often caused by non health-related causes. However, this result is also due to prophylaxis and control assisted by a medical examination.

In addition to general examinations of your health for diving and any surgical procedures, in particular your airways and hearing, it is also important to pay attention to your heart, your lungs, blood pressure, check the mobility of the tympanic membrane and undergo a brief neurological exam.

Given that it is a medical exam for sport and leisure purposes, invasive procedures or procedures with surgical instruments are unnecessary. However, obviously if the doctor has surgical instruments which could allow a further examination without being invasive and without creating risk to the area examined, this allows for a more detailed investigation.

One important remark about the doctor carrying out the medical examination for scuba diving: Usually, it is safe to say that a doctor's training covers a vast and comprehensive range of medical expertise, more than enough to evaluate how fit our organs are for scuba diving. However, it's also true that being an expert in the field allows an evaluation sometimes decidedly different from the usual conditions or from a specific set of conditions.



Here is an example to demonstrate this. A doctor specialised in diving medicine can tell whether a normal tympanic membrane, slightly red has been caused by the stimulus of equalization as opposed to an ear, nose and throat specialist who doesn't have this kind of experience in diving and who could be a cause for stopping the procedure and beginning treatment.

For this reason, we consider it important to suggest that a fitness examination for scuba diving should be carried out by a doctor specialised in swimming or underwater activities or by a doctor who is an expert in the field.

Now let's look at the detail of the examination to help the reader get rid of any doubts they may have about their own fitness, always with the aim of highlighting how important it is to have these checks made in an objective and professional manner.

There are three types of contraindication for health reasons for underwater activities: absolute contraindications, relative contraindications and temporary contraindications.

The first one refers to those conditions which make it dangerous to go into the water. Amongst these, we would like to highlight two in particular which are more frequently subject to questions from users: epilepsy and spontaneous pneumothorax episodes.

Without going into too much detail, we can define epilepsy as a moment in which the brain goes through alterations, the nature of which is rarely considered and these can provoke neurological symptoms, usual just

briefly. In its most typical form, it manifests itself as a serious problem, during which the individual stops breathing for a minute and experiences quite serious paroxysms. It is easy to see how if this kind of incident takes place underwater, the threat to the diver's life would be too dangerous to cope with it. The problems with this condition are most obvious in those individuals who have suffered epileptic fits in childhood, have followed the necessary treatment and after five years without a fit, they stop treatment, as it is no longer recommended. The current procedure tends to be that people with this condition are not considered fit for diving despite the fact that really, each case should be considered separately.

For spontaneous pneumothorax, what happens is that following a sudden increase in pressure in the lung, a small enphysematous bullae, usually congenital, bursts and the air in the pleural area causes a specific reaction. The fact that this can re-occur during a dive, and therefore make resurfacing very dangerous is justification for not allowing people with this condition to dive, even though statistically the risk is minimal. The latest surgical techniques can eliminate emphysematous zones identified with the necessary tests, but lung surgery is another reason why an individual would not be granted a diving fitness certificate.

The relative contraindications are represented by the series of conditions which are not themselves a cause for being declared permanently unfit for diving, but which deserve particular attention, as for example a request for more detailed medical examinations and reducing the duration of the medical certificate from three to six months instead of a year. Let's look at three examples: asthma, hypertension, diabetes.

An asthmatic person should be well informed about what an asthma attack really is, the precautions to take incase it occurs or especially what can trigger such an attack. Since it involves the bronchi, the danger with an asthma attack underwater is that there is an air trap in the resurfacing phase, something which can have disastrous consequences.

High blood pressure affects a large section of the population. As far as scuba diving is concerned, the danger is in the possibility that there may be unexpected changes in blood pressure during a dive. To counter this inconvenience, it's a good idea for the person with the necessary treatment to stabilise their blood pressure levels. This also applies to people with diabetes.

The risk with diabetes is in its long term effects, especially if it is not diagnosed for a while, or for those who have sudden changes in glycaemia levels, whether too high or too low. When the person finds their own personal balance and knows their bodies well and how it reacts to different glucose levels or how to treat them, they will be able to enjoy the underwater experience and have no problems dealing with it.

In conclusion, temporary contraindications are those conditions which lead to stopping scuba diving for the time necessary to resolve the problem. For example, inflammation of primary airways, serious ear problems, but above all, pregnancy, a period in which it is absolutely forbidden to dive.

ABOUT THE AUTHOR
Specialist in Underwater and Hyperbaric Medicine, Cdr. MC. Italian Navy.

UPCOMING EVENTS

DMEX – DIVE MIDDLE EAST EXHIBITION

4-8 March – Dubai International Marine Club, Mina Seyahi

EARTH DAY MOVIE NIGHT @ VOX CINEMAS

22 April | 19:30-21:00

DIGITAL ONLINE SUBMISSION DEADLINE

30 April @ Midnight

DIGITAL ONLINE 2014 AWARDS & EXHIBITION

AWARD CEREMONY: 28 May | 19:00-22:00 | Dubai American University in Dubai in the Rotunda Gallery.
THE EXHIBITION: 29 May-7 June | 9:00-17:00 week days and 14:00-17:00 on Fridays at the Dubai American University in Dubai in the Rotunda Gallery.
* All visitors will be asked to show their ID at the main gate to get an entry pass.

OCEAN ART COMPETITION 2013

MOHAMAD ABDULLA | 1st Place Novice DSLR

A JELLYFISH REFLECTS AT THE SURFACE
A stay with Lissenung Island Resort, Papua New Guinea

Canon 5D Mark II, Canon 100mm macro, F9, 1/200th, ISO 100

This is a jellyfish with its reflection on the surface, I shot this at a dive site in the Arabian gulf, specifically Abu Dhabi. The site is the MV Ludwig.

I was diving for nudibranches at the Ludwig, which is a wreck. I finished my third dive early because it was getting dark, and I already had enough nudibranch shots. On my safety stop, I saw hundreds of jellyfish all over the place, so I went up and my buddy and I were the first divers out of the water. I told the boat captain that I will stay on the surface and he could pick me up when everyone was out of the water. I was so lucky as the water was super calm. It was getting dark so I was getting amazing reflections, the only problem was that I had to get below the surface for a meter and hold my breath so the bubbles wouldn't break the surface. Fortunately I am a pretty good freediver so I was able to manage. The gulf is pretty warm in the summer, and I didn't have a wetsuit on…no wetsuit, a sea full of jellies, it was not as fun as it sounds.

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جمعية الإمارات للغوص
Emirates Diving Association

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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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