

ADEX CHINA 2019 REPORT + ASIAN PHOTOGRAPHER OF THE YEAR 2019

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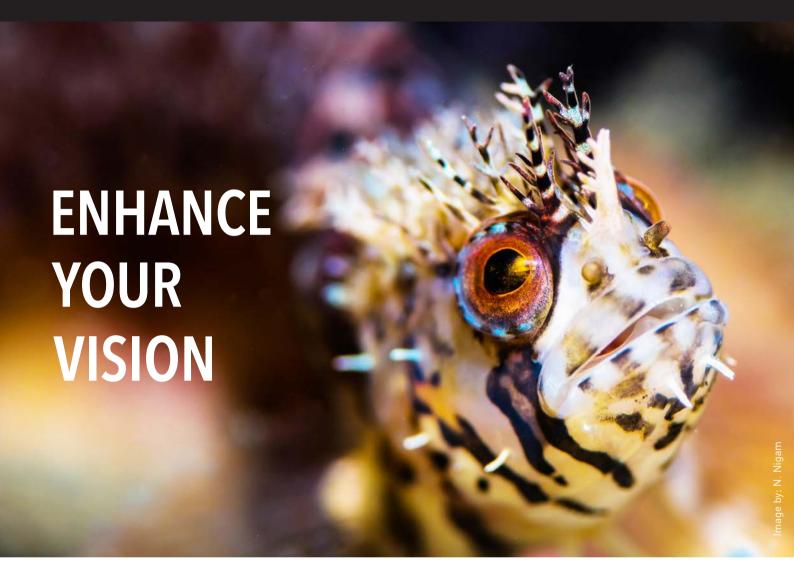
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The Canon EOS R: Capturing Underwater Wonders

By: Nirupam Nigam, biologist and underwater photography guide



Northern feather dusters (Eudistylia vancouveri) with various anemone species, Canon EOS R. f/6.3. 1/1250s. ISO640



A wolf eel (Anarrhichthys ocellatus) curiously eyes the camera, Canon EOS R, f/8, 1/160s, ISO400

This spring, I had the lucky opportunity to be one of the first photographers to take the full-frame mirrorless Canon EOS R underwater. The day after it arrived on my doorstep, I eagerly took it to my favourite dive destination – the cold waters of the Salish Sea in the Pacific Northwest of the United States. With some of the year's best tides that weekend, I braved the region's wildest currents in search of rainbow-coloured walls packed with invertebrate life. Not only did the diving deliver, the Canon EOS R managed to capture it all! For underwater photographers, the Canon EOS R stands out with a 30.3 megapixel full-frame CMOS sensor and Dual Pixel CMOS AF capability with 5,655 selectable autofocus (AF) points. After diving extensively with various cameras, I think the Canon EOS R is the most useable underwater full-frame mirrorless camera on the market.

A combination of ergonomics, build, and high-speed AF make the **Canon EOS R** an enticing option for someone looking to jump into the full-frame mirrorless world. The **Canon EOS R** also outshines its competitors in underwater ergonomics. You can customise 14 different camera controls for stills shooting. The Q menu on the **Canon EOS R** allows for easy access to almost all the important settings you need during your dive. Customisation is essential for adapting the camera to underwater housing controls, especially when it comes to choosing focusing modes, back button focus, and ISO changes. My EF lenses, used together with mount adapters, worked great with the EOS R and I can't wait to try out the new RF lenses on my next diving trip!

The highlight of the **Canon EOS R** is Dual Pixel CMOS AF, which can achieve focus in as fast as 0.05 seconds and offers effective AF tracking. The low-light AF sensitivity is spectacular, which was beneficial to me

when I photographed quick wolf eels in dark, green water. In fact, when I took the **Canon EOS R** underwater, I almost felt like I didn't need a focus light.

Most importantly, I found the underwater image quality on the Canon EOS R to be top tier. I couldn't believe the level of detail in my images when I enlarged them on my computer, especially the photos of wolf eels and colourful walls of corals. A 30.3-megapixel sensor is great for shooting tiny subjects like nudibranchs and cropping to your heart's desire in post-processing. The ISO performance in low light was great with very little noise in my images even when shooting at higher ISOs. Any noise in the image was easy to remove in postprocessing due to the fine grain size. As with most Canon cameras, the colour rendering was spot on with more striking red tones and accurate blue tones. This was especially important when I was shooting 4K video. Overall, I could not ask for better image quality, autofocus capability, and ergonomics in an underwater camera



• 30.3MP full-frame CMOS Sensor

- Up to 0.05secs autofocusing speed
- 5,655 selectable autofocus points
- Low-light sensitivity up to EV –6
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EDITOR'S NOTE



"Freediving for me is my life, work, and an opportunity to travel and meet interesting people. Freediving gives me the chance to do what I love and get great satisfaction from what I am doing" – Alexey Molchanov

There is nothing so pure as donning a simple pair of fins, snapping on a mask, and chomping down on a snorkel bit before a beach entry into a silvery turquoise lagoon. Don't get me wrong -- scuba has been a dear friend for the past 20 years and always will be. But freediving is like a first love, the one that taught us how to move through this three-dimensional world. Together we felt the wonder at the profound beauty of life, but also learned that without respect, all is lost. Freediving gifts us a liquid paradox of possessing the ultimate freedom within limits that are non-negotiable. Ecstasy and disaster living side by side. A combination that is irresistible to many who contributed to these pages.

Dive free my friends, and get back to what you truly love.



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ON THE COVER
Filipino actress Sarah Lahbati

Diego A. Garcia Senior Editor

> perfectly encapsulates the title of this photo, Allure, while freediving in Bauan, Batangas, Philippines Image ©Martin Zapanta

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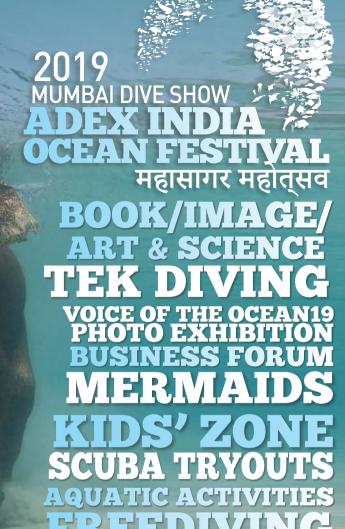
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ADEX INDIA (CELEBRITY) AMBASSADOR PARINEETI CHOPRA

ADEX AMBASSADOR FOR TEKDIVE
GUINNESS WORLD RECORD HOLDER
DEEPEST SCUBA DIVE - 332.35M (1,090.4FT)
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ADEX Shanghai 2019

The Shanghai edition of the Asia Dive Expo (ADEX) was held in conjunction with ISPO Shanghai, a multi-segment summer trade show for innovation, marketing, networking, and communication across China's sports market. The combined events featured first-class speakers from the sports industry, opinion leaders and highly respected experts taking part in discussions on developments in the sports market and beyond. The event convened domestic and international brands in six major sectors, namely fitness, running, outdoor, skiing, water sports and diving, showcasing the trends of the domestic and international sports market.







DAY ONE

The ADEX Shanghai Ocean Fiesta 2019 commenced on July 5 at the Shanghai New International Expo Center. Premiering a collection of prestigious brand names that constitute the pillars of the diving industry, ADEX was positioned to reinforce diving as a sport befitting summer to both professional and aspiring divers in China and around the region.

The Ocean Fiesta was headlined with interactive "live" displays and presentations from the powerhouse agencies of diving and mermaiding. The exhibitors included PADI, SSI, SDI, TDI, SRDI, DAN World, 7 LOB Inc, Infiniti Liveaboard, Mola Mola Liveaboard, RAJA AMPAT – Meridian Adventure Dive Resort, Sea Safari Cruises, Whale Liveaboard Thailand, Akuana Gears, Cetma Composites SRL, Leaderfins, PROBLUE International Corp, Divestar DongGuan SVS Sports Goods Co., Ltd. and MC Bunaken Dive Resort. With its specially appointed exhibitors and speakers, ADEX Shanghai aimed to reach out to aspiring divers and to inspire industry partners to help expand the diving landscape in Greater China.

DAY TWO

The second day of the show began with a spirited display of camaraderie amongst the exhibitors. As well as "live" and interactive diving demonstrations in a custom PADI tank to the graceful displays at the Olympic pool by the mermaids, the Water Stage was graced by the leading industry thought leaders from both local and international companies.

Speaking on the Water Stage, professional underwater photographer James Zhu shared his beautiful works with the audience and explained the complexities and ethics involved behind each image. Wang Yuan from Akuana shared the history of underwater military strategies, the tragic and legendary tales of underwater military heroes of many different countries and about each country's defence, underwater terrorist tactic trends, and the lack of a credible hub for training and supplies. We also heard from Andrea Salomi from CETMA Composite, one of the first to engineer high tech fins made with innovative materials and with the latest technology. In addition,

Raymond Chan from SDI, TDI, ERDI, shared his shipwreck diving efforts and offered tips on the planning of a shipwreck dive. Key points included the best timing to embark on a dive, the ideal weather, and the equipment needed. He also gave his top 10 shipwreck locations to explore.

DAY THREE

On the final day, the show's knowledge-sharing platform - ISPO Water Stage - had the pleasure of inviting Cyril Jin Xuefeng, a dive instructor from WUD, who shared the various top cave diving locations and the challenges in the preparation for overseas exploration - such as the timings, budgets, travel tickets, types of equipment and more. Cyril also raised technical issues such as dive tank logistics for deep-diving, the difference between dive tank compression standards, and the importance of gas composition for the various diving depths. He was followed by a representative from PADI who gave a presentation on the organisation's growth, the four 'Ocean Family" dive centres from the many different regions, and concluded with an intriguing short video on PADI's education and conservation work.

The inaugural edition of the ADEX Shanghai Ocean Fiesta was a resounding success, generating a huge amount of excitement around the areas of recreational diving, technical diving, freediving, underwater photography and videography, and the crowd's favourite fascination, mermaiding. ADEX would like to extend our special thanks to our exhibitors - 7 LOB Inc, Akuana Gears, Cetma Composites, DAN World, DongGuan SVS Sports Goods Co., Ltd., MC Beach Resort-Bunaken Island, Meridien Adventure Dive, Mola Mola Liveaboard, PADI, 藍鯨國際 Problue 優質 水裝備品牌, Leaderfins, Infiniti Liveaboard, Whale Liveaboard Thailand, Sea Safari Cruises, SDI TDI ERDI and SSI. We would also like to thank all our friends, sponsors, partners and other stakeholders for their support and participation in ADEX Shanghai Ocean Fiesta 2019. We look forward to a seeing you again for the 2020 edition!





































ADEX Beijing Ocean Fiesta 2019

The ADEX Beijing Ocean Fiesta focused on social responsibility efforts through the "ADEX GIVES Back" campaign, with the amount raised at the ADEX Charity Auction Gala Dinner as well as part of the proceeds from ticket sales going to China's "Left-Behind Children"



The Asia Dive Expo (ADEX) premiered in Beijing 15 year ago, and this year marked the nineth run of ADEX in Beijing. The ADEX Beijing Ocean Fiesta was held from July 12 to 14 at the in Beijing China International Exhibition Center in partnership with Enlightened Creations and Guoye Cultures.

Themed "Dedicated to a Plastic-Free Future", ADEX is not just a dive expo. Visitors of all ages can expect activities such as ocean-themed photography and art exhibits, the kids' zone, conservation forums, the book festival, film screenings, technical diving talks, mermaids, dive try-outs, and much more. The event featured worldwide diving experts, underwater photographers, diving record holders, conservationists, professors, celebrity guest speakers, and more.

As a sign of appreciation for the contributions of ADEX to Philippines Tourism, Mr. Tomasito G. Umali, Tourism Attache, Philippine Department of Tourism-Beijing office presented a Plaque of Congratulations

to Mr John Thet, CEO of Asia Dive Expo, during the Philippines network night on July 11.

On July 12, the opening ribbon cutting ceremony for ADEX Beijing Ocean Fiesta was graced by Mr. Winston Dean Almeda, First Secretary and Consul, Embassy of the Philippines, Beijing, China; Mr. Tomasito G. Umali, Tourism Attache, Philippine Department of Tourism-Beijing office; Mr Lin Fan, CEO of Enlightened Creation; Mr John Thet, CEO of Asia Dive Expo, Founder of Underwater 360, Publisher of Asian Geographic Magazines Pte Ltd, Founder of Underwater 360, Historical Diving Society Asia (HDSA), and President of Media Publishers Association Singapore (MPAS); the ADEX Ocean Ambassador and ADEX Youth Ocean Ambassador: ADEX conservation and education ambassadors and speakers: ADEX tekdiving speakers; ADEX freediving speakers; ADEX photography and videography speakers; ADEX mermaids and a merman; and the Beijing Public Safety and Welfare Foundation, who brought along 20 of China's "Left-Behind Children".



















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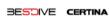
























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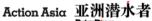


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B DIVE PHOTO GUIDE

TOTAL VISITORS 28,958

DAY	1 (12 Jul)	2 (13 Jul)	3 (14 Jul)
CONSUMER	4,350	9,015	5,457
TRADE	2,343	4,855	2,938
DAILY TOTALS	6,693	13,870	8,395

DAY ONE

THE DIVE SAFETY PANEL DISCUSSION was moderated by John Thet, CEO of ADEX, and included Lou Yan, President of PADI Greater China; Ahmed Gabr, Guinness World Record Holder of the Deepest Scuba Dive of 332.35m; Jean Claude Monachon, Vice President of International Sales and Marketing at SSI; and Wang Yi Kun, founder of Dragon Diving Group. The topics included how to reduce dive risks and organisations that have safety standards systems.

THE FREEDIVING PANEL DISCUSSION was moderated by Dada Li, ADEX Freediving Ambassador, and included Wang Aolin, ADEX Freediving Ambassador (China); Potti Lau, professional freediver; and Maggie Yang, professional freediver. The audience got to learn about their training, daily routines, dangerous situations they have overcome, and even a glimpse of their younger days.

OPENING CEREMONY

The ADEX Beijing Ocean Fiesta saw a large crowd of China divers and non-divers during the opening ceremony at the China International Exhibition Center, during the opening ceremony, a cultural-exchange performance brought by the Tourism Promotions Board Philippines, and the heartwarming introductions to the "Left-Behind Children" of China. Aside from that, headlining on the programmes for the next couple of days were both local and international industry speakers and thought leaders, and guest celebrities included Jing Chao, ADEX China Marine Public Welfare Ambassador; movie actress Mei Ting, ADEX China Ocean Ambassador; movie actor Tan Kai, ADEX China Marine Public Welfare Ambassador; Jin Tao, ADEX Ambassador; Anais Martane, ADEX China Ocean Conservation; and more.

Everyone got to witness an important milestone for Asian Diver and Scuba Diver: the launch of Mandarin versions of the magazines, a strategic partnership between Mr John Thet and Mr Zhang Jian, general manager of Beijing Science and Technology Publishing Co., Ltd.











亚洲潜水者与澳亚潜水者(中文版)
THE LAUNCH OF ASIAN DIVER AND SCUBA DIVER IN MANDARIN













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人。"北京市众安公益基金会感谢您对"胜飞梦想。 走出大京山"公益项目的支持。

人生是花、爱如花蜜、您的善學为贫困地区的孩子





ADEX BEIJING OCEAN FIESTA CHARITY BALL

The ADEX Beijing Ocean Fiesta Charity Ball was held on July 12, 7pm at Infinity Hall, Hilton Beijing, with over 200 invited VIP guests, exhibitors and speakers and hosted by Alexandra Ao and Jin Tao.

The highlights for the evening included a toast on stage for ADEX CEO Mr John Thet, ADEX Ocean Citizen Ambassador Celebrity Eric Tsang, and CEO of Enlightened Creations Mr Lin Fan; a performance by guest Ukraine head violinist Vedmedenko Olha; a song called "Ajelu" performed by the "Left-Behind Children"; a presentation of the Charity Recognition Enterprise Award by the Beijing Public

Safety & Welfare Foundation to Asian Geographic Magazines Pte. Ltd.; an award ceremony for outstanding brands that contributed to the dive industry; and an exciting lucky draw with the grand prize being an 11-day, 10-night Africa Wild Safari and Indian Ocean Itinerary worth over USD20,000 by WCG.

The event included a charity auction for items such as a 3.25m by 1.2m on-site artwork completed by the children with the Millennium

Crown International Arts Education, the Terrapene Vest by Ocean Trash Artist Kalindava worth RMB5,500, Indo Aggressor & Ombak Rindu Liveaboard trip worth RMB 20,000, limited edition XDeep Backpack worth RMB12,800 and Oil Painting and Pearl Whale Brooch by Zhu Guancheng. Working together with Beijing Public Safety & Welfare Foundation, the ADEX Beijing Ocean Fiesta 2019 donated the RMB87,500 charity auction amount raised to the "Left-Behind Children" foundation through the Beijing Public Safety & Welfare Foundation, in conjunction with the

RMB368,530 raised by the China NGO, Water Droplets (水滴公益). After their trip to the city of Beijing, the Left-Behind Children went on their first trip to the coast and realised their dream of meeting the sea for the first time, before returning to their friends in rural towns in China.





CHARITY AUCTION ITEM	PROVIDED BY	BID BY	AMOUNT RAISED
City Sea Painting 3m in length	China Left-Behind Children & Millennium Crown International Arts	Mr Fang Li	RMB30,000
10 Nights Komodo National Park Itinerary for 1 person voucher worth RMB30,000	Indo Aggressor & Ombak Biru	Mr Andy Chen	RMB20,000
ADEX 25th Anniversary Limited Edition BCD by XDEEP worth RMB12,800	Underwater 360/ ADEX	Mr Eric Tsang	RMB28,000
Terrapene Vest by Kalindava worth RMB5,500	Kalindava	Mr Yue Hong Jun	RMB2,000
Oil Painting & Pearl Whale Brooch	Zhu Guancheng	The Forbidden City Liquor Culture Co. Ltd. (Liquor Sponsor of the Charity Dinner)	RMB4,000
ADEX BEIJING OCEAN	RMB84,000		
	RMB381,485		
T	RMB465,485		

DAY TWO

ADEX CHINA YOUTH OCEAN AMBASSADOR

Wang Xing and Liu Jian Xing were crowned the ADEX China Youth Ocean Ambassadors in the inaugural hunt in Beijing. Selected students from Peking University got to present and share their passion for marine conservation to the public on the main stage. The best presenters in the live judging panel walked away with prizes including two SDI, TDI, ERDI Divemaster courses worth RMB6,888 each, CERTINA DS-Action Diver Watch C0324071105100 worth RMB6200, CERTINA PH200M Heritage Watch C0364071605000 worth RMB5,350, and an ADRECC 7-day, 6-night (1 week) camping trip to participate in a conservation project, for 1 person worth RMB4.670.

UNDERWATER PHOTOGRAPHY & VIDEOGRAPHY PANEL DISCUSSION

Moderated by ADEX Ambassador for Macro Photography William Tan, the panel discussion included ADEX Ambassador for Photography (Greater China) Yorko Summer, ADEX Ambassador for Photography (China) Sun Ping, ADEX Asian Photographer of the Year 2019 judges Nan Wang and Christian Vizl; and ADEX Ambassador for Photography Aaron Wong. The panelists discussed the subject of ethics in underwater photography, the interaction with marine creatures, comparing the trends in the past and present, and values which should be held in the everchanging underwater photography arena.

Professional photographer Christian Vizl said it best: "We are divers, we should take care of the ocean, if we don't do it, who will do it? We have set example for the world, with our images and our actions".

SINGLE-USE PLASTIC CONUNDRUM PANEL DISCUSSION

The Single-Use Plastic Conundrum in Greater China Panel Discussion on the main stage was moderated by Claire Li, a Doctor in Environmental Conservation and an SSI Mermaid Instructor. The panel included Wei Rong, President of Peking University Diving Association; Monica Chin, ADRECC Director of Education & Conservation; Fu Subin, Director of the Network Information Center of Wuzhizhu Island; Kalindava, an ocean trash artist from Indonesia; and Morgan Xia from Dive for Love. The topics discussed included the potential impact of law and governance in China regarding single-use plastic, state initiatives such as the recent roll out of categorised recycling bins in Shanghai, how individuals can identify and repurpose single-use plastic in daily life, and the alternatives to single-use plastic that are found in China and other countries.























ADEX BEIJING OCEAN FIESTA DAILY LUCKY DRAW

Held on the main stage, the daily lucky draw gave away amazing prizes such as a 3-day, 2-night Summerbay Resort Dive and Stay voucher for 1 person worth RMB4,015, Divestar Wetsuit worth RMB786, Divecica Wetsuit worth USD150, Akuana Techdive Shorts worth RMB488, three sets of Bancas Island Hopping voucher worth RMB149, SDI TDI ERDI Backpack worth RMB380, 5 sets of Ossidabile Jewellery and 3 sets of Problue 20L Dry Bag.

ADEX BEIJING OCEAN FIESTA MERMAID FIESTA

The Mermaid Fiesta was held on Saturday, July 13, at 7pm at the Superlife Gym, Beijing. This summer pool party for the diving/non-diving public and exhibitors of ADEX was an evening packed with great live music by DJ Shen Yue and DJ Darcy, an inviting pool, drinks, and of course, mermaids! It was a party of like-minded individuals and influencers.

Winners of the exciting poolside lucky draw sashayed home with Ossidabile Jewellery, a 3-day, 2-night Summer Bay Resort Dive and Stay for 1 person voucher worth RMB4,015, a 3-day, 2-night stay for 2 people at Deluxe Beachfront Accommodation with meals provided and four dives included, worth RMB4,970, Magic Jet from Aquarobotman worth RMB5,000, and an ADRECC 3-day, 2-night stay for 2 people at Ara Dinawan Island Private Resort with 4 dives worth RMB 8,250.

SuperLife GYM

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DAY THREE

MERMAID PANEL DISCUSSION

The Mermaid Panel Discussion on the multi-purpose stage was moderated by Jan Kern, International Affairs Director of Enlightened Creations, and included August Ho, ADEX Ambassador for Mermaid (China), mermaid Ann Liu, plus-size mermaid Merliah Moidu, Alan Lam from MFI, mermaid Yolanda Yeo and Corinna Davids. Course Director of SSI Mermaiding.

TECHNICAL DIVING PANEL DISCUSSION

Moderated by veteran technical diver Tan Xiao Long, the panel discussion included Guinness World Record holder Ahmed Gabr, Raymond Chan from SDI TDI, maritime historian Steven Schwankert, Edmund Yue from RAID, Gideon Liew from GUE, and Alex Santos from Philtech. They talked about advances in technology, shared interesting tales of how they adapted and executed technical diving before there were all the digital gadgets, and discussed dive safety and personal experiences in different parts of the world. With the interactive Q&A session at the end of the panel discussion, the audience benefitted greatly from the advice by the six seasoned panelists.

Ahmed Gabr, who holds the Guiness World Record for his dive to 332.35 metres, travelled from Egypt to share his experience and preparation for the record-breaking dive in the Red Sea in 2014. Making a stand for our oceans, he founded an organisation and mobilised 614 divers for the world's largest underwater clean-up. As a technical diving instructor trainer, he is backed by 20-plus years experience in sport and military diving; an ex-Special Forces officer, a graduate of the US Combat Diver course, his passion for technical diving began soon after becoming a professional dive instructor in 1996.

The main stage also saw freediving athlete Wang Ao Lin, the ADEX Ambassador of Freediving, talk about how he feels when he is freediving, the injuries he has overcome and the kind of expectations one needs to dive well and safely. In 2015, he founded "Jie Ta Freediving School". Ao Lin is also the president of China's AIDA International Freediving Association. He represented his country in the AIDA Individual Apnea Depth World Championship in the same year and set national records in three different categories.

ASIAN PHOTOGRAPHER OF THE YEAR 2019 (LIVE JUDGING)

On the final day of ADEX Beijing Ocean Fiesta 2019, the inaugural World Shootout/Adex Asian Photography of the Year "live-judging" session on the main stage commenced with its search for Asia's best underwater photo. The judging panel consisted of both local and international judges – Aaron Wong (Singapore), Christian Vizl (Mexico), Doudou (Greater China), Nan Wang (China), Yorko Summer (Greater China), and Yue Hong Jun (China).

*The winners and finalists can be found on page 20













ADEX CHINA 2019 REPORT





EVENING DINNER

The ADEX VIP Dinner was held on Sunday, July 14, at 7pm at CHUAN'er Bar 酒街串巷 at No.107, 1st floor, 2 Qianmen Street, Dongcheng, Beijing. This was a cosy evening programme for the organising team of ADEX from China and Singapore to celebrate and appreciate the successful opening and closing of the ADEX Beijing Ocean Fiesta before everyone bade their farewells. The VIP attendees included Yorko Summer, ADEX Ambassador for Photography (Greater China); Christian Vizl, Asian Photography of the Year 2019 judge; August Ho, ADEX Ambassador for Mermaids; Ahmed Gabr, Guinness World Record holder; Alexandra Ao; Andrew Lim; Anne Liu; Kalindava; and Tan Xiao Long.



中国,北京市前街道前门大街 2号一层107号

No.107, 1st floor, 2 Qianmen Street, Dongcheng, Beijing, China



CHUAN'erBar 漁街串巷







Winners and Finalists

On Sunday, July 14, the winners of the "World Shootout / ADEX -Asian Photographer of the Year 2019" Underwater Photography Competition were announced at the ADEX Beijing Ocean Fiesta 2019! The inaugural run by the two underwater photography competition organising heavyweights, World ShootOut and Asia Dive Expo. received hundreds of entries from all across Asia including Southeast Asia, Greater China, India, Maldives, the Middle East, and more. The "live judging" session took place at ADEX Beijing Ocean Fiesta Main Stage by a panel of both local and international judges - Aaron Wong (Singapore), Christian Vizl (Mexico), Doudou (Greater China), Nan Wang (China), Yorko Summer (Greater China) and Yue Hong Jun (China). Here, we present the winners, the "Top 5" finalists and the "Most-Voted Online Photo of the Year" winner and finalists.







Wins prizes worth more than USD15,000:

- The Andromeda Statuette Trophy
- 1 x SEACAM Underwater Camera Housing (worth RMB69,000)
- 1 x 10 Nights Komodo National Park Itinerary for 1 Person (worth RMB29,300))

GRAND PRIZE







TOP 5 FINALISTS

1 x 4 Days, 3 Nights Summer Bay Resort Dive & Stay for 1 Person (worth RMB5,300)







TOP 5 FINALISTS

1 x 4 Days, 3 Nights Summer Bay Resort Dive & Stay for 1 Person (worth RMB5,300)







3rd Marco Steiner | Maldives

4th Marco Chang | Taiwan

ASIAN PHOTOGRAPHER OF THE YEAR 2019



2nd Simon Lorenz | Hong Kong



5th Yen Wen Chih | Taiwan



MOST-VOTED ONLINE PHOTO OF THE YEAR 2019 FINALISTS







Zaflee Bin Md Suibarek | Malaysia



Pong Wing Atim Lau | Hong Kong



Yen Wen Chih | Taiwan

An online voting competition was held from July 1 to 11, 2019, showcasing the "Top 5" entries judged online by the very same panel of both local and

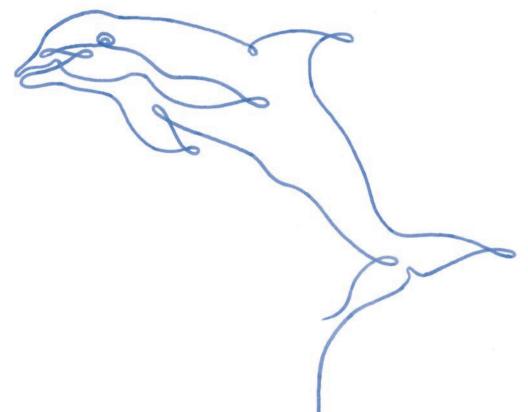
international Judges.
On Sunday, July 14, the winner of the "Most-Voted Online Photo of the Year 2019" was announced at the ADEX Beijing Ocean Festival after the live-judging session. World Shootout Producer David Pilosof was there to present the winner of the "Most-Voted Online" entry, Ms Elianne Dipp from Indonesia, with a cheque for USD500.





WINNER Elianne Dipp | Indonesia





cinema of dreams



www.seacam.com



VOICE OF THE OCEAN SHOT ON SNORKEL

The annual Voice of the Ocean Competition winners were announced at ADEX 2019 in Singapore. But that doesn't mean we can't keep the celebrations going! Here, we present a selection of images that qualified for the final round at ADEX, with a twist. Each of these stunning shots was taken while freediving. No tanks required!

BLUEBOTTLE SUNRISE

(Sydney, Australia)

"Thousands of bluebottle jellyfish regularly wash up all along the Sydney coastline during summer. They collect in shallow rock pools that offer perfect shooting conditions during sunrise. With their electric blue-coloured bodies and yellow-tipped tentacles, they contrast beautifully against the darkwater background. But be careful! Those long, tangling tentacles can deliver a nasty sting and in some severe cases can even cause an anaphylactic reaction. To avoid injury while shooting, I wore a full-length wetsuit and hood as well as having my buddy keeping an eye out for any other stray stingers, letting me concentrate on photographing the mesmerising movements of this marine hydrozoan."

Grant Thomas | ScotlandFinalist of V00 2019 Photo of the Year









▼SPRING MORNING

(Florida, USA)

"Early morning at Three Sisters Spring, Florida. The sun was just rising above the horizon and I dived down into the freshwater spring. Lying on my back gazing at the sky I watched my friend swim overhead. It was such a relaxing and peaceful moment I almost forgot I was holding my breath."

Grant Thomas | ScotlandFinalist of V00 Singapore 2019 Photo of the Year

DUCKING FOR FOOD

(Loch Lomond, Scotland)

"It was midday, the sun high in the sky, as I waded slowly into the shallow water and waited patiently for the swans to become comfortable with my presence. When they began to search for food below the waterline I just had to wait for that perfect moment."

Grant Thomas | ScotlandFinalist of V00 Singapore 2019 Photo of the Year

BREATHE

(Maui, Hawaii)

"As turtles are air breathing reptiles, they need to come to the surface to respire. To capture this over-under, I waited patiently at the surface while the turtle rested below me and when it began to rise, I approached very slowly and waited to hit the shutter at the exact moment that it stuck its head out for a deep breath. As turtles are legally protected in Hawaii, they are accustomed to people and are found in healthy numbers."

Renee Capozzola | USA Finalist of V00 Singapore 2019 Photo of the Year





GIANT FACE

(Canary Islands, Spain)

"Humpback whales visit the Canary Islands all year round, but in this case, this female animal gave me the opportunity to be with her for nearly one hour."

Eduardo Acevedo | Spain Finalist of V00 Singapore 2019 Photo of the Year



HEAT RUN WHALES

(Tonga)

"Who doesn't love whales and dolphins? But being smack bang in the middle of several humpback whales and a pod of rough-toothed dolphins is the epitome of experiencing Nature in all its raw glory. I have been visiting these gentle giants for 17 years, and with over 1,000 days in the water, I can only feel privileged and humbled to have spent a good portion of my life documenting these majestic creatures. I hope you get the chance to share these experiences with me one day."

Scott Portelli | Australia Finalist of V00 Singapore 2019 Photo of the Year

FEEDING TIME

(Taupo, New Zealand)

"Lurking in the cold water streams of New Zealand are hundreds of freshwater trout. At first they are very timid but with some patience and perseverance I was able to get close enough to photograph them feeding."

Grant Thomas | ScotlandFinalist of V00 Singapore 2019 Photo of the Year

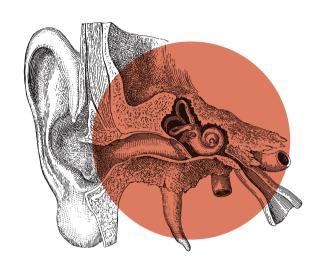






FEATURE THE EVOLUTION OF FREEDIVING

With the constant innovation of diving gear enabling us to go deeper and longer underwater, it's easy to forget that diving began as the simple act of holding your breath and kicking vour leas. Indeed, with the advent of modern underwater breathing apparatus, this most primitive form of diving is now typically differentiated from its more mainstream cousin with the moniker "freediving". But breath-hold diving in humans began more than 8,000 years ago, evolving through the centuries to its presentday status. And now, freediving is constantly taking on new extremes that have risen in popularity especially over the past three decades.







Greek skin divers with scythe, collecting net and skandalopetra www.greekerthanthegreeks.com



ANCIENT TIMES

The first recorded evidence of freediving humans can be traced back more than 7,000 years to the Chinchorro¹, an ancient people who lived along the coast of the Atacama Desert in what is present-day northern Chile and southern Peru. In a study of Chinchorro mummies, archaeologists discovered that the bones inside their ears had started to grow across the ear canal's opening to protect the eardrums from recurrent exposure to water. It was clearly exostosis, a condition that afflicts people whose

heads have been frequently dunked underwater. Exostosis is a common condition among people who surf, dive and kayak. The Chinchorro were people who dived for seafood. Shell midden fossils and bone chemistry tests on the mummies have proven that their diet consisted of 90 percent seafood. Besides the Chinchorro in South America, seashell fossils found at the coast of the Baltic Sea also revealed ancient people living approximately 10,000 years ago who dived for clams.

It was clearly exostosis, a condition that afflicts people whose heads have been frequently dunked underwater

TOP: An illustration of exostosis,
or surfer's ear, where the constant diving
in water causes structural changes
in the inner ear to occur
ABOVE: Historical wooden shipwreck
reconstruction on land in Urla,
Izmir, Turkey.

¹ Arriaza, Bernardo T. Beyond Death: The Chinchorro Mummies of Ancient Chile. Washington: Smithsonian Institution, 1995. Print.





EGYPT, GREECE, MESOPOTAMIA & PERSIA

There is plenty of archaeological evidence of diving in Mesopotamia (West Asia - present day Irag, Kuwait, Saudi Arabia), dating back to 4,500 BC and in ancient Egypt around 3,200 BC. The Greeks have been diving for more than 4,000 years. Artefacts and scripts from the Minoan civilisation, which flourished from 2.700 BC to 1450 BC on Crete and other Aegean islands, include figures of seashells as well as colours produced by seashells in Minoan ceramic art. The Greek sponge trade can also be traced as far back as Plato and Homer, who mentioned the use of sponges for bathing in their writings. The Greeks would dive for sponges at Kalymnos island, using a skandalopetra (the Greek word for stone), like granite or marble weighing eight to 15 kilograms. Carrying this weight, divers descended quickly to as much as 30 metres underwater to collect sponges. There is no exact date of when the Greeks started the sponge trade but Plato would have been 40 years of age around 388 BC when he mentioned the use of sponges in his writings.

Divers have also been used by the Greeks in war. According to Thucydides, the famous Athenian general and historian who recounted the Peloponnesian War² (431–404 BC) between the Delian League led by Athens and the Peloponnesian League led by Sparta until 411 BC, divers were used to scout for and dismantle underwater barricades set up to defend against invading ships. The Persians also recorded using divers in warfare. Having conquered Phoenicia (now Lebanon) in 539 BC, King Cyrus the Great of the Archaemenid Empire used divers to cut the anchor cables of Alexander the Great's ships during the Siege of Tyre in 332 BC.



ABOVE: A skandalopetra, a centuries-old
Greek sponge diver's weight
TOP LEFT: Sponges harvested from the
Aegean: Plato's writing mentioned sponges
being used in Greek bathhouses
TOP RIGHT: In Sri Lanka, temporary huts were
built along the coast to store the pearls
before they were cleaned and sorted
IMAGE: Professor N Athiyaman

SRI LANKA (CEYLON)

For thousands of years, the Gulf of Mannar, separating India and Sri Lanka, was known for the pearls and chanks (large spiral shells) harvested from the waters off Mannar island by local freedivers. According to the Mahawamsa, the historical chronicle of Sri Lanka, King Vijaya landed in Sri Lanka in the fifth century BC and sent a gift of a shell pearl worth twice a hundred thousand pieces to the Pandu King upon taking the hand of his daughter. The ancient Greeks, specifically Megasthenes, the Greek ambassador to the Mauryan royal court in India, also wrote in the third century BC about the brilliance of the pearls from the island of the Taprobane in Sri Lanka. In ancient Greece, Sri Lanka was known as "Palaesimoundu".

Literature from the Sangam-era (third century BC to fourth century AD) such as the *Agananuru*, an anthology collection of classical Tamil poetic work dated around the first and second century BC, talked about a community named Parathavar which fished but also dived for pearls and chanks. Arab traders and divers from the Persian Gulf also entered into the pearl fishery trade in Sri Lanka between the seventh and 13th century AD.

Research shows that the divers would go out to sea in crews as large as 23 in a boat. On each boat would be a tindal, or steersman; a saman oattee, who was in charge of the boat; a thody, who was tasked with bailing out water in addition to cleaning the boat; 10 divers including the adappanar, or lead diver;

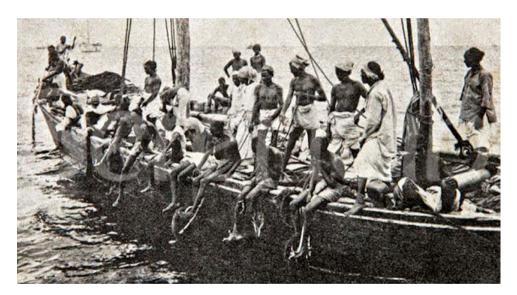
²Thucydides (2009) [431 BCE]. History of the Peloponnesian War. Translated by Crawley, Richard.

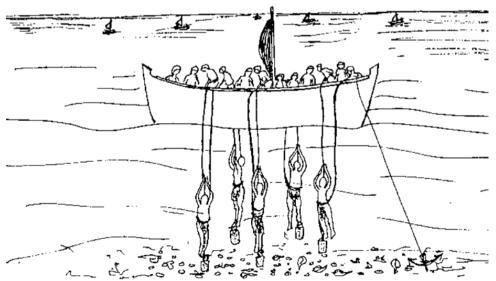
and 10 *munducks*, or operational assistants. They would pull up the oysters, the stone counterweights and the divers themselves from the seabed and back onto the boat

The boats would go out late at night around midnight. The tindals would have started getting ready to hoist the sails more than an hour or so before with the adappanar hoisting a light at the masthead as a signal to set off. The divers in the boat would then get ready in the early hours of the morning by attaching the safety ropes around their waists. Stones would also be tied to ropes to act as counterweights for the divers to do a fast descent to the seabed. As the ropes with the weights are released into the water, the diver would take

a deep breath and descend rapidly by stepping on the weights. They would then start collecting oysters into the nets around their waists the moment they reached the seabed, while the weights are pulled up into the boat. After about a minute, the diver would tug on the rope tied to him to signal the completion of his task, upon which he would be pulled upwards with the oysters he collected.

BELOW: Divers sit ready to make the plunge for pearls along the Gulf of Mannar BOTTOM: Weighed down by stones, divers descend rapidly while their assistants wait to pull the stones back up IMAGE: Professor N Athiyaman





AMA: JAPAN The ama (海人) are coastal people in Japan who make their living diving to depths of up to 25 metres to harvest abalone, turban snails, ovsters and pearls. Many ancient Japanese references³ have stated that the ama have existed for at least 2.000 years. One of the oldest references which refer to the ama is the Gishi-Wajin-Den [魏志倭人伝], one of the oldest historical texts in Japan, which is believed to have been published in 268 BC. Some of the oldest archaeological evidence from Japan has shown that the Japanese have always depended on seabed resources. According to an ancient Chinese chronicle containing sporadic references to Japan, the northwestern part of what is now Kyushu has a lack of arable land to enable its people to survive on agriculture, which has compelled them to depend on the sea to barter for staples such as rice. According to Minoru Nukada from the Department of Health and Physical Education at Toho University⁴, male and female ama engage in different activities. Male ama (海士) usually catch fish, either by hand or with a spear, whereas the female ama (海女) will dive to the bottom of the seabed to collect seaweed and shellfish. Through time, the men engaged in

farming harvest. Usually females, the ama traditionally dive in only a fundoshi (loincloth) for ease of movement with only a tenugui (bandanna) covering their hair. These headscarves are sometimes adorned with symbols in order to bring luck to the diver and ward off evil. They also use a safety rope attached to a wooden tub or barrel that serves as a buoy to rest on between dives. The barrel is also used to hold their catch. Their most important tool, however, was the tegane or kaigane – a spatula-like tool used to pry out abalone from between the rocks on the seabed. In the early 1900s, goggles were introduced and adopted by the ama. In the decades after World War II, the ama started wearing a white sheer garb for modesty, while others

offshore fishing or became sailors on ships while the female ama stayed at home and dived to supplement the

FEATURE THE EVOLUTION OF FREEDIVING





started wearing rubber wetsuits in the 1960s.

There are various theories about why the *ama* are mostly female. One is that the Japanese consider women to be more biologically capable of withstanding cold due to the distribution of fat in their bodies. They are also believed to be more adept at holding their breath. The *ama* are trained as early as 12 or 13 years by elders. At this stage of their training, they are known as Koisodo or Cachido and dive shallow depths of only two to four metres. After

they have been trained a few years (15 to 20 years old), they graduate to being Nakisodo, Okazuki or Funedo and are allowed to dive to four to seven metres in groups from a boat controlled by one or two boatmen, who also act as watchmen for their safety. The Koisodo and the Nakaisodo both use the wooden tub as a buoy. A fully trained *ama* is known as an Ooisodo, Okiama or Ookazuki. Usually more than 20 years old, the Ooisodo can dive to a depth of 10 to 25 metres and usually operate alone with a

boatman for assistance. They use counterweights like a lead belt or a counterweight (haikara) connected to the boat with a rope and a pulley for a fast descent and are then pulled up quickly after harvesting the shellfish.

TOP: Ama divers
preparing to go to sea with
their wooden barrels in tow
ABOVE: Ama divers
use a wooden barrel
as a float

³Rahn, H.; Yokoyama, T. (1965). Physiology of Breath-Hold Diving and the Ama of Japan. United States: National Academy of Sciences - National Research Council. p. 369. ISBN 0-309-01341-0. Retrieved 2008-04-25.

HAE-NYEO: KOREA

Like the ama of Japan, the hae-nyeo [해녀; 海女] or jam-nyeo are women freedivers who make their living from diving and harvesting shellfish and seaweed from the seabed. They are found in the southern part of the Korean Peninsula, especially Jeju Island. Although the exact beginning of freediving in Korea is not known, Korean history experts agree that Jeju was the place where the hae-nyeo were first found. Historical records reveal that as early as 434 AD, pearls were found in the Shilla Kingdom. It is not known when the men dropped out of the diving work. The only explanation we have is the physiological advantage that women have - greater subcutaneous fat and a perceived ability to withstand the cold better. Like their Japanese counterparts, the *hae-nyeo* start learning to freedive in shallow waters at age 11 or 12 and as their skill level progresses, they graduate to an advanced level when they turn 17 or 18.

The hae-nyeo wear black swimming trunks and white cotton jackets. Diving goggles were introduced during the 1930s, with eye glasses used for almost two decades before diving face masks became available. They also use hollowed-out gourds around 30 centimetres in size as floats.









THIS PAGE: Jeju Island's hae-nyeo have collected seaweed, shellfish and other seafood for hundreds of years

SAMA-BAJAU: SOUTHEAST ASIA

All freedivers are familiar with the "mammalian dive response" – when your heart slows down, blood vessels constrict and your spleen contracts because your bod y is trying to keep you alive while you are holding your breath underwater. The Sama-Bajau are a group of sea nomads of Austronesian ethnic group who live off the sea in waters around the Philippines, Malaysia, Indonesia and Borneo. A study about human hypoxia tolerance published by the journal Cell⁵ has revealed that a genetic DNA mutation has given the Sama-Bajau larger spleens, allowing them to freedive for shellfish at depths of up to 60 metres, for as long as 13 minutes.

In the human body, the spleen recycles red blood cells and helps to support the immune system. After previous studies revealed that diving mammals like elephant seals, otters and whales have disproportionately large spleens. Melissa Llardo, the author of the hypoxia study in Cell was eager to find out if the same was true in humans. Her studies revealed that the median size of the spleen of a Sama-Bajau was 50 percent larger than that of the Saluan people, a related group on the Indonesian mainland. The Sama-Bajau were also found to have a gene called PDE10A (which the Saluan did not have) that is thought to control a certain thyroid hormone that in mice is known to be linked to spleen size.

TOP RIGHT:

Bajau speardivers are colloquially referred to as "sea gypsies"

BOTTOM RIGHT:

Bajau boy swimming in shallow water







⁵Cell journal at www.cell.com/cell/fulltext/S0092-8674%2818%2930386-6

THE LEGEND OF 1913

The legendary retrieval of the missing anchor of the Italian navy ship, Reggina Margherita, on July 16, 1913 by a Greek sponge diver from about 88 metres (290 feet) is often cited as the first occurrence of modern freediving. While the exact name of this Greek sponge diver has varied from Stotti Georghios, Stathis Hatzis, Stathis Chatzi to Haggi Statti and Chatzistathis, what is not in dispute was his pulmonary emphysema, his perforated eardrum from years of diving without proper equalisation and the fact that he tied a safety rope to his waist and proceeded to descend quickly to the seabed using the skandalopetra method. He is also consistently described as being a man of average height (1.7 metres), weight (65 kilograms) and age (35 years old). And it is unanimously agreed that he successfully retrieved the anchor by freediving and was rewarded for his efforts with £5 and the lifelong permission to fish with dynamite.





RIGHT: Freediver at the bottom of the line looking at the corals and doing a breath-hold OPPOSITE PAGE: Two freedivers ascending from the depths

FREEDIVING TOOLS TAKE SHAPE

1927

Jacques O'Marchal invented the first diving face mask that enclosed the nose.



1933

Frenchman Louis de Corlieu patented fins you could wear on your feet. Calling them "swimming propellers" they were later massproduced by Owen Churchill, an American.



1938

Maxime Forjot improved upon O'Marchal's design by using a compressible rubber pouch to cover the wearer's nose, thus enabling divers to pinch their nostrils shut to make it easier to equalise the pressure in the ears.



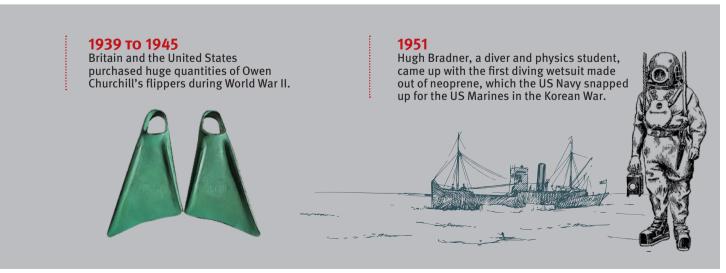


COMPETITIVE FREEDIVING BEGINS

Like the one-minute mile, the 30-metre (100ft) freediving mark was an important milestone that kickstarted the modern competitive freediving movement. Although scientists had openly predicted pressure-crushing death at that depth, in 1949 Raimondo Bucher, an Italian airforce captain and an avid spearfisher born in Hungary, officially became the first man to dive to a depth of 30 metres. Using a large rock as a counterweight, Bucher dived to the bottom of the sea at Naples without a breathing apparatus. He was met at that target depth by Ennio Falco, a fellow Italian diver, who had staked 50,000 lire against him completing the feat. Bucher won the 50,000 lire but Falco would take his record two years later.

THE ITALIAN JOB

Bucher's freediving record fired up the competitive freedivingscene in Italy and the next two decades saw the Italians dominate the record books with legends like Alberto Novelli and Enzo Maiorca spearheading the sport. Together with Brazilian Americo Santarelli (who retired in 1963) and later Jacques Maol, the famous French freediver who used yoga techniques and meditation to calm his body, records were taken to ever greater depths.





Despite the fears of scientists who believed that the high pressure at great depths would collapse human lungs, Enzo Maiorca broke the 50 metre barrier in 1962 and would go on to achieve 17 world records. Mayol would achieve 11 world records and was the first freediver to go past 100 metres. Maiorca and Mayol's rivalry was immortalised in Luc Besson's 1988 film, *The Big Blue*, a fictionalised take on their rivalry.

WOMEN FREEDIVING

In the 1960s, female freedivers such as Gilliana Treleani (Italy) and Evelyn Patterson (Great Britain) made history by diving deeper than 30 metres. Treleani achieved the mark of 35 metres in 1965. Constant Weight Apnea (CWT), one of the disciplines of freediving recognised by the International Association for the Development of Apnea (AIDA), was pioneered by Francesca Borra and Hedy Roessler, both from Italy, in 1978. CWT is a freediving discipline whereby a freediver descends and ascends with the help of their fins or monofin and/or their arms without pulling on the rope or changing their

ballast. Only a single hold of the rope, either to stop the descent or start the ascent, is allowed. During the 1980s, Enzo Maioca's two daughters, Patricia and Rossana also set records, diving to 70 metres and 80 metres, respectively. But it was Angela Bandini of Italy who would shock the freediving community in 1989 by becoming the first human to freedive to 107 metres underwater, breaking Mayol's world record by two metres.

MODERN FREEDIVING IN USA

One of the pioneers of freediving in the United States is Robert Croft, a US Navy diving instructor who taught personnel how to escape from a stricken submarine. Croft could hold his breath for more than six minutes and was studied by US Navy scientists for signs of "blood shift". Croft set three depth records in a one-anda-half-year period and in 1967, he overcame what scientists believed to be the human physiological depth limit for freediving by becoming the first person to dive deeper than 64 metres. Croft also developed the Glossopharyngeal Breathing Technique, a technique of forcing

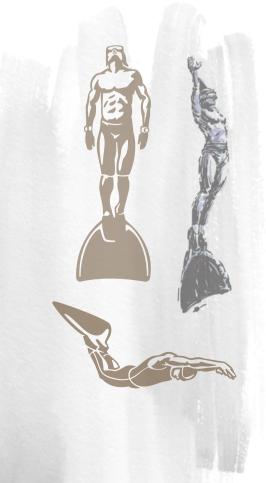
more air into your lungs before a dive, called lung packing. He would go on to become the first freediver to dive beyond 70 metres by achieving a freediving depth of 73 metres before retiring from competitive freediving in 1968.

The flagbearer for US freediving after Croft is Tanya Streeter. Streeter reached 113 metres with a No Limit dive in 1998. She broke the world record surpassing the men's apnea record, with a No Limit dive of 160 metres in 2003, and a Variable Weight record, of 122 metres that stood for seven years.

NO LIMIT FREEDIVING

With the retirement of Mayol and Maiorca, a new freediving rilvary was born with Italian Umberto Pelizzari and Cuban Francisco Rodriguez (better known as Pipin Ferreras), both appearing on the scene around 1990. New freediving disciplines emerged such as Constant Weight Apnea and Variable Weight Apnea – a discipline where the freediver descends with the help of a counterweight and ascends using his own strength, either by pulling or not pulling a rope.





The traditional form of competitive freediving, i.e., diving as deep as possible on one breath, going down with weights and coming up with a buoyancy bag, was renamed No Limit. Pelizzari and Pipin pushed No Limit Apnea to new depths, swapping records going to 110, 120 and 130 metres and beyond. The current No Limit world record holder is Herbert Nitsch. who dived to 253.2 metres on June 6, 2012, in Santorini, Greece. The dive, which was not accredited by AIDA. resulted in a serious dive injury due to severe decompression sickness. The Austrian made a partial recovery and still deep freedives.

THE FOUNDING OF AIDA

Freediving continued to grow and develop internationally in the 1980s and 90s and in 1992, AIDA was founded by Frenchmen Roland Specker, Loic Leferme and Claude Chapuis in Nice, France, with Specker serving as its first president. Set up to organise clinics to grow the sport of competitive freediving, the International Association for Development of Apnea, aka AIDA, isthe worldwide body responsible for keeping the records and rules of competitive

The traditional form of competitive freediving, i.e., diving as deep as possible on one breath, going down with weights and coming up with a buoyancy bag, was renamed No Limit

OPPOSITE PAGE: A female freediver glides over the sandy sea bottom ABOVE: Two freedivers play with bubbles near the rope

freediving events worldwide. AIDA establishes the safety standards and the ratification of official freediving world record attempts and freediving education. AIDA International is also the parent organisation for national clubs of the same name.

Besides Constant Weight, Variable Weight and No Limit Apnea, another discipline of freediving that has captured the public's imagination is Static Apnea, which measures how long a person can hold their breath (apnea) without swimming any distance. The current record for Static Apnea is held by Serbian Branko Petrović, who held his breath for 11 minutes and 54 seconds on October 7, 2014.





JUST ONE BREATH

The exhilaration, excitement and utter freedom of underwater exploration and competition without the hindrances of modern scuba. These athletes share what motivates them to pursue the depths as only a freediver can By: various contributors

Competitive freedivers are incredibly disciplined athletes that take their sport very seriously IMAGE: Andrey Matveenko

FREEDIVING RECORDS (ASIA)

AIDA - International Association for the Development of Apnea

Static Apnea (STA)
Dynamic With Fins (DYN)
Dynamic With Bifins (DYNB)
Dynamic Without Fins (DNF)
Constant Weight (CWT)
Constant Weight With Bifins (CWTB)
Constant Weight Without Fins (CNF)
Free Immersion (FIM)
Variable Weight (VWT)
No Limit (NLT)

AIDA (Afghanistan / Women)

CWT Constant Weight ANNA MATREI [27 metres, 9/07/16, Cooldown 2016]

AIDA (Afghanistan / Men)

STA Static Apnea ALEKSEJ JUSCENKO (05:46, 13/02/10, Riga Freediving Cup 2010)

DYN Dynamic with Fins ALEKSEJ JUSCENKO (141 metres, 13/02/10, Riga Freediving Cup 2010)

DYNB Dynamic With Bifins ISHAQ ALFARSI [133 metres, 12/04/19, Kingdom Pool Championship Jeddah 2019]

DNF Dynamic Without Fins ALEKSEJ JUSCENKO (105 metres, 21/08/09, 5th AIDA Individual Pool World Championship 2009)

CWT Constant Weight ALEKSEJ JUSCENKO (45 metres, 24/10/09 The Dahab Rubber Festival Competition 2009)

CNF Constant Weight Without Fins ISHAQ ALFARSI [35 metres, 27/08/18, Red C Cup 11th Edition 2018]

FIM Free Immersion ISHAQ ALFARSI (50 metres, 30/08/18, Red C Cup 11th Edition 2018)





AIDA (Australia / Women)

STA Static Apnea JODY FISHER (06:09, 7/10/11, World Championship AIDA 2011 Indoor Event)

DYN Dynamic With Fins AMBER BOURKE [200 metres, 12/10/13, Curtis Coast Freedive Challenge 2013]

DYNB Dynamic With Bifins AMBER BOURKE [169 metres, 31/03/19, AFA Pool Nationals 2019] DNF Dynamic Without Fins AMBER BOURKE [164 metres, 21/06/13, Individual AIDA Pool World Championships 2013]

CWT Constant Weight CHRISTINA SAENZ DE SANTAMARIA (80 metres, 20/05/14, Caribbean Cup 2014)

CNF Constant Weight Without Fins AMBER BOURKE (68 metres, 19/08/17, Caribbean Cup 2017)

FIM Free Immersion CHRISTINA SAENZ DE SANTAMARIA (78 metres, 25/05/14, Caribbean Cup 2014)





AIDA (Australia / Men)

STA Static Apnea ANTONY JUDGE [07:15, 9/09/09, Sydney Freedivers Club Competition 2009]

DYN Dynamic With Fins TANC SADE [218 metres, 11/11/12, Southern California Apnea Series 2012]

DYNB Dynamic With Bifins CHRIS ELLEM (174 metres, 23/06/19, Freediving Gold Coast Club Dynamic Mini Competition 2019)

DNF Dynamic Without Fins LEIGH WOOLLEY (184 metres, 26/11/15, Pan Pacific Championship 2015)

CWT Constant Weight WALTER STEYN [106 metres, 17/04/11, Vertical Blue 2011]

CWTB Constant Weight With Bifins DAVID MULHERON (71 metres, 24/04/19, Xibalba 2019)

CNF Constant Weight Without Fins WALTER STEYN (74 metres, 17/04/11, Vertical Blue 2011)

FIM Free Immersion ADAM STERN [99 metres, 24/07/18, Vertical Blue 2018]



AIDA (Bahrain / Men)

STA Static Apnea ALI ALORIFI (04:19, 29/08/19, Red C Cup 11th Edition 2019)

CWT Constant Weight ALI ALORIFI [40 metres, 28/08/18, Red C Cup 11th Edition 2018]

CNF Constant Without Fins ALI ALORIFI [25 metres, 27/08/18, Red C Cup 11th Edition 2018]

FIM Free Immersion ALI ALORIFI (45 metres, 30/08/18, Red C Cup 11th Editition 2018)



AIDA (Brunei / Men)

CWT Constant Weight HANEEF HS (33 metres, 3/11/2018, Sabang International Freediving Competition 2018)

FIM Free Immersion HANEEF HS (30 metres, 5/11/18, Sabang International Freediving Competition 2018)

AIDA (Hong Kong / Women)

STA Static Apnea TRACY LAU [04:40, 13/10/18, ID: Apnea Competition 2018]

DYN Dynamic With Fins TRACY LAU (107 metres, 12/10/2018, ID: Apnea Competition 2018)

DNF Dynamic Without Fins MANON KO (58 metres, 14/10/18, Hong Kong Freediving Competition 2018)

CWT Constant Weight TRACY LAU (44 metres, 8/06/18, Asian Freediving Cup 2018)

CWTB Constant Weight With Bifins TRACY LAU [48 metres,10/05/2019, SuperHOME Cup Freediving Competition 2019]

CNF Constant Weight Without Fins LO KA YAN (31 metres, 8/11/18, Sabang International Freediving Competition 2018)

FIM Free Immersion TRACY LAU (50 metres, 24/08/18, SuperHOME Depth Challenge 2018)





AIDA (Hong Kong / Men)

STA Static Apnea KEN TONG KIM SANG (04:27, 11/10/15, 2nd Hong Kong Freediving Competition 2015)

DYN Dynamic With Fins ANDREW YIU (106 metres, 14/10/18, Hong Kong Freediving Competition 2018)

DNF Dynamic Without Fins STEVEN LAU (82.7 metres, 22/10/17, 3rd Hong Kong Freediving Competition 2017)

CWT Constant Weight CHRIS CHEUNG [94 metres, 24/08/18, SuperHOME Depth Challenge 2018]

CWTB Constant Weight With Bifins CHRIS CHEUNG [71 metres, 12/05/19, SuperHOME Cup Freediving Competition 2019]

CNF Constant Weight Without Fins YIP HIU FAAT (45 metres, 12/05/19, SuperHOME Cup Freediving Competition 2019)

FIM Free Immersion LEO LEUNG TSZ WAI (75 metres, 09/06/18, Asian Freediving Cup 2018)

AIDA (Israel / Women)

STA Static Apnea ERI RUBIN (05:38, 01/02/08, FDI – Free Diving International 2008)

DYN Dynamic With Fins LIZA YAKUBAK (100 metres, 23/05/12, Israeli National Pool Competition 2012)

DNF Dynamic Without Fins BEBE ZACHOR [83 metres, 23/5/12, Israeli National Pool Competition 2012]

CWT Constant Weight VERED DEKEL [51 metres, 24/09/2016 Free2be Israeli National Pool Championship)

CNF Constant Weight Without Fins OFRI ORGAD (30 metres, 31/08/18, Free2be Depth Mini Comp 2018)

FIM Free Immersion RONI GOHAR [50 metres, 20/10/18, Infinity Depth Games 2018]

AIDA (Israel / Men)

STA Static Apnea NIR FOX (06:27, 23/05/12, Israeli National Pool Competition 2012)

DYN Dynamic With Fins ALON RIVKIND (200 metres, 20/04/18, Free2be Pool Competition 2018)

DYNB Dynamic With Bifins DAVID PAIS (150 metres, 6/04/19, Free2be Israeli National Pool Championship 2019)

DNF Dynamic Without Fins ALEX GEYZNER (129 metres, 5/04/19, Free2be Israeli National Pool Championship 2019) CWT Constant Weight ALON RIVKIND (87 metres, 11/09/15, AIDA Depth World Championships 2015)

CWTB Constant Weight With Bifins ARIEL KEDMI (73 metres, 29/05/19, Dahab Apnea Spring Camp 2019)

CNF Constant Weight Without Fins YARON HOORY (61 metres, 27/04/14, Sunnto Vertical Blue 2014)

FIM Free Immersion YARON HOORY (82 metres, 9/11/213, Vertical Blue 2013)





AIDA (Jordan / Men)

STA Static Apnea AMRO DABASH 04:39, 19/06/15, Individual AIDA Pool World Championships – Belgrade 2015)

DYN Dynamic With Fins AMRO DABASH (150 metres, 19/06/15, Individual AIDA Pool World Championships – Belgrade 2015)

DNF Dynamic Without Fins AMRO DABASH (81 metres, 16/06/2016, Dubai Mini Comp)

AIDA (Kuwait / Men)

STA Static Apnea HASAN SHARRAH [06:50, 23/03/19, Jeddah Static Competition Vol.02, 2019]

DYN Dynamic With Fins ABDULLAH AL OMRAN (101 metres, 31/07/18, Dahab Apnea 2018)

DNF Dynamic Without Fins ABDULLAH AL OMRAN (73 metres, 31/07/18, Dahab Apnea 2018)

CWT Constant Weight AHMAD ABBAS (65 metres, 5/11/18, Blue Hole Mini Competition 2018)

CNF Constant Weight Without Fins YAQUOP BIN-JABAL [45 metres, 11/05/15, RedCoup 2015]

FIM Free Immersion ABDULRAHMAN ALRASHIDI (66 metres, 23/10/18, Red C Cup 12th Edition 2018)

AIDA (Lebanon / Women)

STA Static Apnea SUZANA AL HAYEK [04:00, 23/03/19, Jeddah Static Competition Vol.02, 2019]

AIDA (Lebanon / Men)

STA Static Apnea MARWAN HARIRI [04:54, 26/03/19, The Attempt 2019]

DYN Dynamic With Fins YOUSEF YAACOUB (85 metres, 16/06/16, Dubai Mini Comp 2016)

DNF Dynamic Without Fins YOUSEF YAACOUB (53 metres, 16/06/16, Dubai Mini Comp 2016)

CWT Constant Weight GEORGE NADER (52 metres, 24/06/18, Nice Abyss Contest 2018)

CNF Constant Weight Without Fins MARWAN HARIRI [32 metres, 20/10/12, Triple Depth 2012]

FIM Free Immersion MARWAN HARIRI [43 metres, 20/10/12, Triple Depth 2012]





AIDA (New Zealand / Women)

SSTA Static Apnea KATHRYN NEVATT (07:45, 28/10/16, New Zealand National Champs 2016)

DYN Dynamic With Fins SUZY OSLER (200 metres, 21/08/09, 5th AIDA Individual Pool World Championship 2009)

DNF Dynamic Without Fins KATHRYN NEVATT [165 metres, 23/08/14, Oceanhunter Freediving Championship 2014]

CWT Constant Weight KATE MIDDLETON [97 metres, 10/05/2017, Vertical Blue 2017]

CWTB Constant Weight With Bifins KIA BARNES [15 metres, 16/03/19, Freediving NZ Depth Nationals 2019]

CNF Constant Weight Without Fins NICOLA RODERICK (60 metres, 14/06/10, 3rd Mediterranean Freediving Meeting 2010)

FIM Free Immersion KATE MIDDLETON (84 metres, 2/05/17, Vertical Blue 2017)

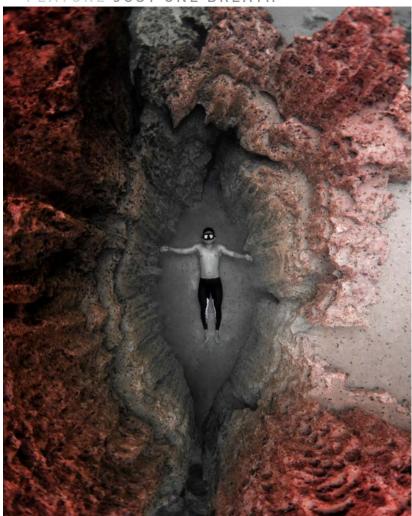
AIDA (New Zealand / Men)

STA Static Apnea GUY BREW (09:03, 12/07/09, Wellington Winter Champs, Freediving Competition 2009)

DYN Dynamic With Fins DAVID MULLINS (265 metres, 27/09/10, Cressi World Record Challenge 2010)

DYNB Dynamic With Bifins JACK MICHAEL (175 metres, 14/07/19, AIDA Bullsharks Winter Bite 2019

FEATURE JUST ONE BREATH







Martin Zapanta (PHILIPPINES) Freediver

Top 1 Freediver Philippine Overall Ranking x9 National Record Holder Philippine Freediving Team

"Freediving is my passion. It taught me a lot of things about myself and in life. It becomes a lifestyle. Freediving is a very personal sport – every athlete experiences it in their own unique way, but then again, it has the most supportive sports community. Freediving competitions are not designed for the athlete to push their limits, but to know their limits.

One thing I have learned in my work in healthcare that applies to all of us is that when you are well and have found the best version of yourself, you can provide the best care to all who are around you.

Freediving provides a way to find and become your best self"



IMAGE & QUOTE:
Tracy Roxanne Migriño
(PHILIPPINES)
Freediver
Best Female Newcomer
(Singapore 2019) National Records



AIDA (New Zealand / Men)

DNF Dynamic Without Fins DAVID MULLINS [232 metres, 12/07/09, Wellington Winter Champs Freediving Competition 2009]

CWT Constant Weight DAVID MULLINS (126 metres, 26/08/17, AIDA World Depth Championship 2017)

CWTB Constant Weight With Bifins PHIL CLAYTON [55 metres, 14/03/19, Freediving NZ Depth Nationals 2019]

CNF Constant Weight Without Fins WILLIAM TRUBRIDGE (102 metres, 14/07/16, World Record Attempt – William Trubridge 2016)

FIM Free Immersion WILLIAM TRUBRIDGE (124 metres, 2/05/16, Vertical Blue 2016)

AIDA (Phillippines / Men)
CWT Constant Weight

MARTIN ZAPANTA (60m, 23/03/18, Bohol, Philippines 2018)

DYN Dynamic With Fins MARTIN ZAPANTA (156 metres, 12/12/18, Jakarta, Indonesia 2018)

CWTB Constant Weight With Bifins JULIAN JONES [53 metres, 19/03/19 Bohol, Philippines 2019]

DNF Dynamic Without Fins CEZAR SAYOSAY (75metres, 20/03/18 Cebu, Philippines 2018)

CNF Constant Weight Without Fins CEZAR SAYOSAY [45 metres, 19/05/19 Bohol, Philippines 2019]

STA Static Apnea MARTIN ZAPANTA (5:15, 29/04/18 Bohol, Philippines 2018)

FIM Free Immersion MARTIN ZAPANTA (65 metres, 5/11/18, Sabang, Indonesia 2018)

AIDA (Phillippines / Women) CWT Constant Weight

CWT Constant Weight MARESE SECADES (59 metres, 19/05/19, Bohol, Philippines 2019)

DYN Dynamic With Fins DORINA DOERR (100 metres, 10/01/2019, Cebu, Philippines 2019)

CWTB Constant Weight With Bifins MARIA NOELLA ZOSA (55 metres, 18/03/19 Bohol, Philippines 2019)

DYNB Dynamic With Bifins TRACY MIGRINO [111 metres, 6/04/19 Singapore 2019]

CNF Constant Weight Without Fins BING LAROCQUE (36 metres, 118/03/19, Bohol, Philippines 2019)

DNF Dynamic Without Fins TRACY MIGRINO (83 metres, 7/04/19, Singapore 2019)

FIM Free Immersion MARIA NOELLA ZOSA (51 metres, 6/11/18, Sabang, Indonesia 2018)

STA Static Apnea MARESE SECADES (5:04, 7/03/2019, Bohol, Philippines 2019)

AIDA (China / Women)

Static breathhold (STA)
JESSEA LU WENJIE
(8:01 metres, 27/08/16, International Freediving
Championships 2016)

Dynamic With Fins (DYN)
JESSEA LU WENJIE
[200 metres, 24/09/16, Team World
Championship 2016]

Dynamic With Bifins (DYNB) LI YUERONG

(100metres, 2/06/19, AIDA OneFreedive City League Guangzhou 2019)

Dynamic Without Fins (DNF) JESSEA LU WENJIE (150 metres, 20/05/17, Deja Blue 8 Grand Cayman 2017)

Constant Weight (CWT) XU TONGTONG (86 metres, 8/06/2018, Asian Freediving Cup 2018, Panglao)

Constant Weight With Bifins (CWTB)
JESSEA LU WENJIE
[70 metres 10/05/2019 SuperHome Cup 2019 Bohol,
Philippines]

Constant Weight Without Fins (CNF)
JESSEA LU WENJIE
[60 metres 23/04/2016 Vertical Blue 2016 Long Island)

FIM Free Immersion JESSEA LU WENJIE (86 metres 22/08/17 AIDA World Depth Championship 2017)





AIDA (China / Men)

STA 07:04 YANG GUANG (MATT) (19/08/17, OneFreedive Beijing Summer Pool Competition 2017)

DYN Dynamic With Fins WANG AOLIN [200metres, 24/09/16, Team World Championship 2016]

DYNB Dynamic With Bifins LIN SHUWANG (109 metres, 2/06/19, AIDA OneFreedive City League Guangzhou China 2019)

DNF Dynamic Without Fins CHEN HAIXIONG (127 metres, 19/08/17, OneFreedive Beijing Summer Pool Competition 2017)

CWT Constant Weight WANG JIN (SENDOH) [111 metres, 18/05/19, Philippine Depth National Championship 2019

CWTB Constant Weight Bifins YANG YI (75 metres, 10/05/19, SuperHOME Cup 2019 Freediving Competition, Bohol Philippines 2019)

CNF Constant Weight Without Fins WANG JIN (SENDOH) (70metres, 7/11/18, Sabang International Freediving Competition 2018)

FIM Free Immersion WANG JIN (SENDOH) (95 metres, 25/06/17, Freedive Panglao June Minicamp, Bohol Philippines 2017)

AIDA (Taiwan / Women)

STA Static Apnea LEE MING-WEN (05:34, 27/04/19, Pacific Rim Cup 2019)

DYN Dynamic With Fins HSIN YUAN YANG (150 metres, 28/04/19, Pacific Rim Cup 2019)

DNF Dynamic No Fins YEH CHIH-LIN (96 metres, 27/04/19, Pacific Rim Cup 2019)

Constant Weight Without Fins (CNF) LIN LAN LIEN [43 metres, 24/05/18, Caribbean Cup 2018]

CWT Constant Weight LIN LAN LIEN (57 metres, 21/05/18, Caribbean Cup 2018)

FIM Free Immersion LIN LAN LIEN (56 metres, 23/05/18, Caribbean Cup 2018)

CWTB Constant Weight With Bifins 57 metres YEN WANYU (19/05/19, Philippine Depth National Championship 2019)

AIDA (Taiwan / Men)

STA Static Apnea HUANG HUA-YANG (06:31, 27/04/19, Pacific Rim Cup 2019)

DYN Dynamic With Fins LU HUNG YANG (173 metres, 28/04/19, Pacific Rim Cup 2019)

DNF Dynamic No Fins LU HUNG YANG (106 metres, 27/04/19, Pacific Rim Cup 2019)

CWT Constant Weight HUANG MINGCHUN [97 metres, 9/5/18, Nirvana OceanQuest Depth Contest 2018]

FIM Free Immersion HUANG MINGCHUN [88 metres, 7/5/18, Nirvana OceanQuest Depth Contest 2018]

CNF Constant Weight Without Fins KUO WEI CHUN (60 metres, 12/5/19, SuperHome Cup, Freediving Competition 2019)

AIDA (Malaysia / Women)

STA Static Apnea SYAFIDATUL AZUA SHAFII (05:02, 14/10/17, !D: Apnea Competition 2017)

DYN Dynamic with Fins SYAFIDATUL AZUA SHAFII (165 metres, 23/3/18, Pan Pacific Championship 2018)

DNF Dynamic Without Fins SYAFIDATUL AZUA SHAFII [111 metres, 12/10/18, ID:Apnea Competition 2018]

CWT Constant Weight SYAFIDATUL AZUA SHAFII (61 metres, 27/11/17, Sail Sabang Freediving Competition 2017)

CNF Constant Weight No Fins SYAFIDATUL AZUA SHAFII (34 metres, 8/11/18, Sabang International Freediving Competition 2018)

FIM Free Immersion SYAFIDATUL AZUA SHAFII (56 metres, 6/11/18, Sabang International Freediving 2018)



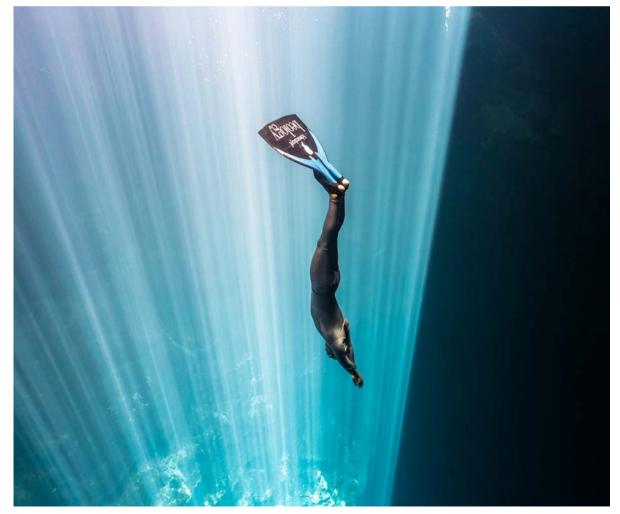
"Inner peace and connection to the Earth is what I attained in freediving. It's a personal space that I want to share with everyone through safe practices and my art – film and photography.

My dream to swim with
whale sharks got me started in
freediving, and
now, combined with my passion for
photography and film, I found a bigger
purpose on promoting this lifestyle
and sport to everyone"





IMAGE & QUOTE: Valerie Faye Bautista (PHILIPPINES) RAID Freediving Instructor





MAGE
Wang Aolin
(CHINA)
ADEX China
Ambassador of Freediving
(ADEX CHINA 2017,
2019 SPEAKER)

AIDA (Malaysia / Men)

STA Static Apnea PAUL SACK WAI-KEI (06:17, 13/10/18, ID:Apnea Competition 2018)

DYN Dynamic With Fins PAUL SACK WAI-KEI (150 metres, 15/10/17, ID: Apnea Competition 2017)



DYNB Dynamic With Bifins MUBIN AIMAN (112 metres, 6/04/19, Singapore Open Pool Competition 2019)

DNF Dynamic Without Fins MOHD AZAM ABDUL HAMID (105 metres, 4/03/18, Singapore Open Freediving Competition 2018)

CWT Constant Weight PAUL SACK WAI-KEI (70 metres, 10/06/18, Asian Freediving Cup 2018)

CWTB Constant Weight With Bifins MOHD AZAM ABDUL HAMID (60 metres, 18/05/19, Philippine Depth National Championship 2019)

CNF Constant Weight Without Fins PAUL SACK WAI-KEI (52 metres, 5/11/18, Sabang International Freediving Competition 2018)

FIM Free Immersion
PAUL SACK WAI-KEI
[72 metres, 7/11/18, Sabang International
Freediving Competition 2018]

AIDA (Indonesia / Women)

STA Static Apnea AUDREY JIWAJENNIE (04:55, 3/03/18, Singapore Open Freediving Competition 2018)

DYN Dynamic With Fins AUDREY JIWAJENNIE (134 metres, 23/03/18, Pan Pacific Championship 2018)

DNF Dynamic Without Fins NIKITA FIMA ATRIYU (95 metre, 7/04/19, 2019 Singapore Open Pool Competition 2019)

CWT Constant Weight NIKITA FIMA ATRIYU (43 metres, 4/11/18, Sabang International Freediving Competition 2018)

CNF Constant Weight No Fins AUDREY JIWAJENNIE (39 metres, 5/6/17, Asian Freediving Cup 2017)

FIM Free Immersion NIKITA FIMA ATRIYU (42 metres, 6/11/18, Sabang International Freediving Competition 2018)

AIDA (Indonesia / Men)

STA Static Apnea IRIANSYA HENDRA (05:38, 9/10/16, ID: Apnea Competition 2016)

DYN Dynamic With Fins GUNA DARMA (139 metres, 6/04/19, Singapore Open Pool Competition 2019)

DNF Dynamic No Fins GUNA DARMA (104 metres, 7/04/19, Singapore Open Pool Competition 2019)

CWT Constant Weight STANLEY SRADAPUTTA (81 metres, 8/05/18, Asian Freediving Cup 2018)

na Darma



CNF Constant Weight No Fins STANLEY SRADAPUTTA (51 metres, 10/06/18, Asian Freediving Cup 2018)

FIM Free Immersion STANLEY SRADAPUTTA (75 metres, 9/06/18, Asian Freediving Cup 2018)

AIDA (Iran, Islamic Republic of / Men)

DYNB Dynamic With Biffins MOHSEN SHAHINI (84 metres, 14/04/19, AIDA Minsk Freediving Weekend 2019)

AIDA (Japan / Women)

STA Static Apnea YURIKO ICHIHARA (07:06, 30/06/18, Individual AIDA Pool World Championships Belgrade 2018)

DYN Dynamic With Fins HANAKO HIROSE [197 metres, 24/09/16, Team World Championship 2016]

DYNB Dynamic With Bifins Fumi Sonezaki (78 metres, 6/04/19, Singapore Open Pool Competition 2019)

DNF Dynamic Without Fins TOMOMI HAMAZAKI [160 metres, 1/07/16, Pool World Championship 2016]

CWT Constant Weight HANAKO HIROSE [106 metres, 25/07/18, Vertical Blue 2018]

CWTB Constant Weight With Bifins SAYURI KINOSHITA (82 metres, 27/04/19, Xibalba 2019)

CNF Constant Weight No Fins SAYURI KINOSHITA [72 metres, 26/04/16, Vertical Blue 2016 / World Record]

FIM Free Immersion SAYURI KINOSHITA [97 metres, 26/07/18, Vertical Blue 2018]

AIDA (Japan / Men)

STA Static Apnea YOSUKE SEKIYA (07:51, 21/03/16, Individual AIDA Pool World Championships 2016)

DYN Dynamic With Fins SHINYA 0I (227 metres, 23/03/18, Pan Pacific Championship 2018)

DNF Dynamic Without Fins SHINYA OI (165 metres, 22/03/2018, Pan Pacific Championship 2018)

CWT Constant Weight RYUZO SHINOMIYA (115 metres, 27/04/10, Vertical Blue – The Suunto Dive-Off 2010)

Shinya Oi

CWTB Constant Weight With Bifins KEN KIRIYAMA (70 metres, 18/05/18, Philippine Depth National Championship 2018)

CNF Constant Weight Without Fins RYUZO SHINOMIYA [66 metres, 27/11/14, Suunto Vertical Blue 2014]

FIM Free Immersion RYUZO SHINOMIYA (104 metres, 27/04/10, Vertical Blue – The Suunto Dive-Off 2010)





AIDA (Republic of Korea / Women)

STA Static Apnea LEE HEE YOUNG (06:11, 8/09/18, UDF Korea Freediving Championship 2018)

DYN Dynamic With Fins KWON SEOYEONG (156 metres, 17/02/19, Nature UDF Freediving Challenge 2019)

DYNB Dynamic With Bifins CHOI JIWON [128 metres, 28/04/19, Kaja Cup International Freediving Indoor Competition]

DNF Dynamic Without Fins KIM JUNG A [111 metres, 8/09/18, UDF Korea Freediving Championship 2018]

CWT Constant Weight
KIM JUNG A
[80 metres, 4/11/18, Sabang International
Freediving Competition 2018]

CWTB Constant Weight With Bifins KIM JUNG A (71 metres, 10/05/19, SuperHOME Cup Freediving Competition 2019)

CNF Constamt Weight Without Fins KIM JUNG A (45 metres, 12/05/19, SuperHOME Cup Freediving Competition 2019)

FIM Free Immersion KIM JUNG A (70 metres, 11/05/19, SuperHOME Cup Freediving Competition 2019)

AIDA (Republic of Korea / Men)

STA Static Apnea JANG JIHOON (06:24, 27/04/19, AIDA Dahab Championship 2019)

DYN Dynamic With Fins HAN WONSIK [161 metres, 14/03/13, Korean Association for Freediving Mini Pool Competition 2013]

DYNB Dynamic With Bifins LIM JUYOUNG [143 metres, 28/04/19, Kaja Cup International Freediving Indoor Competition 2019]

DNF Dynamic Without Fins LEE JUNEHYUK [119 metres, 29/07/17, Blue Cup Korea Pool Competition 2017]

CWT Constant Weight JANG JIHOON (93 metres, 8/06/2018, Asian Freediving Cup 2018)

CWTB Constant Weight With Bifins SEONG HYUNHO (75 metres, 29/04/19, AIDA Dahab Championship 2019)

CNF Constant Weight No Fins JANG JIHOON (62 metres, 10/06/18, Asian Freediving Cup 2018)

FIM Free Immersion PARK JEONGMIN (95 metres, 19/05/19, Philippine Depth National Championship 2019)



AIDA (India / Women)

DYN Dynamic With Fins SHRUTHI SHREEDHARAN (50 metres, 26/06/16, Dubai Mini Comp 2016)

AIDA (India / Men)

STA Static Apnea NAVALKISHOR SINGH (04:11, 30/06/17, Swedish Pool Championship 2017)

DYN Dynamic With Fins NAVAL KISHOR SINGH (124 metres, 2/07/17, Swedish Pool Championship 2017)

DNF Dynamic Without Fins NAVAL KISHOR SINGH [59 metres, 20/03/16, A Second Chance 2016]

AIDA (Myanmar / Men)

STA Static Apnea KYAW ZAW THAN (04:05, 6/04/19, Singapore Open Pool Competition 2019)

DYNB Dynamic With Bifins KYAW ZAW THAN (100 metres, 6/04/19, Singapore Open Pool Competition 2019)



DNF Dynamic Without Fins KYAW ZAW THAN (100 metres, 07/04/19, Singapore Open Pool Competition 2019

AIDA (Pakistan / Men)

STA Static Apnea Jameel Qurban (04:13, 19/08/16, SFA Pool Competition 2016)

AIDA (Palestinian Territory, Occupied / Men)

STA Static Apnea FAYYAD TAREK [04:45, 19/08/16, SFA Pool Competition 2016]

DYNB Dynamic With Bifins IBRAHIM ALAJEZ [92 metres, 12/04/19, Kingdom Pool Championship Jeddah 2019]

DNF Dynamic Without Fins FAYYAD TAREK [75 metres, 19/08/16, SFA Pool Competition 2016]

CNF Constant Weight Without Fins FAYYAD TAREK (24 metres, 21/10/18, Kingdom Depth Competition 2018)

AIDA (Oman / Male)

STA Static Apnea IBRAHIM AL SALATNI (07:32, 12/08/18, Dahab Apnea 2018)

DYN Dynamic With Fins IBRAHIM AL SALATNI (150 metres, 13/08/18, Dahab Apnea 2018)

CNF Constant Weight Without Fins OMAR AL GHAILANI [50 metres, 21/10/18, Kingdom Depth Competition 2018]

FIM Free Immersion OMAR AL GHAILANI [90 metres, 30/08/18, Red C Cup 11th Edition 2018]

AIDA (Syria / Men)

STA Static Apnea HASAN AL-HAJ MOHAMMAD (05:11, 19/08/16, SFA Pool Competition 2016)

DYNB Dynamic With Bifins MAHMOUD ZAKARIA (131 metres, 12/04/19, Kingdom Pool Championship Jeddah 2019)

DNF Dynamic Without Fins MAHMOUD ZAKARIA (100 metres, 13/04/19, Kingdom Pool Championship Jeddah 2019)

CWTB Constant Weight With Bifins ALI MAIHOB (38 metres, 10/05/19, SuperHOME Cup Freediving Competition 2019)

CNF Constant Weight No Fins ALI MAIHOB (21 metres, 12/05/19, SuperHOME Cup Freediving Competition 2019)

FIM Free Immersion ALI MAIHOB [41 metres, 11/05/19, SuperHOME Cup Freediving Competition 2019]

AIDA (Kazahstan / Women)

STA Static Apnea NATALYA KHALOVA (03:43, 15/09/17, Splash Freediving New Zealand Pool Nationals 2017)

DYN Dynamic With Fins NATALYA KHALOVA (70 metres, 16/09/17, Splash Freediving New Zealand Pool Nationals 2017)

DNF Dynamic Without Fins NATALYA KHALOVA (30 metres, 17/09/17, Splash Freediving New Zealand Pool Nationals 2017)

CWT Constant Weight ZHANAR ICHSHANOVA [25 metres, 22/05/19, Russian Open Depth Championship 2019]

AIDA (Kazakhstan / Men)

STA Static Apnea DAUREN ZHOLDASBAYEV (03:08, 25/10/17, Red C Cup 9th Edition 2017)

CWT Constant Weight SULEIMAN TOKHTAMOV (50 metres, 22/05/19, Russian Open Depth Championship 2019)

CWTB Constant Weight With Bifins SULEIMAN TOKHTAMOV (41 metres, 20/05/19, Russian Open Depth Championship 2019)

FIM Free Immersion SULEIMAN TOKHTAMOV (53 metres, 21/05/19, Russian Open Depth Championship 2019)



AIDA (Saudi Arabia / Women)

STA Static Apnea GHADEER NASSIER [05:06, 23/03/19, Jeddah Static Competition Vol.02 2019]

DYNB Dynamic With Bifins SALMA SHAKER (79 metres, 21/04/19, Jeddah DYN Comp 01 / 2019)

CWT Constant Weight ROWAIDA ALERWI (30 metres, 30/08/18, Red C Cup 11th Edition 2018)

CNF Constant Weight Without Fins ROWAIDA ALERWI (20 metres, 21/10/18, Kingdom Depth Competition 2018)

FIM Free Immersion AMEL AL SHEKL [43 metres, 30/08/18, Red C Cup 11th Edition 2018]

AIDA (Saudi Arabia / Men)

STA Static Apnea
BASSAM BAKHEET
[06:17, 23/03/2019, Jeddah Static Competition Vol.02 / 2019]

DYN Dynamic With Fins ALI AL KHALIFAH (124 metres, 2/10/15, Ocean Hunter Freediving New Zealand Pool Nationals 2015)

DYNB Dynamic With Bifins BASSAM BAKHEET [131 metres, 12/04/19, Kingdom Pool Championship 2019]

DNF Dynamic Without Fins BASSAM BAKHEET (104 metres, 13/04/19, Kingdom Pool Championship Jeddah 2019)



CWT Constant Weight ATEF FILIMBAN (70 metres, 13/08/14, Arab League Championship 2014)

CNF Constant Weight Without Fins BASSAM BAKHEET [42 metres, 25/04/19, AIDA Dahab Championship 2019]

FIM Free Immersion BASSAM BAKHEET (71 metres, 25/05/17, Red C Cup 7th Edition 2017)

AIDA (Singapore / Women)

STA Static Apnea
PAOLA SEOW
105:30, 13/08/18, ID: Apnea

(05:30, 13/08/18, ID: Apnea Competition 2018)

DYN Dynamic With Fins VALERIE CHIA (135 metres 26/11/2015 Pac Pacs Arvo Competition)

DYNB Dynamic With Bifins LIM YEE HUI (109 metres, 6/04/19, Singapore Open Pool Competition 2019)

DNF Dynamic Without Fins LIM YEE HUI (102 metres, 7/04/19, Singapore Open Pool Competition 2019)

CWT Constant Weight LIM ANQI (62 metres, 8/06/18, Asian Freediving Cup 2018)

CNF Constant Weight Without Fins LIM ANQI (45 metres, 10/06/18, Asian Freediving Cup 2018)

FIM Free Immersion LIM ANQI (58 metres, 9/06/2018, Asian Freediving Cup 2018)





AIDA (Singapore / Men)

STA Static Apnea JONATHAN CHONG (06:35, 6/04/19, Singapore Open Pool Competition 2019)

DYN Dynamic With Fins FU XINGQIANG (163 metres, 6/04/19, Singapore Open Pool Competition 2019)

DYNB Dynamic With Bifins FU ZI XIANG (150 metres, 6/04/19, Singapore Open Pool Competition 2019)

DNF Dynamic Without Fins FU XINGQIANG (125 metres 7/04/19 Singapore Open Pool Competition 2019)

CWT Constant Weight FU XINGQIANG (75 metres, 10/05/19, SuperHOME Cup Freediving Competition 2019)

CWTB Constant Weight With Bifins MUHAMMAD FIRDAUS BIN MOHD KHAIR [47 metres, 10/05/19, SuperHOME Cup Freediving Competition 2019]

CNF Constant Weight Without Fins FU XINGQIANG (54 metres, 12/05/19, SuperHOME Cup Freediving Competition 2019)

FIM Free Immersion JONATHAN CHONG (61 metres, 3/11/18, Sabang International Freediving Competition 2018)

AIDA (Thailand / Women)

STA Static Apnea PLOY MALAIWONS (05:19, 25/10/15, Red C Cup 9th Edition 2015)

DYN Dynamic With Fins KAURARAT SUKSOMSTARN (135 metres, 10/03/19, Bristol Blue 2019 – UK BFA National Pool Championships 2019)

DNF Dynamic Without Fins SIGOURNEY BROGDEN [57 metres, 30/3/19, AFA Pool Nationals 2019]

CWT Constant Weight NIPPON MUKDASATHIEN (30 metres, 8/02/08, Andaman AIDA Freediving Challenge 2008)

FIM Free Immersion YUKO NOLTE [42 metres, 7/10/10, FDD Mini Competition 2010]





AIDA (Thailand / Men)

STA Static Apnea KEERAPAT LAOWAKUL (05:48, 6/04/19, Singapore Open Pool Competition 2019)

DYN Dynamic With Fins RICHARD WONKA (104 metres, 3/09/08, AIDA Team World Championships 2008)

DYNB Dynamic With Bifins ABDULRAHMAN KALONG (77 metres, 12/04/19, Kingdom Pool Championship Jeddah 2019)

DNF Dynamic Without Fins ABDULRAHMAN KALONG (59 metres, 13/04/19, Kingdom Pool Championship Jeddah 2019)

CWT Constant Weight KOMTANOO PINPIMAI (94 metres, 7/11/18, Sabang International Feediving Competition 2018)

CNF Constant Weight Without Fins MICHAEL NELSON [46 metres, 7/11/18, Sabang International Freedivin Competition 2018]

FIM Free Immersion KOMTANOO PINPIMAI (75 metres, 15/11/16, Australian Depth National Freediving Championship 2016)

AIDA (Turkey / Women)

STA Static Apnea BILGE CINGIGIRAY (06:08, 15/04/18, ONEBREATH Spring Pool Games 2018)

DYN Dynamic With Fins BILGE CINGIGIRAY (166 metres, 28/01/18, ONEBREATH Winter Pool Games 2018)

DNF Dynamic Without Fins BILGE CINGIGIRAY (108 metres, 13/05/18, AIDA Hellas Pool Championship 2018)

CWT Constant Weight SAHIKA ERCUMEN (65 metres, 24/06/15, Sponteneous Blue Hole Competition 2015)

CNF Constant Weight Without Fins SAHIKA ERCUMEN [45 metres, 27/8/18, Red C Cup 11th Edition 2018]

FIM Free Immersion FATMA URUK (50 metres, 22/9/17, Authentic Big Blue 2017)









AIDA (Turkey / Men)

STA Static Apnea DEVRIM CENK ULUSOY (06:03 29/05/05 Rhein Main Cup 2005)

DYN Dynamic With Fins DEVRIM CENK ULUSOY (156 metres, 29/10/05, Rhein Main Cup 2005)

DNF Dynamic Without Fins OĞUZHAN YEŞIL (111 metres, 28/01/18, ONEBREATH Winter Pool Games 2018)

CWT Constant Weight
MEHMET ARIKOK
[72 metres .14/10/14, Triple Depth 2014]

CNF Constant Weight Without Fins MEHMET ARIKOK [53 metres, 20/09/17, Authentic Big Blue 2017]

FIM Free Immersion MEHMET ARIKOK (78 metres, 19/09/18, Authentic Big Blue 2018)

AIDA (United Arab Emirates / Women)

STA Static Apnea OLGA BLINOVA (02:49, 28/08/15, 2nd UAE Freediving Competition 2015)

DYN Dynamic With Fins OLGA BLINOVA (63 metres, 28/08/15, 2nd UAE Freediving Competition 2015)

AIDA (United Arab Emirates / Men)

STA Static Apnea AHMED KHOORI (04:0, 30/05/12, FDD Last Chance WC Qualifying Competition 2012)

DYN Dynamic With Fins ADEL ABU HALIQA (73 metres, 23/11/08, 4th Dutch Apnea Open 2008)

DNF Dynamic Without Fins ADEL ABU HALIQA [23/11/08, DNF National Record Relay 2008]

CWT Constant Weight
AHMED KHOORI
[45 metres 30/5/2012 FDD Last Chance WC
Qualifying Competition]

CNF Constant Weight Wihtout Fins FEDERICO ERROI [31 metres, 26/10/18, Fujairah Freediving Competition 2018]

FIM Free Immersion MOHAMMAD ABDUL RAHIM (50 metres, 26/10/18, Fujairah Freediving Cpmpetition 2018) "Freediving to me is a way to see life from the bright side, to travel, to meet people and enjoy Nature. Freediving brings out my strengths and weaknesses and lets me feel the taste of life in all its manifestations – pleasure, pain and fear"





MAGE & QUOTE:
Andrey Matveenko
(RUSSIA)
Freediver

World Champion Russian National Champion Unofficial World Record: Under-ice CTW (76m, 250ft)



Marianna Gillespie (RUSSIA) Freediver

World Champion National Record Youngest Female Winner of Vertical Blue



"Freediving for me is a way to connect with my consciousness.

In everyday life we are always in a hurry, we want to achieve bigger results, we want to win and be successful. On the other hand, many of us feel stressed, pushed, under constant pressure, unhappy and even depressed. Freediving helps to see yourself more 'purely'. It changes your usual and sometimes painful perception of things and teaches acceptance. You cannot achieve anything in freediving being tense or lying to your own body. It's an amazing practice to learn about who you are"

CURRENT WORLD RECORD TABLE

AIDA (Russia / Women)

STA Static Apnea NATALIA MOLCHANOVA (09:02 min, 21/06/13, AIDA Pool World Championships 2013)

AIDA (Poland / Women)

DYN Dynamic With Fins MAGDALENA SOLICH-TALANDA (243 metres, 29/06/18, AIDA Pool World Championships Belgrade 2018)

DNF Dynamic Without Fins MAGDALENA SOLICH-TALANDA (191 metres, 1/07/17, XIV Polish Freediving Pool Championships 2017)

AIDA (Italy / Women)

CWT Constant Weight ALESSIA ZECCHINI (107 metres, 26/07/18, Vertical Blue 2018)

CNF Constant Weight Without Fins ALESSIA ZECCHINI (73 metres, 22/07/18, Vertical Blue 2018)

AIDA (Japan / Women)

FIM Free Immersion SAYURI KINOSHITA (97 metres, 26/07/18, Vertical Blue 2018)

AIDA (Netherlands / Women)

VWT Variable Weight NANJA VAN DEN BROEK (130 metres, 18/10/15, WR attempt variabel weight 2015)

AIDA (USA / Women)

NLT No Limit TANYA STREETER (160 metres, 17/08/02, WR Attempt 2002)

AIDA (France / Men)

STA Static Apnea STÉPHANE MIFSUD (11:35 min, 08/06/09, WR Attempt -MIFSUD Stephane / Static Apnea 2009)

AIDA (Greece / Men)

DYN Dynamic With Fins GIORGOS PANAGIOTAKIS (300 metres, 2/07/16, Pool World Championships 2016)

AIDA (Poland / Men)

DYN Dynamic With Fins MATEUSZ MALINA (300 metres, 2/07/16, Pool World Championships 2016)

AIDA (Poland / Men)

DNF Dynamic Without Fins MATEUSZ MALINA (244 metres, 1/07/16, Pool World Championships 2016)

AIDA (Russia / Men)

CWT Constant Weight ALEXEY MOLCHANOV (130 metres, 18/07/18, Vertical Blue 2018)



IMAGE & QUOTE:
Alexey Molchanov
(RUSSIA)
ADEX Ambassador
of Freediving
ASIA DIVE EXPO
(ADEX 2017, 2019
SPEAKER)

AIDA (New Zealand / Men)

CNF Constant Weight Without Fins WILLIAM TRUBRIDGE (102 metres, 21/07/16, World Record Attempt 2016)

AIDA (Russia / Men)

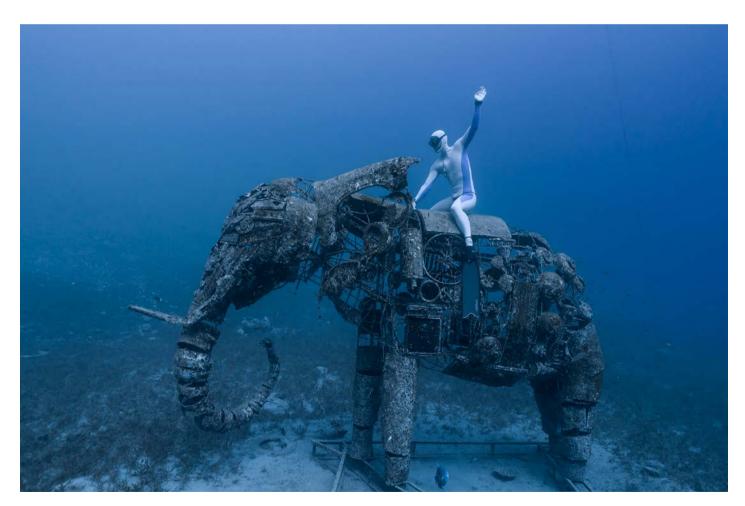
FIM Free Immersion ALEXEY MOLCHANOV (125 metres, 24/07/18, Vertical Blue 2018)

AIDA (Greece / Men)

VWT Variable Weight STAVROS KASTRINAKIS (146 metres, 01/11/15, WR Attempt Stavros Kastrinakis 2015)

AIDA (Austria / Men)

NLT No Limit HERBERT NITSCH (214 metres,14/06/07, WR Attempt 2007)



"Freediving for me is my life, work, and an opportunity to travel and meet interesting people. Freediving gives me the chance to do what I love and get great satisfaction from what I am doing"

- Alexey Molchanov -

Alexey Molchanov

President of AIDA Russia, World Champion, Co-founder of Russian Freediving Federation Multiple World Records, Static Apnea: 130m (426ft), Dynamic With Fins: 125m (410ft)

Ghost Nets of Mergui

A group of international divers arrives for a four-day initiative to retrieve abandoned fishing gear from the sea. We look at the big picture and get the inside scoop from a biologist on the ground

Text by: UW360 with Ocean Quest Global / Awei Pila Images by: Magnus Larsson

A team of experienced divers from around the world have launched a campaign to clear lost and disused fishing nets – known as ghost nets – from the coral reefs in Myanmar's Mergui Archipelago. From May 8 to 11, 2019, the team of nine divers and five surface support crew – from as far afield as Brazil, Sweden, Lithuania and Romania – set out from Awei Pila on the island of Kyun Pila in the heart of the archipelago, which is home to some 800 islands and atolls.

Ghost nets, or ALDFG (abandoned, lost or discarded fishing gear), include fishing nets, lines and traps which are left in the ocean and become entangled in rocks and reefs, ultimately killing fish and other marine life and suffocating coral. Within four days, the divers recovered, only using scissors, some 300 kilograms (660lbs) of ALDFG from the surrounding reefs at depths of up to 25 metres (80 feet).

The team was led by Anuar Abdullah, the founder of Ocean Quest Global, a Southeast Asia-based organisation dedicated to the protection and rehabilitation of coral reefs. "The importance of healthy coral reefs to their surrounding communities cannot be understated," the group says in its mission statement.

"In 2009, the United Nations estimated that 640,000 tonnes of ghost gear were littering the world's oceans," says Marcelo Guimaraes, a marine biologist working for Awei Pila Resort, which hosted the

RIGHT: Abandoned fishing gear, known as ghost nets, damage coral reefs and kill marine life

IMAGE: Magnus Larsson





Map of Mergui Archipelago



expedition. "Most of the nets are made of nylon and will not biodegrade for the next 600 years. These are the silent killers of our ocean marine life and we must do something about it."

Awei Pila is one of a handful of resorts or hotels in the archipelago, which only in recent years opened to tourism. General Manager Steffen Kroehl says that the goal of his resort is to have a "minimum impact on a pristine environment." The Awei Pila

ABOVE AND OPPOSITE PAGE TOP:

"In 2009, the United Nations estimated that 640,000 tonnes of ghost gear were littering the world's oceans" - Marcelo Guimarae

Helping out cleaning up ghost nets from the coral reefs

OPPOSITE PAGE BOTTOM: Abandoned nets gets caught up in the corals,

breaking them, suffocating them

and all the life underneath

IMAGES: Magnus Larsson

initiative follows closely on the heels of a similar ghost net clearance campaign in the Mergui Archipelago by the Myanmar Ocean Project. Marcelo says plans are in place for both teams to cooperate in a joint effort to clear more fishing gear from the sea in September or October. To learn more about the area and the team's efforts, we asked Marcelo a few more key questions.

Q&A WITH MARCELO GUIMARAES, MARINE BIOLOGIST

Awei Pila Resort, Mergui Archipelago

How and when did you first become fascinated with the ocean and marine biology?

It was in Rio de Janeiro when I was 14 years old, I started snorkelling off the beach and got hooked by all those fish and especially the underwater noises from all those creatures that you could not see. When I was 16, I signed up for my first scuba certification. By the time I was 18, I had become a scuba instructor.

You've worked in beautiful locations around the world such as your home country Brazil, the Caribbean, Mexico, Egypt and the Maldives. What inspired you to come to Myanmar?

I have been travelling since I was 8 years old, first with my parents and later on by myself. I can count 78 countries so far. I believe that travelling is the best way to gain knowledge about the world and better understand different cultures, ecosystems, and people.

Coming to Myanmar, it is an opportunity to discover a new diving region, a new country, a new culture, to dive unspoiled reefs and to help established sustainable tourism activities that will help the country during this transition period into becoming Asia's newest and best tourist destination.

How does scuba diving in the Mergui Archipelago compare to all the previous places you've been?

I think what impacts the diver the most is the archipelago's biodiversity and the amount of underwater life, huge schools of fish, wide coral tables and the fact that no one dives or fishes in the archipelago during the off-season (June to September), allowing the chance for the ecosystem to recover from human impact.

What are the highlights of diving in the archipelago?

The Mergui Archipelago has it all and this is why it is so unique. In one dive you can look up and search for manta rays and whale sharks and at the same time nose down into the creeks to spot seahorses, nudibranchs, mantis shrimp and two or three different species of clownfish.





A few roles you have adopted at Awei Pila are to engage local communities, reduce the impact on the environment, and protect and restore habitat on the island. Can you tell us about that?

We are working with local fishermen from the nearby village and have requested they sell us some of their daily catch. We aim to use the resources from the island and reduce our carbon footprint.

Plastic is another major concern for us. The resort will reduce to a minimum the use of plastics, banning bottles, bags, and straws from the island. When plastic goes into the ocean, it puts marine life at risk, such as the green turtles, which are an indigenous species here.

Another goal is to help some coral species such as *Acropora digitifera* regrow and spread out by replanting some broken coral branches in our





TOP RIGHT: Divers from around the world gather to retrieve abandoned fishing nets from sea

RIGHT AND TOP LEFT: Over 300 kilograms of ghost nets were retrieved by the team of divers cleaning up the ocean in Myanmar's Mergui Archipelago

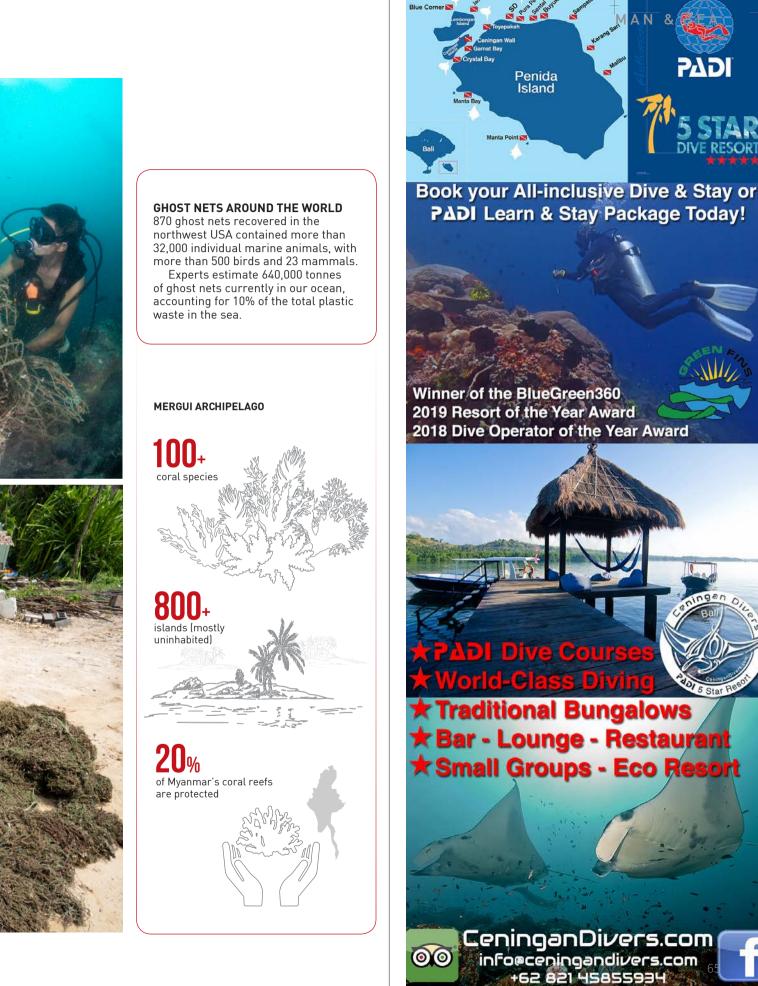
IMAGES: Magnus Larsson

house reef. We will do the same in the mangroves by replanting *Rhizophora* and making sure that the (critically endangered species) *Sonneratia griffithii* stays untouched in our mangroves. And of course, we will only use moorings or drift diving techniques to avoid further coral damage.

The Mergui Archipelago has approximately 800 islands, pristine reefs and untouched beaches. And it has only a handful of resorts, so coming to Awei Pila is a chance to encounter Nature as it was meant to be, a chance to scuba, paddle or relax away from any big city nuisances. To indulge and immerse yourself in a natural environment, experiencing the best that Myanmar has to offer, and visit a region that was, until 2008, off-limits to all visitors.

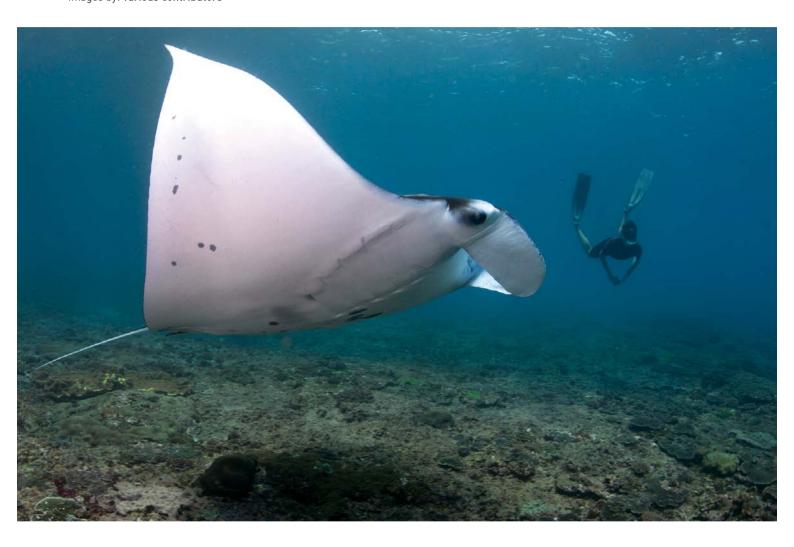






New Discovery: Manta Ray Nursery

One of Asia's most popular big animal havens is the focus of a fascinating new study on the movements and behaviours of its iconic residents. Bali's Nusa Penida is turning heads once again, as new research digs deeper into the manta ray population, revealing little by little the secrets of these ocean giants Text by: UW360 with Marine Megafauna Foundation Images by: various contributors



Scientists from the Marine Megafauna Foundation and Murdoch University are reporting a large number of juvenile manta rays in the waters of Nusa Penida, a small island 18 kilometres (11 miles) southeast of Bali, suggesting the area may be a nursery for this threatened species. The finding is exciting for ocean lovers as few studies have uncovered such a large number of juvenile manta rays before, including significant numbers of newborns.

Reef mantas (*Mobula alfredi*), which grow up to five metres (15 feet) in disc width, tend to reside and feed in

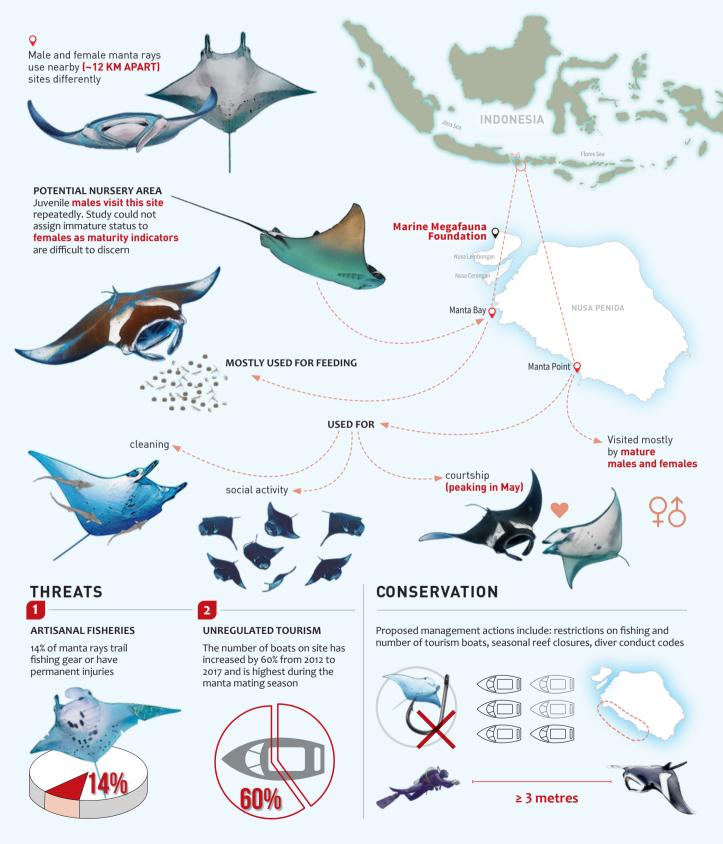
shallow, coastal habitats. They also visit "cleaning stations" on coral reefs to have parasites or dead skin picked off by small fish. In Nusa Penida, they are present year-round making the recently appointed marine protected area (MPA) a snorkelling and diving hotspot. But divers have known this for decades. What is truly surprising is how the animals use and organise themselves around the well-known dive sites Manta Point and Manta Bay.

Manta Bay is described in this new study as predominantly frequented by juvenile males looking for food. Some are as small as 1.5 metres in disc width on first sighting, whichstill might sound pretty big, but is in fact within the known range of newborns [1.3–1.6 metres or 4.2–5.2 feet]. This is strong evidence that the site forms part of a nursery habitat and foraging ground for the local reef manta population. Interestingly, most individuals have been seen repeatedly across multiple years, in some cases recording individuals right up to maturity.

ABOVE: Freediver with manta ray

IMAGE: Andrea Marshall (Marine Megafauna
Foundation)

Reef Manta Rays within the Nusa Penida Marine Protected Area







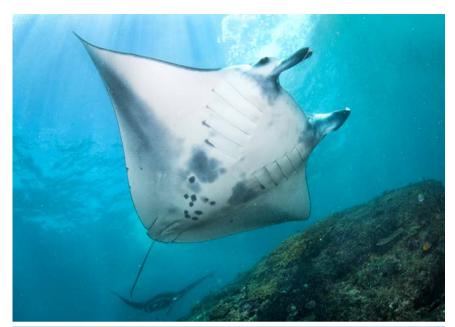


"Where manta rays are born and grow up still baffles us. Our research in Indonesia suggests there might be a reef manta nursery in the Nusa Penida area and possibly also in the famous Raja Ampat archipelago," says lead author Elitza Germanov, a manta ray researcher at Marine Megafauna Foundation and PhD student at Murdoch University. "It's really important for us to know where these nurseries are. They provide a safe space for young, vulnerable manta rays to grow and develop away from the reach of predators."

The data for this six-year-long study was obtained from citizen scientists and trained observers submitting ID photos to the global manta ray database, *Mantamatcher.org*. Overall, 624 individual reef manta rays were identified from 5,913 sightings based on their unique ventral colouration patterns and sex and maturity indicators. And here is where it gets really fascinating.

Interestingly, mature males and females seem to prefer Manta Point, a second dive site a mere 12 kilometres away. In contrast to the foraging juveniles down the street, these adults are here for entirely different reasons. The rays at Manta Point are mostly observed visiting cleaning stations and engaging in social activity as well as courtship display during the mating season (peaking in May). And just like the local disco after hours, it's extremely rare to see a juvenile at Manta Point!

Manta Bay seems to address all the indicators for a nursery: protection from predators, ample food source for young rays, and the animals appear to be using the site over a period of several years at least. Taken together, however, the research points to more than just a possible nursery, but an intricate spatial complexity that may come as a surprise to divers Like all compelling science, the research raises more questions: Why do juveniles avoid Manta Point? Is it a physical risk or are there social barriers in manta culture? And surely there is a pupping ground nearby as well, where females give birth?







TOP: Reef manta in Nusa Penida, Bali, IMAGE: Simon Pierce (Marine Megafauna Foundation)

MIDDLE: Manta Bay and Manta Point are the most heavily visited sites, IMAGE: Andrea Marshall (Marine Megafauna Foundation)

ABOVE: Large numbers of divers stress the mantas, IMAGE: Elitza Germanov (Marine Megafauna Foundation and Murdoch University)

The population here also shows a skew towards males (1.4:1) in general, which is the largest yet seen worldwide. It seems there is far more going on at these long-favoured sites than we ever imagined. And yet this also points to the extreme fragility of their world.

With so many mysteries now swirling, the primary focus is on the future survival of a species that has become extremely valuable. The manta ray industry's total worth to Indonesia has been estimated at USD15 million, making it the secondmost valuable on Earth. Nusa Penida attracts more than 200,000 tourists each year. On the surface, given the range of manta rays as a species, this might not appear to be too bad. However, when you consider that Bali's mantas are only rarely seen at other dive sites, showing extremely high "site fidelity", a large proportion of divers are being funnelled through these two small sites.

Of the 11 main dive spots in these waters. Manta Bay and Manta Point are frequented most by tourism operators, putting the local manta ray population under increasing pressure. While manta rays are protected in Indonesia, there are currently few regulations in place to manage the growing tourism industry. The number of boats allowed to enter manta ray habitats is not limited and codes of conduct for manta ray interactions are voluntary. The average annual number of boats present at the two manta ray sites has increased by 60 percent since 2012 and tourism is highest during the mating season.

"Manta Bay is a foraging ground, used primarily by immature individuals, whereas Manta Point is an important site for adult social and reproductive activity"

- Germanov et al., 2019

"Large diving groups and boat engine noise can cause chronic stress to these vulnerable animals," says Germanov. "Tourists may disrupt the foraging, cleaning and mating behaviour of manta rays if they get too close, which can have serious implications for their growth and fitness." Limiting the number of

tourism vessels allowed at one time and making codes of conduct for diving and snorkelling with manta rays mandatory are proposed as a way to minimise the impact from tourism. Seasonal closure of Manta Point could also be considered to protect the manta rays from disturbance during the mating period.

I. Gede Hedrawan from Udayana University in Bali, another author on this study, says: "Since it was declared a marine protected area in 2014, Nusa Penida has become an attractive area for tourism and even for international scientists. Local authorities have since implemented a code of conduct for zonation and management in this coastal tourism park. This new research will prove useful for MPA managers, informing future reviews and allowing them to assess the appropriate capacity for manta ray watching in this diving hotspot."

Artisanal fishing poses a further threat to the local population. During the study, 14 percent of manta rays were either trailing hooks and lines or had injuries and even amputations from fishing gear cutting through their skin and cartilage skeleton. While all fishing activities are officially prohibited in both Manta Bay and Manta Point, the whole west coast of Nusa Penida could be closed off as a precautionary measure.

Dr Andrea Marshall, principal scientist and co-founder of the Marine Megafauna Foundation, says: "This is clearly an important habitat for reef mantas. In fact, the resighting rates in the Nusa Penida MPA are higher than anywhere else in the world. The two aggregation sites are very close to each other but used for different purposes. We still don't know much about when and how the mantas move between the feeding, cleaning and mating grounds. Putting the pieces of this puzzle together will help us figure out how to protect these slow-growing animals." 🕰

The Marine Megafauna Foundation (MMF) was created in 2009 to research, protect and conserve the populations of threatened marine megafauna around the world. The study titled "Contrasting habitat use and population dynamics of reef manta rays within the Nusa Penida Marine Protected Area, Indonesia" was published in Frontiers in Marine Science in May 2019.



MAKO: PHANTOM OF THE SEA

Naturalist, artist and award-winning cinematographer Joe Romeiro captures unique still images of the world's fastest shark while freediving. Makos have occupied a unique space in Joe's heart, and after all these years of filming and photographing them, he continues to push the limits of mako imagery

By: Joe Romeiro



FEATURE MAKO: PHANTOM OF THE SEA



Now that makos have hit the IUCN endangered species list, they could use all the help we can give them IMAGE: Joe Romeiro





I remember my first make shark off Rhode Island, around 12 years ago. It was a small animal, a tiny make that was screaming around. At first, I thought it was just an ordinary fish because it was a baby, but then I got a better look and I saw this miniature shark that looked like a great white, but it was only a couple of feet long! I fell in love with that shark that day. I've always been on the water since I was a little kid and it was kind of natural that it would evolve into what it is today. I have been shooting professionally now for close to a decade, and now I'm shooting for Shark Week, National Geographic and the BBC quite regularly. I recently did a shoot with Will Smith! I feel like I have achieved a lot of things in my

life and done a lot of things in my life and there is this animal that has been kind of riding – at least in my mind – alongside me throughout the whole thing. All of these great things have happened in my life but the mako shark has always been there, a part of it all.

Till this point, I have been involved in filming makes for about five or six TV shows about them. We have



Makos are thought to be one of those animals that are so widespread, they are in all oceans just about everywhere in temperate waters

OPPOSITE PAGE: A mako approaches the camera like a torpedo ABOVE: The mako shark is not only the fastest shark; it can jump 10 metres in the air

IMAGES: Joe Romeiro

California, as well as Baja in Mexico, off Texas, and of course, just off the coast of my home in Rhode Island. I have yet to make it to South Africa or Australia but they are there. They are thought to be one of those animals that are so widespread, they are in all oceans just about everywhere in temperate waters. And that's kind of where the problem starts because it's so hard to protect an animal that is distributed globally across so many international borders.

filmed them in New Zealand, off of

Although because we can protect makos off of Rhode Island or in US waters, those animals go off where they will have no protection. Now we are focused on bringing together international groups and research organisations to try to get this animal really protected properly. That group of people is just now coming together, and we are starting to be more of a collective voice, which is the important thing because that's what's going to be able to start international policies.

RAINBOW SKIN

Out of around 440 species, there are only five sharks that are endothermic, and what I mean by that is they're almost warm-blooded. This really is the best way to describe them. All

five species are relatives of the great white, and all of them come to this area around Rhode Island, where I live. Everyone knows what makes the mako shark so special is that it's the fastest shark in the world. But there is more to them than that. There is something that is just more carnal about mako sharks, more primitive in a way. They eat sea lions and dolphins, even billfish – huge 200-kilogram fish with swords on their faces. How do you not have respect for an animal like that?

Despite this fearsome ability, when you see a mako, it's not terrifying. It's this rainbow-coloured shimmering effect that is just an amazing combination. Every different angle has a different colour. It's not like any

other shark. It has a living kind of skin to it, like a rainbow. And that's what I wanted to capture with these shots. But when you see a dead version of it, it loses that colour. It loses that effect.

ART AT SEA

Video aside, with my photography I've been trying to play around with techniques more. Nowadays, there are all sorts of apps that will influence different light levels in your images. So these images are a combination of exposure bracketing as well as high dynamic range (HDR) treatments. For me, it's a matter of controlling the light levels of three different images that are going to be laid over one another. Based on early results, I identify areas that need light and then I will play with

BELOW: It's not easy to freeze in an image the world's fastest sharks

OPPOSITE PAGE: Cobalt blue torpedoes with teeth, but they are such beautiful sharks

IMAGES: Joe Romeiro





that in the field. But my approach with this is try to make it feel more like art, rather than just photographic documentation. The bottom line is these images are not manipulated or augmented. It's about trying to pull out those details and that colour that is contained there in the digital information, and you might see it when you're underwater but it's just a shimmer. You often hear about the rules of underwater photography that you supposedly can't break, but for me, those rules are quite meaningless. If it looks good, it looks good - and that's it! So for me as an artist when I am painting I want to show the best colours in the best light. And that's what I am after in these shots.

LIGHTING A GHOST

With fast-moving sharks, you have to use fast shutter speeds. But the real challenge is your lighting, figuring out how high or low to position your strobes. The difficult part is that you are essentially trying to shoot a silvercoloured fish. It's like photographing the shiniest and fastest thing you can imagine, like a knife being thrown at you. It's so shiny it's reminiscent of

chrome, almost like you can see your reflection in it. But then all these blues and different colours come out and when you throw a strobe on that it has such a way of reflecting that light. So keeping a lid on that is the challenge.

It's so easy to blow out the colours

completely because it's so reflective, but it's more to do with the angle. You can dump tonnes of light from above but as soon as you hit it from the side you will blow out your colours. Then things get even more complicated with bursts up to 74 km/h (46 mph), passing by you guick and shiny like a bullet. and with this huge array of teeth right in the front where it swings around, testing you. It's best not to think about it, but it is their habit to bite things to test them to see if they want to eat it. So there is that to contend with. But also, they tend to get bored quickly and move on quickly, so your window to get a shot is small. The mako is there and then it's gone like a ghost, literally a phantom of the sea. Every time I see one I feel so lucky to have that in my life, to have that opportunity. I don't have anything else in my life that feels like that.

MAKOS IN DANGER

People always find that special kind of music, or favourite food, that they enjoy. For me, my favourite kind of music is the make shark! It's that one, out of a huge cast of ocean characters, that's the one that I identify with more than any. It's like this lightning bolt that you can't catch. For me, I have gone from this kid who loves sharks to finding a way to work with them and film them. But now, things have changed.

Catch limits have recently increased, allowing fishing of make sharks of larger and larger sizes. That means. in all likelihood, that smaller sharks are being fished out, and now we are going after the mature animals that support the population. The result is that both the more common shortfin mako and the rare longfin mako are both now classified as "Endangered" on the International Union for Conservation of Nature's Red List.

Once we saw catch limits going up, we knew we had to start our own non-profit. The Atlantic Shark Institute focuses on pelagic sharks, like blues and makos. And now we have started working with universities, government

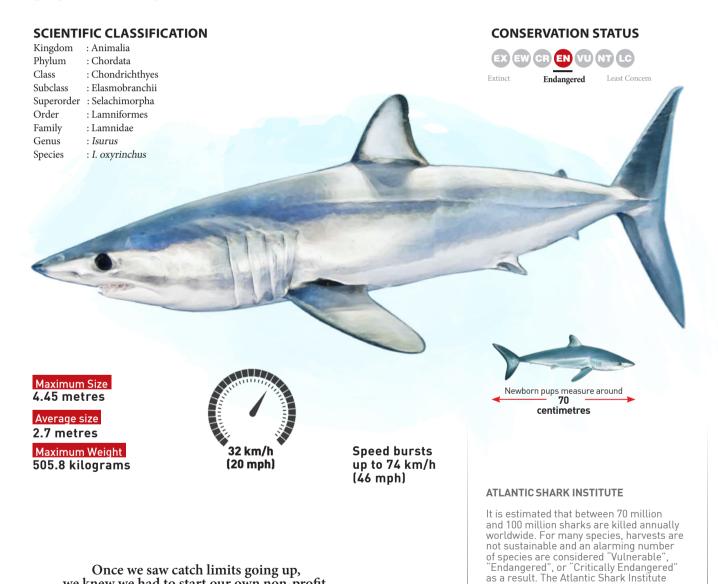


agencies, as well as advisory groups. We are just starting to have this amazing collective that can speak with one voice but also have the research and data to back it up. I personally have acquired a

46-foot (14-metre) research vessel called the RV Warfish, all decked out with the bells and whistles that you need for research, so I'm going to be supporting a lot of projects with researchers, as well as media

and filming projects. Anything we can do with the sharks to help promote and study them is so important now, and I'm just happy to be a part of all this, moving shark conversation forward to where it needs to be.

SHORTFIN MAKO



Once we saw catch limits going up, we knew we had to start our own non-profit. The Atlantic Shark Institute focuses on pelagic sharks, like blues and makos

OPPOSITE PAGE:

Those who do not have voices need people to speak for them $$_{\mbox{\scriptsize IMAGE}}$$ Joe Romeiro

funds research on shortfin mako, blue,

porbeagle, common thresher, great white, sand tiger, hammerhead and many other species of sharks with the singular goal of

aiding in their protection and sustainability.





Craving something completely different? Colourful cold-water diving spells true adventure in this remote outpost in southern New Zealand

By: Grant Thomas

A diver takes the plunge in closed-circuit rebreather gear.

The deep waters here are perfect for divers
to get their technical fix

IMAGE: Grant Thomas

Milford Sound is one of the wettest places in New Zealand, but don't let that put you off as it is also one of the most beautiful!



Milford Sound, located in the remote southwest corner of New Zealand, is not the first place that comes to mind when planning a dive trip. The name "Sound" suggests that it was formed when a river valley was flooded by the sea. However, Milford Sound is actually a fjord, carved out by the erosion of ancient glacial ice leaving behind a deep valley flanked by sheer rock faces, lush forest and majestic snowy peaks. Over time the deep valley has been slowly filled by overflow from the Tasman Sea, bringing with it a vast array of life.

With an annual rainfall of 6813mm (268 inches), Milford Sound is one of the wettest places in New Zealand, but don't let that put you off as it is also one of the most beautiful! High amounts of rainwater rush down through the dense vegetation bringing with it a tea-coloured tannin that pours into the fjord and stains the top layer of water a dark brown. This fresh water can range from two to six metres deep (6 to 20 feet) depending on rainfall, and as you descend your eyes will struggle to focus through the salt- and freshwater mixture. It is this cold, blurry layer, or halocline, that makes Milford Sound so unique to dive. The dark tannin mixture filters out sunlight which in turn creates the perfect environment for deepwater species such as sevengill sharks and huge ancient black coral trees.

CRAY & THE COD

The Piopiotahi Marine Reserve, established in 1993 and located along the northern side of Milford Sound, has created a safe environment for marine life to flourish. This is immediately obvious as you descend onto the first dive site and are greeted by curious crayfish and friendly blue cod. From a photographer's perspective this is perfect as you can get super close to your subject without harassing them, or as I found, they might even start harassing you! If you are planning a photo trip then make sure you bring your setups for both macro and wide-angle subjects as there are more than enough of both to keep your camera busy.











FAR LEFT: Always keep an eye out in the deeper water for curious bottlenose dolphins cruising past

TOP LEFT: A diver up close with a crayfish – or spiny rock lobster

BOTTOM LEFT: Perspective is a wonderful thing when photographing the small or large

IMAGES: Grant Thomas

Descend Scuba Diving is the only dive company operating in Milford Sound and they are a fantastic bunch of people. They have a range of high spec rental equipment such as wing BCDs and trilaminate drysuits, which are very much a consideration with water temperatures ranging from 12 to 18 degrees Celsius (54 to 64 Fahrenheit). The diving season runs from mid-July to mid-May and booking in advance is essential as spaces fill up fast.

THREE FAVES

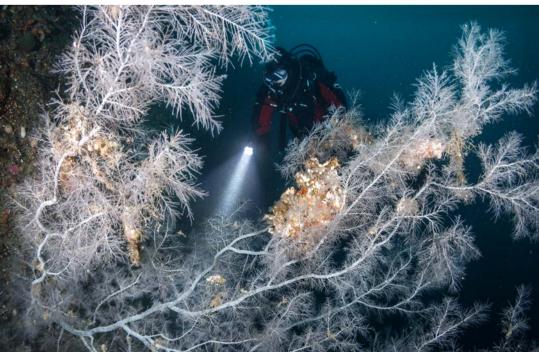
There are a huge variety of dive sites throughout the fjord but some of the most popular are Penguin Cove, Greenstone Point and The Triangle. Penguin Cove is a popular dive site and an easy way to start the day with a sloping sandy bottom and plenty of life. Huge crayfish spill out of every crack and crevice, very much as curious of us as we are of them. Black coral trees reach high up with their delicate white branches and contrast beautifully against the dark water. Also keep an eye out for the curious dogfish and carpet sharks swimming around below. The sandy floor soon drops away into a black abyss and you continue along steep rocky topography with endless black coral structures.

Greenstone Point dive site, located at the mouth of the fjord, is a steep wall dive with an abundance of life. Schooling kingfish and butterfly perch hang in the current with bright red hard coral structures reaching out from the precipitous rocky edge. Yellow zoanthids envelop entire rocky areas and carpet shark eggs nestle amongst the black coral tree branches. These eggs can often reveal a partially developed shark foetus, which can be absolutely mesmerising to watch as its tiny gills beat into life.

FJORD FUN

The Triangle dive site is different from other areas as it is located deep within the fjord and as a result it is less affected by ocean currents that help flush out sediment. This buildup of debris in the water column acts as a sun shade, blocking out light and creating the perfect environment for sevengill sharks. Unfortunately, we did not encounter any that day, but we did get to see one of the largest black coral structures in the entire fjord, about the size of a large family car.







OPPOSITE PAGE TOP:

Yellow zoanthids envelop entire rocky areas

OPPOSITE PAGE BOTTOM:

One of the many huge black coral trees

MAGES: Grant Thomas







TOP:

A single strobe captured this Jason's nudibranch along with a silhouette of his wrasse fish friend ABOVE:

A friendly octopus emerges from its hole and strikes a perfect pose LEFT:

Surface interval at one of the wonderful waterfalls IMAGES: Grant Thomas There are many more amazing dive sites to keep you busy during your trip. Swim through schools of blue moki at Moki Reef, observe millions of crayfish at Cray's Crack, and hang out with friendly octopuses at Dale Point. Knowledgable dive guides are always on hand to point out interesting and unique creatures such as the warty nudibranch or spiny seadragons. Always keep an eye out for curious fur seals and pods of dolphins that cruise up and down the fjord.

During the surface interval you can expect a guided tour to one of the many magical waterfalls, along with an ice cold glacial shower to keep you refreshed. Milford Sound has everything to keep you amused, both above and below the water. It is more than just a dive trip – it is a whole experience that is very unique to New Zealand.

The best time to visit is in the New Zealand summertime, but Descend Scuba Diving do operate from the middle of July to the middle of May. Most people choose to stay in the nearest town of Te Anau and drive or bus into Milford each morning. Weather can change wildly throughout the day so come prepared and bring a warm jacket, sunscreen and most importantly, your sense of adventure!

(RE)BREATHE DEEPER

Reap the benefits of closed-circuit scuba at Wakatobi Resort, where rebreathers have been a staple since the early days By: Walt Stearns

The reef system surrounding Wakatobi Resort presents divers with an impressive array of underwater topographies with profiles beginning a mere one to three metres (3–10 feet) from the surface plunging to drop-offs bounding into the abyss. For opencircuit divers, a single bottle will easily provide a run time of 60 to 70 minutes without even going into deco. The one limiting detail is depth, as recreational divers are pretty much confined to the upper part of these reefs, between the surface and 39 metres (128ft). For these divers, what lies beneath will

remain a mystery, unless of course they happen to be diving a closedcircuit rebreather.

While this sophisticated underwater breathing apparatus has in no way replaced the widespread use of open-circuit scuba, their popularity has grown substantially. In addition to the benefits of delivering warmer, moister gas for the diver to breathe, which can go a long way in reducing the loss of body heat and dehydration for added comfort, the most beneficial aspects of a closed-circuit rebreather

"Overall, it would be hard
to imagine a more
perfect environment.
You don't have to dive a
rebreather to experience all
the wonderful attractions of
Wakatobi, but having these
systems can add yet
another layer to your enjoyment
of Wakatobi's magnificent
ecosystem."
- Craig Willemsen,

RIGHT: One the greatest advantages
CCR divers have is the ability to stay
submerged for extended periods of time
FAR RIGHT: At Wakatobi divers have the
option to enjoy extended CCR dives mere
steps away from the dive centre, entering
from the beach or off the jetty ladder

Owner of Silent World Diving



(CCR) is the ability to provide extended range dive profiles in terms of both depth and time. Then there is the silent factor, as most rebreathers can perform this task without making hardly any noise at all, which often allows divers to approach marine life without startling them.

The one complication for diving CCRs in remote locations around the world is the operations offering support must be able to provide more than a sufficient supply of pure oxygen and absorbent medium for the rebreather's scrubber as well as air, nitrox or even helium for the unit's supply cylinders and bailout tanks. The operation's staff should have adequate knowledge and understanding of CCR diving, as they often encompass modified diving itineraries to accommodate longer run times.

AMONG THE FIRST

Dating back to 2006, Wakatobi has actively catered to CCR diving in the Indo-Pacific region, and is among the very first to have done so. Here, rebreather divers are provided not only the support structure required to service their equipment, but they also have access to the same reefs that allow open-circuit scuba divers to enjoy long multi-level dives. To a rebreather diver, this can be nirvana, as a profile can begin with the investigation of the deeper portions of a given site, followed by a long, leisurely hour-plus ascent along the side of the reef. Taking into consideration that reef profiles often terminate just below the surface, the underwater scenery along with its abundant collection of marine life is unending until the diver exits the water.



Closed-Circuit Rebreather





Why Wakatobi took on this level of service is due to the interests of the resort's founder, Lorenz Mäder. Soon after purchasing his first rebreather, Lorenz realised the need to invest in the systems required to support closed-circuit diving, and not just for his own benefit. The dive centre quickly acquired the appropriate equipment and supplies. This includes gas boosters and oxygen supply for pumping CCR oxygen cylinders to 206-bar [3,000 psi]. Additionally, a constant supply of Sofnolime 797 [8-12 mesh]

absorbent, along with a cache of two-litre CCR oxygen and Dil tanks in both steel and aluminium are on hand, along with an assortment of off-board bailout tanks and regulators. The measures do not end there, as the delivery of helium to support trimix diving is available when requested.

GROUPS AND GUIDES

The resort maintains a steady level of support for up to 15 rebreather divers at all times. Larger groups can, with advanced notice, be accommodated

as well. Cartridge absorbent can also be provided given sufficient lead time to ensure shipping.

To accommodate rebreather diving, Wakatobi's dive team maintains a set of protocols and boat schedules to carry out CCR intensive dives. Larger rebreather groups are often assigned their own boat, allowing them to take maximum advantage of the silent diving experience and enjoy the full freedom the technology allows.

On many trips, rebreather divers are paired with a dive guide who is also rebreather qualified, and who



ABOVE: Rebreather divers can explore the deeper portions of Wakatobi's walls and reefs,
taking their time as they move up into the shallows, IMAGE: Dr. Claus Meyer

OPPOSITE PAGE TOP: Wakatobi's house reef is ideal for rebreather diving. Divers have the option to enjoy extended CCR dives mere steps
away from the beach fronting the resort's villas and bungalows, IMAGE: Walt Stearns

OPPOSITE PAGE BOTTOM: At Wakatobi rebreather divers are provided not only the support structure their equipment requires, but also enjoy a
marine environment that is ideally suited to maximising the in-water benefits of rebreathers, IMAGE: Steve Miller





will accompany the dive team through an extended profile. Even on those occasions when rebreather-qualified guides are not available, the dive team can create a plan that allows rebreather divers to enjoy extended bottom times with guides on open-circuit equipment who split their services into two shifts.

LIVEABOARD CCR

CCR diving is also available aboard Wakatobi's liveaboard dive yacht, Pelagian – but only upon advance request of at least four months with Wakatobi's administrative offices in Bali.

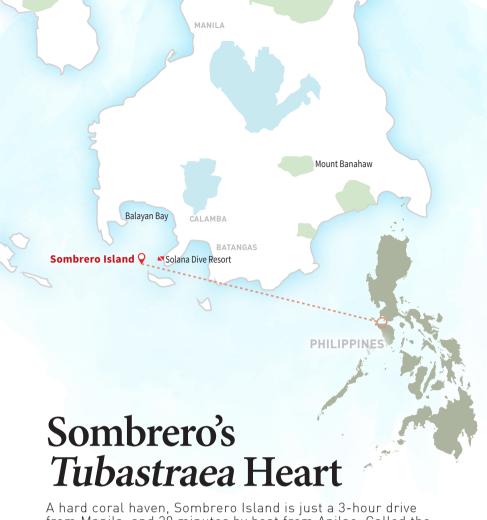
Diving from *Pelagian* is conducted from the yacht's tenders, therefore diving a rebreather from these smaller boats requires a higher degree of fitness and comfort with

the equipment than would be the case aboard the resort's large day boats. In addition, because gear space aboard the tenders is limited on trips when the *Pelagian* is filled to capacity, CCR diving at such a time would be limited to a single off-board configuration rather than the more complex rigging needed to stage extended decompression or trimix dives.

Any rebreather divers planning to visit Wakatobi should be certified on the equipment they bring, as the resort is not geared to provide CCR instruction. Visiting groups are not allowed to perform their own classes, as the instruction would require an Indonesian permit. The dive centre stocks spare parts for AP Diving rebreathers, but divers using other brands will need to carry any spares they feel necessary.

Regardless of your preference to go deep or shallow, there are plenty of reasons to bring a rebreather to Wakatobi. But even with all these advantages, there's still one thing you will have in common with those who use traditional scuba: At the end of your trip, no matter how much bottom time you logged, you'll want to come back for more.

For more information about Wakatobi's rebreather support services, or to plan a trip, contact office@wakatobi.com, or complete a quick trip inquiry at www.wakatobi.com.



A hard coral haven, Sombrero Island is just a 3-hour drive from Manila, and 30 minutes by boat from Anilao. Called the birthplace of Filipino scuba diving by some, the stunning colours of Sombrero's reef places it among the nation's best By: Jett & Kathryn Britnell

For several days, Kathryn and I had been gazing longingly at a hat-shaped island from Dive Solana Resort's expansive compound. It felt as if Sombrero Island was calling to us, but we were being held back from making a dive there due to its exposed location and some rather impressive white-cap wave action generated by storm winds courtesy of a typhoon lurking ominously offshore from the Philippines.

Aptly named because its unique shape resembles that of a Mexican sombrero, this uninhabited island is situated off the eastern tip of Tingloy Island in the Philippines Anilao Batangas Marine Park Sanctuary, and is known as being one of the best diving and snorkelling spots in the park. On the morning the weather improved, we departed early to go for a splash to avoid currents and swell that tend to be strongest in the afternoon.

Fueled with anticipation, all the scuba divers on-board double-checked

their underwater camera settings as our diving banca, a traditional Filipino boat, nudged itself closer to Sombrero's northern shoreline to drop anchor. Stiff surge pushed and pulled us around the moment we slipped beneath the waves.

Once we descended closer to the seafloor, things settled down somewhat as we were able to use Sombrero's numerous gullies and coral heads as cover from the liquid headwinds. Indeed, we were informed the diving here can be tricky at times due to ripping currents and formidable undertows that may flow from any direction, but occasionally no current. Yet, we felt quite at ease exploring Sombrero's shallower coral depths amid the dense swarms of anthias frolicking in the water column.

RIGHT: Tubastraea cup corals, crinoids and a multitude of hard corals adorn Sombrero Island's reefscapes IMAGE: Jett Britnell







for macro diving. Indeed, there is an impressive assortment of exotic reef critters at Sombrero Island, so at times it pays to simply stay in one place and search every nook and cranny for rare and unusual species.

For those seeking some all-out muck diving to strike some marine life such as mototi octopus, Zanzibar shrimp or solar-powered nudibranchs off their critter bucket list, you'll find them in spades at nearby dive sites in Batangas Bay, or Balayan Bay. Both these large bodies of water match up favourably against the exotic marine biodiversity one can find at other world-famous muck diving destinations, but perhaps with less trash and better visibility.

Sombrero Island is often mistakenly assumed to be part of Anilao because diving tours depart from there. Most of the dive resorts in Anilao will visit Sombrero Island

BIRTHPLACE OF PHILIPPINES DIVING

Sombrero Island's current-swept hat rim stretches from north to south underwater and is crisscrossed with wide gullies and immense coral heads. Tubastraea cup corals, also known as sun corals, with their striking yellow polyps and pink bodies, carpet the reef terrain. Ocean currents nourish these colourful hard corals, which in turn attracts large schools of trevallies, jacks, tuna and rainbow runners. Reef fish species include triggerfish, lionfish, batfish, giant frogfish and several species of rays. While it is always possible for some big pelagics to swim by, these encounters are unfortunately never guaranteed. Amongst the barrel and vase sponges, there are soft corals and a spectacular range of nudibranchs. Multicoloured feathery crinoids are seemingly scattered everywhere.

In 2006, international marine scientists proclaimed the Philippines as being in the centre of marine biodiversity in the world, surpassing even the Great Barrier Reef of Australia. In an archipelago with more than 7,000 tropical islands, Sombrero Island is one tiny isle that stands out in a crowd. Viewed by many as being the birthplace of scuba diving in the Philippines, Anilao's dive sites have earned a worldwide reputation









when tide and weather conditions are just right. Anilao is just a two- to three-hour drive from Manila, the capital of the Philippines. To reach Sombrero Island, it will take you 15 to 30 minutes by boat from the dive resorts. Travel time will vary depending upon weather conditions and how calm or rough the sea conditions are.

Overall, divers can anticipate good visibility and water temperatures requiring only a dive skin or 3mm

wetsuit. The season is optimal between November to May, while June to October is the rainy season, also known for typhoons. Rain will generally cause a decrease in underwater visibility and in places can bring about storm warnings that prohibits diving for several days. Sombrero is deemed to be an uninhabited island, but is also visited by day trippers who want to chill on its white sand beach. As the island

is privately owned, there are fees to be paid if you wish to go ashore and use any of the available huts and tables.

TUBASTRAEA HEART

Whenever shimmering rays of sunlight pierce Sombrero Island's depths. there are few places we have dived in the Philippines that compare to its beautiful hard coral gardens. With its often exceptional visibility and countless swim-throughs, underwater photographers can easily shoot either wide-angle or macro subjects here due to the sheer abundance of marine life species. Apparently, if you descend deeper in places at Sombrero, you will come across some undersea caves. Ginclear warm water mixed with a mindblowingly beautiful reefscape makes this corner of the Philippines a true scuba diver's paradise. In retrospect, we feel we only gently felt the pulse of Sombrero Island's Tubastraea heart.

There are few places we have dived in the Philippines that compare to Sombrero Island's beautiful hard coral gardens

OPPOSITE PAGE TOP: We were able to use Sombrero's numerous gullies and coral heads as cover from the liquid headwinds IMAGE: Jett Britnell

BELOW (CLOCKWISE FROM TOP-LEFT): The porcelain anemone crab, Neopetrolisthes maculatus, is also known as the spotted porcelain crab; a giant frogfish; Dive Solana Dive Resort shore front with Sombrero Island off in the distance on the right side of this image; a poison ocellate octopus, aka mototi blue-ring octopus, IMAGES: Jett Britnell





TUBASTRAEA CORAL

Aka orange cup corals, sun corals



Family Genus Diet : Dendrophylliidae : Tubastraea

: Zooplankton, non-photosynthetic

Reproduction : Polyps (asexual) and

Status : Appendix II (CITES), at-risk



JETT AND KATHRYN BRITNELL are professional underwater and wildlife photographers, explorers, internationally published writers and speakers based in Vancouver, British Columbia, Canada. Both are Fellows of The Explorers Club in New York, Royal Canadian Geographical Society in Ottawa, and Royal

Geographical Society in London.

Special thanks: Dive Solana Resort, San Teodoro, Mabini, Batangas, Philippines. www.divesolana.com.

EX-HMAS TOBRUK

Queensland's newest dive site By: Tourism & Events Queensland

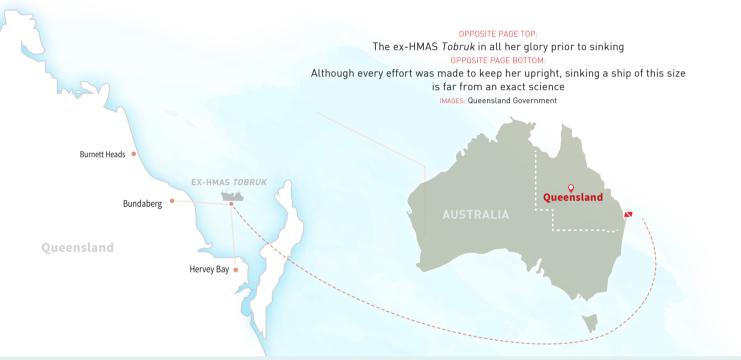
The ex-HMAS *Tobruk* was officially opened to divers on Monday, February 25, 2019. Scuttled in mid-2018 approximately 32 kilometres (17 nautical miles) off the coast, halfway between Bundaberg and Hervey Bay in the Great Sandy Marine Park, the ex-HMAS *Tobruk* is much more open than a standard military wreck, which allows more light in and is a key

point of difference for the site. A significant amount of growth has already begun to form across the wreck and a huge variety of marine life has made the site home, including turtles, rays, groupers, cod and Spanish mackerel. What sets the ex-HMAS *Tobruk* apart from other wreck dives is that certified wreck divers can swim over 100 metres in

one direction inside the ship. Troops areas, crew quarters, the tank deck and other sections are also all waiting to be explored. Divers can also expect to see and hear migrating humpback whales as they traverse through the Great Sandy Marine Park from May to November.

LOCATION

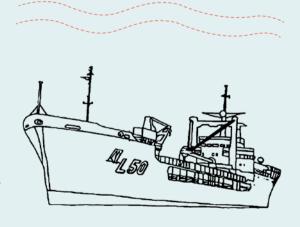
Approximately 32 kilometres (17 miles) offshore, the site is located 40 kilometres (22 miles) from Bundaberg and 46 kilometres (25 miles) from Hervey Bay. Dive tour vessels can reach the site within an hour.



DIVE INFORMATION

28.5M (93FT)of water at lowest astronomical tide (LAT)

The tidal range at the site is approximately 3m (10ft), therefore at high tide the wreck could be in 31.5m (103ft) of water



Visibility is typically between 8M (26FT) & 20M (65FT)

with the best visibility in winter and on the slack tides

The shallowest part of the ship (the entire port side) is in

12M (40FT) of water at LAT

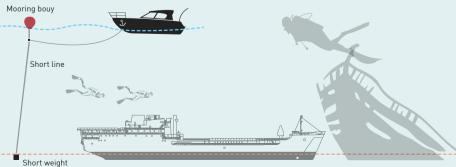




Each boat accessing the site is allocated a mooring. There is a diver transit line that runs from the mooring line to the ship. This guides divers to and from the ship

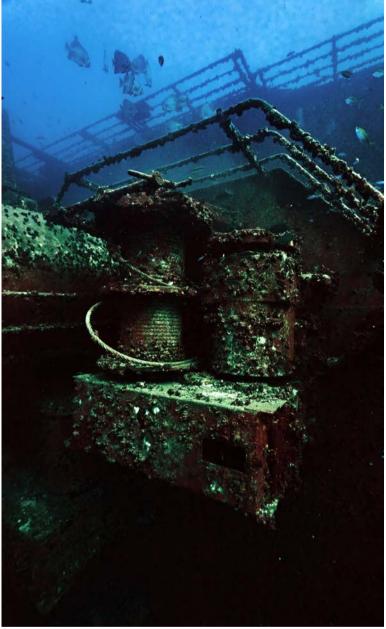
All divers must have a recognised scuba diving qualification.
A range of dives is available, suitable for Open Water level certificate divers to Advanced Wreck Divers

Check the weather forecast before your dive trip. Weather forecasts are available from the Bureau of Meteorology









TOP LEFT:

Top view of the crane with ex-HMAS *Tobruk* on its side TOP RIGHT:

Giant winch with fresh barnacles indicate the wreck is recently sunk MAGES: Glenn Yong

The ex-HMAS *Tobruk* site is a restricted access area in the marine parks, and entry is prohibited without a permit or written approval. This applies to everyone – all vessels, divers and snorkellers. Be sure to check with your operator, who should be able to assist in getting all permissions in order.

It is important to remember that wreck diving is potentially dangerous. Ensure to plan your dive and dive your plan. The Ex-HMAS *Tobruk* dive wreck is a partnership between the Queensland Government, Bundaberg

and Fraser Coast Regional Councils; creating a world-class dive site in the Great Sandy Marine Park.

TO BOOK A DIVE ON EX-HMAS TOBRUK:

- Visit Fraser Coast Tourism and Events, for tours leaving Hervey Bay
- Visit Bundaberg Region Tourism, for tours leaving Bundaberg.

DIVING THE TOBRUK

By: Glenn Yong

Famed as one of the world's most spectacular dive regions, the Great Barrier Reef now has a new attraction. Spanning a whopping 127 metres, the Ex-HMAS *Tobruk* caters for divers of all levels and certifications, and will prove to be a star attraction in the coming years.

Despite the ship listing to one side during sinking, most areas of the *Tobruk* remain accessible and while there is limited visibility within the ship, the troop areas, tank deck and other sections of the ship are waiting to be explored by divers. The upper decks rest at a comfortable depth of

approximately 18 metres, while the tank decks range to about 25 metres.

Getting into the Ex-HMAS *Tobruk* requires hopping on-board with one of the few authorised dive centres in Bundaberg, and enjoying a fairly comfortable ride out, when the waters are calm and still







The best time to dive the *Tobruk* is from November till January when waters are slightly warmer. The Southern Reefs are filled with so many options to explore that this latest wreck is like the icing on the cake of activities to do in Bundaberg.

TOP LEFT: The top of the ship lies
at 12 to 15 metres.

This would be a very good experience for
Open Water and Advanced divers
to challenge themselves
with wreck diving
LEFT: The ship was sunk in June 2018,
and large schools of reef fishes
are now seen schooling around the wreck
ABOVE: Top view of the walkways
of the ex-HMAS Tobruk
IMAGES: Glenn Yong

Marine Stewardship Council: Sustainable Seafood in Asia

Non-profit sustainable seafood certification programmes are not just restricted to Europe and the United States. The Marine Stewardship Council is working with fisheries across Asia to ensure all commercial fishing is done responsibly

By: Terence Koh

The Marine Stewardship Council (MSC) ecolabel and certification programme recognises and rewards sustainable fishing practices by helping to create a more sustainable seafood market.

According to Sheryl Torres-Wu, the nonprofit organisation's programme director for Southeast Asia and Hong Kong, the average amount of seafood consumed by a Singaporean is 22 kilograms per year, a figure higher than most global averages.

Speaking at a luncheon at Grand Hyatt Hotel (which serves seafood certified sustainable by MSC and the Aquaculture Stewardship Council, the two organisations that set standards for sustainable fishing and aquafarming) organised especially to raise awareness about the need for sustainable seafood, Sheryl revealed that there are at least 15 species that are now sustainably sourced from fisheries certified by the MSC, including king prawns, lobster, abalone, and tuna.

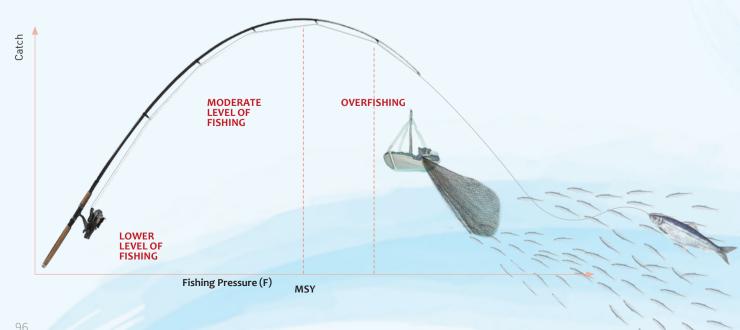
To qualify for MSC's certification, fisheries have to satisfy three core principles. Firstly, the fish that the fishery catches must have sustainable stocks. The fishing has to be at a level that ensures the fish population remains productive and healthy so that it can continue indefinitely. Secondly, there must be minimal environmental impact from the fishing activity. For this to happen, fishing activity needs to be managed carefully so that other species and habitats within the ecosystem remain healthy. Thirdly, the fishery must be well managed. Fisheries certified by MSC must comply with relevant laws and be able to adapt to changing environmental circumstances. Each stage of the production process, from the fishery, wholesaler to the retailer, must adhere to MSC's principles of conduct. These principles help ensure that each fish can be traceable from a retail box to a seafood packaging

factory and all the way to a fishing boat out in the ocean.

With 60 certified fisheries in Asia Pacific, MSC hopes to cut down the consumer's dependence on seafood caught through illegal fishing. One of its certified fisheries is Meiho Fishery, a pole-and-line skipjack and albacore tuna fishery located in Shiogama-city, Miyagi Prefecture in Japan. The first fishery in Tohoku (North East) and only the third fishery of any kind certified in Japan, Meiho Fishery was founded by Mr. Matsunaga after 16 years working in the seafood processing industry. Due to the shortage of skipjack tuna caused by the 2011 Great East Japan Earthquake, Matsunaga decided to start his own fishery instead. Meiho was certified by Acoura Marine, an independent certifier, who deemed it in compliance with MSC standards.



MAXIMUM SUSTAINABLE YIELD (MSY)







1. Sardine (Sardinops sagax)

Location : Eastern Indian Ocean Gear Type : Surrounding nets – with purse

lines (purse seines)

Certified Fishery: South Australia Sardine

(since 2018)



2. Hake (Merluccius australis)

Location : Southwest Pacific Gear Type : Trawl – bottom trawl Certified Fishery : New Zealand Hoki

(since 2014)



3. Sea Mullet (Mugil cephalus)

Location : Eastern Indian Ocean Gear Type : Gill nets, haul nets

Certified Fishery: Peel Harvey Estuarine Commercial

Blue Swimmer Crab and Sea Mullet (since 2016)



4. Swordfish (Xiphias gladius)
Location : Southwest Pacific

Gear Type : Hooks and lines – longlines

Certified Fishery: Walker Seafood Australian

Albacore, Yellowfin Tuna, and Swordfish Longline (since 2015)



5. Pink Ling (Genypterus blacodes)

Location : Southwest Pacific
Gear Type : Longlines, bottom trawl
Certified Fishery: New Zealand EEZ Ling Trawl

and Longline (since 2014)



6. Pipi - Australia (Donax deltoides)

Location : Eastern Indian Ocean Gear Type : Hand gathered

Certified Fishery: South Australia Lakes and

Coorong Pipi (since 2016)



7. Yesso Scallop (Patinopecten yessoensis)

Location: Northwest Pacific
Gear Type: Miscellaneous gear
Certified Fishery: Zhangzidao Scallop, China

(since 2015)



8. Blue Swimmer Crab (Portunus armatus)

Location : Eastern Indian Ocean

Gear Type : Traps

Certified Fishery: Peel Harvey Estuarine Commercial

Blue Swimmer Crab and Sea Mullet (since 2016)



9. King Prawn (Penaeus (Melicertus) latisulcatus)

Location : Eastern Indian Ocean Gear Type : Hooks and lines – longlines

Certified Fishery: Spencer Gulf King Prawn, Australia (since 2011), Shark Bay Prawn, Australia (since 2015), Exmouth Gulf Prawn, Australia (since 2015)



10. Orange Roughy (Hoplostethus atlanticus)

Location : Southwest Pacific Gear Type : Trawl – Bottom trawl Certified Fishery : New Zealand Orange Roughy

(since 2016)



11. Antarctic Toothfish (Dissostichus mawsoni)

Location : Antarctic and Pacific
Gear Type : Hooks and lines – set longlines
Certified Fishery: Ross Sea Toothfish Longline

(since 2010)



12. Skipjack Tuna (Katsuwonus pelamis)

Location : Pacific

Gear Type : Surrounding nets with purse

lines (purse seines), pole and line, hooks and lines

Certified Fishery: PNA Western and Central

Pacific Skipjack and Yellowfin, Unassociated / Non FAD Set, Tuna Purse Seine (since 2011)



13. Yellowfin Tuna (Thunnus albacares)

Location : Pacific

Gear Type : Hooks and lines – longlines,

surrounding nets with purse lines

(purse seines)

Certified Fishery: PNA Western and Central

Pacific Skipjack and Yellowfin, Unassociated / Non FAD Set, Tuna

Purse Seine (since 2011)



14. Rock Lobster (Panulirus cygnus)

Location : Eastern Indian Ocean Gear Type : Traps – pots

Certified Fishery: Australian Western Rock Lobster

(since 2000)



15. Abalone (Haliotis conicopora)

Location : Eastern Indian Ocean

Gear Type : Hand gathered Certified Fishery : Western Australia Abalone

(since 2017)



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JAPAN AGAIN KILLING GIANTS

The Japanese government stops pretending it is conducting science and admits it is now allowing a fleet to hunt whales for profit By: Diego A. Garcia (UW360)



The Japanese government has pulled out of decades-old international agreements, parting ways with the International Whaling Commission, and is now openly hunting whales for commercial purposes for the first time in 30 years. How has it come to this?

The head of Japan's fisheries ministry, Shigeto Hase, said: "The resumption of commercial whaling has been an ardent wish for whalers across the country." The statements were made during a ceremony in Kushiro for the departing fleet. He said the resumption of whaling would ensure that "the culture and way of life

will be passed on to the next generation." The statements appear out of step with reality, however, as the fleet is clearly a commercial whaling operation of the modern era.

In the indigenous communities of Lamalera, Indonesia, for example, restrictions on modern technology are enforced by the locals themselves. Whale meat is not sold in supermarkets but is instead shared following traditional requirements. In Japan, the whaling fleet returned with their harpoons covered. But we haven't forgotten recent videos showing explosive-tipped harpoons that hardly invoke the warm and virtuous

"cultural" argument the ministry representatives are touting. Grandpa isn't taking junior out in a rowboat to tell him tales of the old country, only to bring back enough catch for their dinner plates. And since when is navigating via GPS "cultural"?

Nevertheless, the agency has stated that whale hunting will take place only in Japanese waters, which leaves no legal recourse.

ABOVE:

Japan returns to commercial whaling, Monbetsu, Japan, 2019 As history has taught us, however, just because something is legal, it does not make it right. We are talking about rare animals the size of numerous elephants, known to be both easy to kill and slow to reproduce. It is a miracle we still have so many whale species alive today.

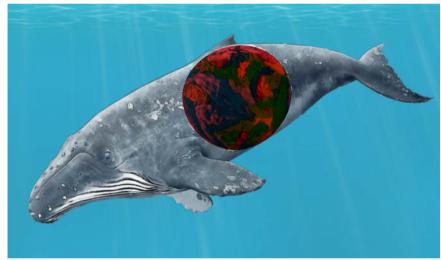
Humans have hunted whales for millennia, but only since the Industrial Age have we been able to kill these enormous animals with such veracity that we very nearly eliminated them. Despite decades of protection, not all whale populations have recovered. In fact, many are still struggling, having to now cope with threats as pervasive as the accumulation of toxic chemicals in their flesh, plastic pollution in their stomachs, noise pollution throughout their habitat, discarded fishing gear, and horrific fatal collisions with ships.

"The real beast here is not the whales, but the market and its relatively infinite consumption. Why poke the beast by reopening the market and telling people it's okay to eat these amazing animals?"

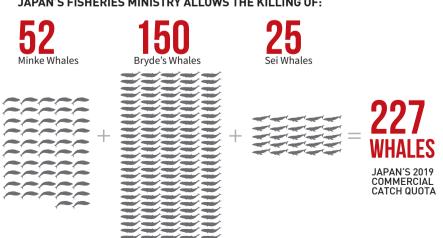
TOP RIGHT:
Hunters haul in their catch,
Monbetsu, Japan, 2019
RIGHT:

Plastic pollution in a whale's stomach





JAPAN'S FISHERIES MINISTRY ALLOWS THE KILLING OF:



There are so many good arguments against reopening whale hunting anywhere that it hurts the head to think about it, but perhaps my biggest concern is this: In the 40s and 50s whales were the biggest source of meat in all of Japan. Since then their economy, as well as tastes, have changed, but palates are finicky things, and can always change back. The real beast here is not the whales, but the market and its relatively infinite consumption. Why poke the beast by reopening the market and telling people it's okay to eat these amazing animals? This is the true crime, if not against the law, certainly against Nature. AD



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THE DAN MEDICAL INFORMATION LINE

DAN World



I remember my first call to DAN, which I made years before I became CEO (or even joined the board of directors). As my fellow divers and I rode out to a dive site, our conversation turned to asthma, and I casually mentioned that I had asthma as a child. While my condition had been under control for years, some members of the group were concerned about whether it was safe for me to dive. They encouraged me to call the DAN Medical Information Line to find out more. I distinctly remember how impressed I was not only with the medic's expertise but also with his sensitivity and candour. Even though he told me it was probably safe for me to dive, he also helped me fully understand my fellow divers' concerns and the considerable risks for divers with unmanaged asthma. Thanks to the information he provided, I was able to reassure the group and continue diving with confidence.

The DAN Medical Information Line is a core component of DAN's service to

its members. Established in 1982, this assistance line was created to provide relief to overwhelmed public emergency lines. It was initially staffed by a handful of medics who fielded approximately 200 calls annually. Today DAN medical information specialists answer more than 15,000 information and emergency calls and emails annually. Whereas DAN medics once kept track of calls using handwritten documentation, they now record notes as well as demographic and regional data in a central database that allows experts to identify trends to better target research and assistance efforts. With this information, DAN can identify regional needs for resource allocation and pinpoint topics that require more dedicated attention. Even though the number of calls has increased since we first started this service, our team still employs that same level of sensitivity and expertise I recall from my first encounter. They continue to work diligently to provide divers with the most accurate, up-to-date and

unbiased information on issues related to dive safety. The DAN medical services team is composed of dive instructors and leaders who carry impressive credentials: They are paramedics, emergency medical dispatchers, dive medical technicians, emergency medical technicians, certified hyperbaric technicians and physicians.

In addition, the team maintains an extensive network of medical professionals and subject-matter experts; if we can't provide an answer directly, we can connect you with the resources that can. For divers who need to find local doctors familiar with dive medicine, we maintain an extensive physician-referral database. We also serve as a resource for physicians; about 10 to 15 percent of calls are from healthcare providers requesting consultation on fitness-to-dive assessments or nonemergent medical conditions related to diving. If you have questions about medical conditions or medications, we encourage you to call us. Even if you think it's minor, don't hesitate to dial the DAN Medical Information Line at +1-919-684-2948, or send us an email (medic@dan.org). Our team is standing by to assist you.

Dive safely,

Bill Ziefle President DAN (Divers Alert Network)

Connect

Engage with DAN on Facebook for insights into various dive safety and medical issues. Search "Divers Alert Network"



COULD BREATH-HOLD DIVING AFTER SCUBA CAUSE DECOMPRESSION SICKNESS?

By Petar Denoble

Recreational divers sometimes practise scuba and breath-hold diving on the same day. Some are concerned that

breath-hold diving after scuba may increase their risk of decompression sickness (DCS). Their worry is that



repeated descents and ascents might change the ultimate destination of venous gas emboli (VGE) - or bubbles possibly present in their blood after scuba diving and make them more likely to suffer DCS. Another reason for their concern is the possibility that breathhold dives build up dissolved inert gas in addition to what remained in the body after scuba and thus may create conditions for DCS. But is DCS feasible in breath-hold diving at all?

Despite uncertainties about their causes. neurological accidents in extreme breath-hold diving have been observed and cannot be dismissed

Modelling the risk of DCS after freediving in humans provided a hypothetical scenario in which DCS could occur after a single extreme dive, but the mechanisms that cause DCS seem unlikely in breath-hold diving. Cumulative effects of many repeated dives with short surface intervals could theoretically produce conditions for the occurrence of VGE, but so far there have been very few reports of bubbles observed in breath-hold divers. Some argue that DCS in breath-hold diving may be different than in scuba diving and that it may occur independent of VGE.

DCS-like symptoms in breath-hold divers have been reported. Symptoms of brain affliction have been observed in extreme diving done by harvesters, spearfishermen using scooters and in freedivers repeatedly doing very deep dives.

DCS is one possible cause of these symptoms, but other causes include oxygen depletion, brain bleeding (due to extreme changes in blood pressure observed in breath-hold diving), arterial gas emboli caused by lung damage at depth, repeated micro-injuries to the brain and other factors. Pre-existing medical conditions like small vessel disease could also be involved.

Regardless of whether breath-hold diving produces VGE by itself, the concern that breath-hold diving after scuba may cause the redistribution of VGE seems rational, but the risk remains very small. Despite uncertainties about their causes, neurological accidents in extreme breath-hold diving have been observed and cannot be dismissed.

Here, two experts address questions regarding DCS in breath-hold diving.

Q: Is the occurrence of DCS in breathhold diving a real risk?

Robert M. Wong: DCS seems to be a real risk but only in extreme breath-hold diving. Clinical signs and symptoms have been observed in competitive divers, commercial sea harvesters of Japan (ama divers), recreational spearfishermen of Australia and Spain, and in the pearl divers of the Tuamotu Archipelago. Symptoms never appear on the first day of the diving week for the ama divers, and symptoms occur only after diving for at least 3.5 to 4 hours to depths in excess of 20m when the surface interval is shorter than the dive time, suggesting nitrogen accumulation as a contributing factor.

Venous gas bubbles have been detected in Japanese *ama* divers

(K. Kolshi 2010, pers. comm.) as well as in a breath-hold diver who performed a series of dives to depths of 47m despite breathing oxygen for decompression (K. Huggins 2006, pers. comm.). Obviously, detection of bubbles per se does not imply occurrence of DCS, but the possibility exists. A patent foramen ovale (PFO) may have been a contributing factor in the case of a diver who made between 10 and 12 dives to depths of 10 to 18 metres, each lasting 60 to 120 seconds with surface intervals of five to six minutes. Two hours after the last dive, he experienced dizziness, visual disturbance, chest tightness and numbness in the right side of his face. It appears that the dives he made were sufficient to produce VGE, which then may have caused symptoms because of the PFO.





Neal W. Pollock: There are anecdotal and retrospective data in the literature that are consistent with a diagnosis of DCS. A recent attempt to model the risk found that it was negligible for dives to depths of less than 100m, then rising as a function of exposure depth until the depth was sufficient for airway collapse to limit gas uptake from the lung, possibly in the range of 230m. The magnitude of the hazard is unclear, but the absolute risk is probably very low for most freedivers, particularly when conservative surface times between dives are maintained.

Q: Does breath-hold diving after scuba diving increase the risk of DCS?

Wong: Breath-hold diving after scuba may increase the risk of DCS, but the evidence is scarce. The classic case was reported by Paulev, who experienced nausea, dizziness, belching, hip and knee pain, weakness, paraesthesia and blurred vision after performing repetitive breath-hold dives to 20m for five hours. His breathhold dives were preceded by a hyperbaric exposure as a chamber attendant for eight minutes at 20m. Three similar cases of DCS have been reported after divers were exposed to pressure in a hyperbaric chamber prior to breath-hold diving.

Pollock: Compressed-gas diving prior to freediving certainly increases the theoretical risk. High tissue concentrations of inert gas after compressed-gas dives could make the impact of the freediving important. While no experimental evidence exists, bubbles produced following the compressed-gas dive could migrate to more sensitive tissue when transiently compressed by the freedive. Similarly, the physiological stress of freediving could enhance pulmonary shunting, potentially increasing the risk or frequency of bubbles entering arterial circulation. The hazard might be greatest in the first part of the freedive when both bubble size and physical effort would be relatively high or at the end of the freedive if augmented shunting continued. Again, though, there is no evidence of these factors causing injury.

Studying a relatively rare event like DCS is difficult; studying a second rare event on top of the first is much more difficult.

Q: What is the nature of neurological symptoms reported in breath-hold divers?

Wong: Symptoms after breath-hold dives appear to affect the central nervous system more frequently than symptoms that follow scuba dives. The most common are vertigo, nausea, vomiting, paraesthesia, muscular weakness and paralysis. Others include impaired concentration, lethargy, speech disturbance and altered level of consciousness. Musculoskeletal or joint pain appears uncommon.

Pollock: A key feature of the neurological symptoms reported by freedivers is the transient nature. This could be consistent with the lower gas loads associated with freediving exposures and the faster compression and decompression rates freedivers experience. It is tempting to think that we understand decompression hazards based on the wealth of compressed-gas data, but this includes relatively little at the high descent and ascent rates - on the order of 1.8m per second – commonly employed by freedivers.

Q: What is the risk of neurological accidents in breath-hold diving, and how could it be mitigated?

Wong: The common factors causing neurological symptoms include breathhold dives in excess of 20m, repetitive dives over the course of three hours or more and short surface intervals. If time spent at depth is more than double the time on the surface, even a series of repetitive dives lasting less than three hours would risk DCS. To avoid an increased risk of DCS, breath-hold divers should limit the number of repetitive dives and keep the surface interval time greater than the dive time.

Pollock: Neurological compromise in freediving may result from hypoxic

loss of consciousness, decompressioninduced insult or other problems. A battery of strategies should be employed to reduce the hazard. First, freedivers must understand and limit predive hyperventilation; it works to extend breath-hold time but can completely remove normal protections against loss of consciousness. Freedivers should also employ defensive weighting, establishing empty lung neutral buoyancy at 5m, or deeper with deeper dives.

Adequate supervision to address incidents immediately is also critical. Direct supervision by a partner or partners should be maintained throughout a breath-hold dive and for 30 seconds postdive to ensure stable consciousness. The complexity of the support network increases with dive depth and other complications such as low visibility. Automatic surfacing devices have the potential to reduce the life risk under a range of conditions. The risk of DCS is reduced by separating freediving and compressed-gas diving and by maintaining a minimum surface interval between dives. The surface interval should start at twice the duration of the dive time and increase as a function of the exposure depth.

Meet the Experts

Neal W. Pollock, Ph.D., is a research director at DAN and a research associate at the Center for Hyperbaric Medicine and Environmental Physiology, Duke University Medical Center, in Durham, N.C.

Robert M. Wong, M.D., FANZCA, was an anaesthesiologist at the Royal Perth Hospital and a medical director in the department of diving and hyperbaric medicine at Fremantle Hospital in Australia. He is a diving medicine consultant to the Australian pearling industry.

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- following repeated breath-hold dives. J Appl Physiol. 1965; 20(5):1028-31.

From the Medical Line

DIVING AFTER KIDNEY DONATION

DAN medical information specialists and researchers answer your dive medicine questions

Q: I want to donate a kidney to my sister, who is in need. Will donating a kidney affect my ability to dive?

A: First, thank you for considering being a living kidney donor. The concern with diving after donating a kidney is the same as with any abdominal surgery: You must allow a sufficient amount of time for healing not only the external surgical site but also the abdominal wall and the organ structures. For this reason, you'll likely stay in the hospital for several days. Once discharged you'll continue your recovery at home. It generally takes about six weeks for you to heal completely and return to your normal routine. If you have no complications in healing, you can consider diving after your surgeon clears you for unrestricted physical activity.

A common symptom following kidney donation is persistent fatigue, which can vary in duration. If you experience significant fatigue, diving is not recommended. Once your fatigue subsides, diving should not present any increased risk. There is no evidence of increased or decreased DCS risk following kidney donation or abdominal surgery. Once your physician clears you to dive, your risks will be no greater than they were before the surgery.

[Jonathan Gilliam, EMT-P, DMT]

Q: I have been a dive instructor for more than 20 years. Last year I was diagnosed with hypertrophic cardiomyopathy; I do not take any medication for my condition, and I have passed several tests, including a full stress test last February. About a month ago I met with my cardiologist to discuss my fitness to dive. My physician

is pleased with my stress test results, and he reviewed my Recreational Scuba Training Council (RSTC) Medical Statement. After my exam he recommended that I exercise but avoid training that would increase my heart rate to more than 160 beats per minute for prolonged periods. He did not say that I couldn't dive, but he said there is potential for increased risk if something happens to me while underwater. What is your professional medical opinion on this condition? Can I still dive?

A: A hypertrophic cardiomyopathy is not necessarily an absolute contraindication to scuba dive; it depends on how well your heart can perform under the physical demands typically encountered on the type of diving you expect to be able to accomplish.

First, you should define what type of diving you expect to be able to do, where you plan to dive and what you expect from diving.

Type of Diving: The demands of a predictable and shallow tropical reef dive are not the same as those of a dive to the Andrea Doria. Thermal stress, dealing with currents, breathing dense gases, psychological stress and heavy equipment could significantly influence your cardiovascular demands.

Location: The location of your dive directly correlates to the amount and severity of risks you are taking if anything goes wrong. There is a big difference between diving 30 minutes off the coast of Miami, Florida, where you have access to world-class medical facilities and readily available emergency medical services (EMS) and diving off Vanuatu, where you are far from the

closest reliable medical facilities in New Zealand or Australia.

Dive expectations: If you are acting as a dive instructor, your demands are higher than those of a diver who is simply enjoying a dive with a buddy. While diving for enjoyment, divers are responsible for their own well-being and at most the well-being of a dive buddy. As an instructor, you are responsible for all the divers following your lead, and you must be physically ready to make a rescue at any time to fulfill the duty of care you have to your students. Consider these requirements before you take on students, and assess your abilities with your doctor to determine if you are able to meet the demands of being a dive professional or whether you should stick to diving for enjoyment.

We cannot weigh in on your medical and physical fitness to dive with such little information. While your cardiologist was pleased with your stress test results, that news could be deceptive: The doctor might have expected lower outcomes, and your results still might not indicate that you are fit enough to dive. Scuba diving poses some unique cardiovascular challenges that cannot be accurately replicated in any other context. Even the best cardiovascular assessment will not simulate the blood shifts that occur when you are immersed or the increased breathing resistance that takes place when you are breathing colder, drier and denser gas from a scuba regulator.

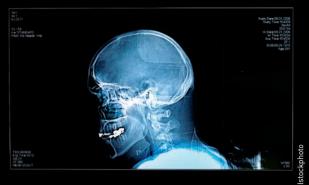
Your doctor can call our Medical Information Line at +1-919-684-2948 with any questions or concerns when assessing your physical and medical fitness to dive. If your doctor is not comfortable making this recommendation, we can refer you to a physician near you who has knowledge and experience in dive medicine.

[Matías Nochetto, M.D.]









Incident Insight

EXPLORE ALL POSSIBILITIES

By Marty McCafferty, EMT-P, DMT

THE DIVER

The diver, a 32-year-old male, was an experienced recreational dive instructor. Approximately 18 months prior to the dive incident, he was injured in an all-terrain vehicle accident, suffering serious injuries to his face and skull. He required multiple surgeries to repair and reconstruct the orbit of his left eye, both zygomatic arches (cheek bones) and his maxilla (upper jaw). Some of the fractures entered the maxillary sinus cavity. The diver's maxillofacial surgeon authorised him to return to diving after a prolonged recovery. He gradually resumed diving with no problems or complications.

THE DIVE

The diver was instructing a class of four students for their second day of openwater dives. The dive was planned with a beach entry and a brief surface swim to an area with a maximum depth of 10m, accompanied by a certified divemaster and an experienced rescue diver. When the group began to descend, the instructor immediately experienced intense pain on the left side of his face from his cheek to his forehead. The pain quickly progressed from distracting to incapacitating.

The divemaster recognised that the instructor was having a serious problem and safely ascended with the students from about 1.5m (4.5ft). The rescue diver descended to assist the instructor, finding him on the bottom holding the left side of his face with one hand and securing his regulator in his mouth with the other. The rescue diver was able to assist the instructor in making a controlled ascent to the surface. They established positive buoyancy and reached shore. The pain was so severe

that the diversaster called the emergency medical services (EMS).

The EMS crew performed a quick assessment and transported the instructor to the closest emergency department (ED), which was at the hospital where he had been treated for his previous injuries.

MEDICAL EVALUATION

The ED staff administered pain-relief medication. The attending physician examined the diver and promptly sent him for a CT scan of the head and face. Consulting the scans, the attending radiologist and maxillofacial surgeon who had previously treated him found no obvious signs of complications associated with the surgeries. The sinuses, orbit and other bones were healed, and no hardware had been displaced. There was no clear cause of the intense pain. The doctor prescribed pain medication and scheduled a follow-up appointment for the diver to see the maxillofacial surgeon.

The next day the diver called the DAN Medical Information Line (+1-919-684-2948) and told the DAN medical staff about his experience. Because the most likely cause of his symptoms was a complication from his previous injuries, the caller sought a referral to an ear, nose and throat (ENT) specialist with dive medicine experience. The specialist, who also suspected a complication from the diver's previous injuries, could not offer a solution other than to continue taking the medication and following up with his surgeon. Ten days after the dive, his pain persisted and was relieved only by the medication.

A DIFFERENT PERSPECTIVE

Despite the pain, the diver kept a scheduled appointment with his

dentist for an unrelated issue. During the examination the dentist was able to localise the pain in an upper bicuspid (tooth between the canine and molar). After taking X-rays, the dentist determined that the root of the tooth had an abscess and the tooth was cracked. It is likely that during equalisation the diver unintentionally forced food, air or some other material into the tooth, which prompted pain associated with the exposed nerve. The dentist extracted the tooth, and there was purulent drainage from the socket, which is a sign of infection. The pain subsided as the fluid drained. By that evening the diver no longer needed to take pain medication, only an antibiotic to address the infection.

CONCLUSION

This case is an example of how easily prior medical history can become a focal point. A history of severe injury certainly warrants an evaluation of the previously affected areas, but this focus should not happen at the exclusion of other possibilities. The doctors, the specialist and DAN medics all lost objectivity to the physical discomfort of the patient. Fortunately, his situation was not lifethreatening, although he required pain medication longer than he would have with a more thorough evaluation. It is imperative to try to avoid opiate use for any longer than necessary.

Every misstep is a teachable moment: All of us in DAN Medical Services learned from this case to remain diligent in our evaluations and avoid tunnel vision.

TOP LEFT
Symptoms do not always point to just one definite cause, so it is often just as important to continue listening to the patient and exploring options that might not be immediately apparent

TOP RIGHT
Medical imaging
and prior history are
important pieces of the
diagnostic puzzle that
cannot be overlooked,
but they are not the
only pieces



LIONFISH STINGS

By Jorge Dario Gomez Castillo, M.D.

Indo-Pacific lionfish (*Pterois volitans*) have invaded many popular scuba diving locations in the Atlantic and Caribbean. Aside from causing possible harm to swimmers and divers, this voracious predator can dramatically affect populations of native marine animals in the ecosystems to which they have been introduced.

Lionfish are venomous and belong to the Scorpaenidae family. These fish and those of the Synanceiidae family (such as Synanceia, or stonefish) comprise most of the existing venomous fish. Without putting life at risk, envenomations caused by scorpionfish and lionfish can cause significant symptoms due to the systemic action of their venoms.

Lionfish have spines that are covered by an epithelial sheath containing

venom-producing glands in the grooves of the upper two-thirds of the long and slender spines. The dorsal fin has 12 or 13 rays or spines, the pelvic fin has two, and the anal fin has three. When the ray of the fin penetrates the victim's skin, venom flows to the wound. Possible contact with various marine life occurs during diving, fishing and food handling. Even though most fish stings are benign, some lionfish stings require urgent medical treatment.

Puncture wounds by lionfish can cause pain lasting for several hours, rapid edema (swelling) and subcutaneous bleeding. Swelling typically clears in two to three days, while the tissue discolourations can last up to five days. In some cases swelling can become so severe that blood flow is compromised, possibly leading to tissue necrosis (tissue death), which can be common in fingertips. A secondary complication is wound infections. Lionfish venom is not lethal to healthy humans, and we are not aware of any published reports of death.

Envenomations are rare even in areas where lionfish are common, but recognition of the fish is important to prevent injuries. In Cozumel, we have gathered six years of data encompassing 107 cases for which we recorded the following symptoms in order of frequency: pain, erythema (redness), edema, local heat, blisters, necrosis (dead tissue), nausea, vomiting, dyspnea, fever and muscular weakness. Limb paralysis and cardiac failure are infrequently observed.

We have recorded only two complications from lionfish envenomations: one due to thermal burn (and later infection) when applying hot water to the sting area and one case of decompression sickness resulting from a diver reacting with a rapid ascent after being stung. The injuries we recorded did not pose risks of cardiovascular failure or death in our patients. The most important symptoms were the local inflammation and severe pain. We did not observe in our patients some signs and symptoms sometimes reported with lionfish envenomations; we recorded











only four cases each of blisters and necrosis. In our opinion, most of the systemic signs we found were related to pain.

In the past two years we have seen a significant reduction in the number of lionfish envenomation victims seeking medical assistance, likely because people are now more familiar with lionfish and proper first aid for stings - and also because the Arrecifes de Cozumel National Park has reported fewer lionfish sightings after an intensive programme to control them began five years ago. DAN has provided information about how to treat lionfish injuries, working in conjunction with park authorities to distribute thousands of first-aid information cards over the past five years. Informed divers are able to reduce contact with lionfish and increase their ability to manage injuries when they occur. NAM

Jorge Dario Gomez Castillo, M.D., is the DAN medical liaison in Mexico. LEFT Lionfish are fascinating and beautiful creatures, but they can cause serious injuries as well as environmental problems outside their normal range

OPPOSITE PAGE Population control projects are one way to manage the spread of lionfish

DAN TIP

For more diving health and safety resources, including DAN Doc, visit "Diving Safety" at DANAP.org



- Clean the wound by thoroughly washing the area with soap and fresh water. Remove any foreign material, and control bleeding
- Control the pain by immersing the affected area in the hottest water tolerable without causing injury - the upper limit is 45°C - for 30 to 90 minutes. Have someone test the water on the same area as the injury to ensure it is not too hot, as intense pain may impair one's ability to discriminate between hot and scalding. Repeat as needed
- Apply cold packs or ice later to reduce swelling and help with pain
- · Take pain control medication, if needed
- Apply topical antibiotic, if available
- Seek a professional medical evaluation; medical management may include sedatives, a tetanus vaccination and antibiotics
- If severe symptoms are present, call your local emergency medical services number
- · Call the DAN 24-hour emergency hotline at +61-8-8212-9242 (or 1800 088 200 within Australia)



Advanced Diving

FIVE LESSONS FOR COLD-WATER DIVING

By Frauke Tillmans, Ph.D.

Diving in cold water presents an array of new environments to explore along with new equipment and new considerations. The best thermal protection you can get for cold-water diving is a well-fitted drysuit with appropriate undergarments. Your suit's material, waterproof zippers, neck seals and wrist seals keep you dry throughout your dive. Staying dry and layering with proper undergarments – along with the layer of air between the suit and your body – provide warmth.

Divers can add air using a manually triggered valve, usually situated near the chest, or vent it from an exhaust valve, usually situated at the left shoulder or left sleeve. Well-maintained drysuits hold air, and controlling the flow of air into and out of your drysuit allows divers to both adjust the level of thermal protection and use their drysuit as a buoyancy control device

(BCD). If being in a drysuit in cold water isn't your natural habitat, consider these five lessons to prepare yourself for this interesting and challenging way to dive.

LESSON 1: START SIMPLE

Your gear should not limit your adventures underwater. Diving dry requires more work than diving with other types of exposure suits and being able to comfortably solve problems while in your drysuit is a must. When you first start diving dry, begin in daylight at a dive site you know well, with an easy entry and adequate visibility, and ideally with an experienced cold-water diver. If you do not see more than the bottom of a pool or a training platform at 5m on your first few drysuit dives, don't get discouraged – extra time might be exactly what you need

to make friends with your new drysuit or gear configuration.

LESSON 2: PREPARE YOUR GEAR

There are good reasons to aim for redundancy, especially in cold water. Many people diving dry choose to dive with two cylinders or carry a bailout bottle. It's a good idea to attach your primary second-stage regulator and your primary BCD to two different first-stage regulators if diving with more than one cylinder. Gear configuration is heavily discussed worldwide, and there is no de facto right or wrong approach. I prefer to rely mainly on my drysuit for buoyancy, so I handle only one device throughout the dive. My BCD functions merely as a backup.

The key to using a drysuit as the main BCD is proper weighting. If you are underweighted, you will have difficulty



getting underwater, but if you manage to get down, you will not be able to add air to the suit, causing uncomfortable squeezes or loss of insulation. If you are overweighted, you will have to add more air to your suit. Air within the suit will always travel toward the surface, and depending on your position, this air could easily make its way to the bottom of your suit around your legs and feet. This could decrease your mobility, make stabilising yourself in the water column more difficult or even flip you upside down. Proper training will cover how to troubleshoot this situation and properly vent the excess air.

LESSON 3: BE PREPARED FOR UNCOMFORTABLE SCENARIOS

When you are stressed or afraid or are suddenly immersed in very cold water, your ability to think may become impaired, but it is important to remain calm if you cannot rely on your common sense. One of the best ways to prevent panic is to think through your responses to a list of potential problems before your dives.

Losing or flooding your mask is annoying enough in warm water, but your body will react more aversely to a flush of cold water. Remaining calm in this scenario is a matter of training yourself to withstand the involuntary reflex to inhale or the feeling of being unable to breathe.

For those who wear dry gloves or mittens, a sudden flood, inflation or squeeze could make handling gear problematic due to cold hands or loss of dexterity. Practise removing your gloves so you know you can easily remove them, and make sure your buddy knows your gear well enough to help get you out of trouble.

Anything from an incorrectly folded seal to catastrophic damage to the suit can cause a leak. While cold water entering your suit is uncomfortable, it is not life-threatening by itself. Excess water in your suit will not drag you down, and depending on your positioning and the severity of the leak, you might even be able to finish the dive with this suit as your main BCD. If the leak is caused by a damaged zipper, a front zip might be more advantageous than a back zip because you can still retain air in the bubble on your back. If the amount of water in your suit or the temperature becomes too uncomfortable to bear, abort the dive

in a controlled way; there is no need to make a rapid emergency ascent or omit a safety stop.

In cold water the first stages of regulators are more likely to freeze. When they do, this can either prevent air delivery or lead to a free flow. Both situations are uncomfortable but can be handled if you remain calm and do not panic. If you cannot easily draw air from a regulator, make sure you can easily access your alternate air source and breathe from it. In case of a free flow, make sure you are able to turn off the corresponding tank valve. Once you manage the situation, safely abort the dive.

OPPOSITE PAGE A diver admires the rich colours of a vertical wall with red soft coral (Eunephthya rubiformis) in Browning Pass, British Columbia, Canada

BELOW LEFT A diver prepares to dive in Gulen, Norway BELOW RIGHT A diver encounters a male cabezon (Scorpaenichthys marmoratus) guarding eggs in Edmonds Underwater Park, Seattle, Washington









LESSON 4: PRACTISE DRYSUIT SKILLS

Know how to properly vent your drysuit. Drysuits can hold much more air than a BCD, and all drysuit divers who use their suits as a BCD should be aware that this air can shift to any part of the suit depending on your body's position. The exhaust valve is usually located near the shoulder or arms, so this valve, and therefore the upper part of the body, needs to be the highest point to effectively vent air out of the suit.

Changing body position throughout a dive is sometimes necessary, but avoid feet-up diving to prevent an inverse ascent. If air shifts to the feet of your suit and flips you upside down, it is critical to be able to get your feet back

under your body, readjust your position and vent any excess air that throws off your positioning. This requires some practice in confined water and is easiest with proper weighting.

Learn how to connect and disconnect your inflator. A disconnected inflator can lead to uncomfortable squeezes or inflow of water in the suit, and it can potentially decrease your mobility to a point where you are unable to move or handle gear (a condition known as vacuum packing). If you realise that you cannot inflate your suit as you descend, check to see if the hose is connected. If it's not, retrieve the hose. Start feeling from your first stage if your hose is not readily retrievable, and reconnect

it. It is important to know if you are able to reconnect a pressurised hose.

Being able to disconnect the hose is just as important. If your inflator gets stuck and uncontrollably inflates your suit, you do not want to risk a rapid ascent. If this occurs and you cannot disconnect your inflator hose, fully open the exhaust valve, get your buddy to close the corresponding tank valve or do it yourself, or in the very worst case release air through your neck seal. This is a last-resort option, because venting air through the neck seal will simultaneously flood your drysuit.

Practise reaching, pressing and turning your exhaust valve. This valve is usually located at your shoulder and should be within reach for both of your hands. At least one hand should be able to press it, and the other hand should be able to reach across your chest and turn it. Turning the valve clockwise closes it; the further you close it, the more air your suit can hold and the more pressure you can build up in your suit. Turning the valve counterclockwise opens it and reduces the pressure needed for the valve to open and release air from the suit on its own. A fully closed valve can only vent air if manually purged.

LESSON 5: STAY WARM

Undergarments can make or break your drysuit diving experience. Some people choose to wear multiple layers: a base layer to wick away moisture from the body, a second insulating layer made of fleece or merino wool and a third layer, if necessary. When choosing what to put on under your suit, wear what makes you most comfortable. Adding or losing a layer or choosing what material works best is a highly individual decision.

Once you exit the water and feel cold, quickly remove your hood, put on a hat, and do not delay changing into dry clothes. When you are warm and dry, prepare yourself a nice cup of tea or other hot beverage. Enjoy the cold, and stay safe. NAM

A diver films in a forest of giant kelp (Macrocystis pyrifera) at Santa Barbara Island, California

BOTTOM A diver explores the Silfra rift, a deep fault filled with fresh water in the rift valley between the Eurasian and American tectonic plates at Thingvellir National Park, Iceland



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