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DIVERS FOR THE ENVIRONMENT

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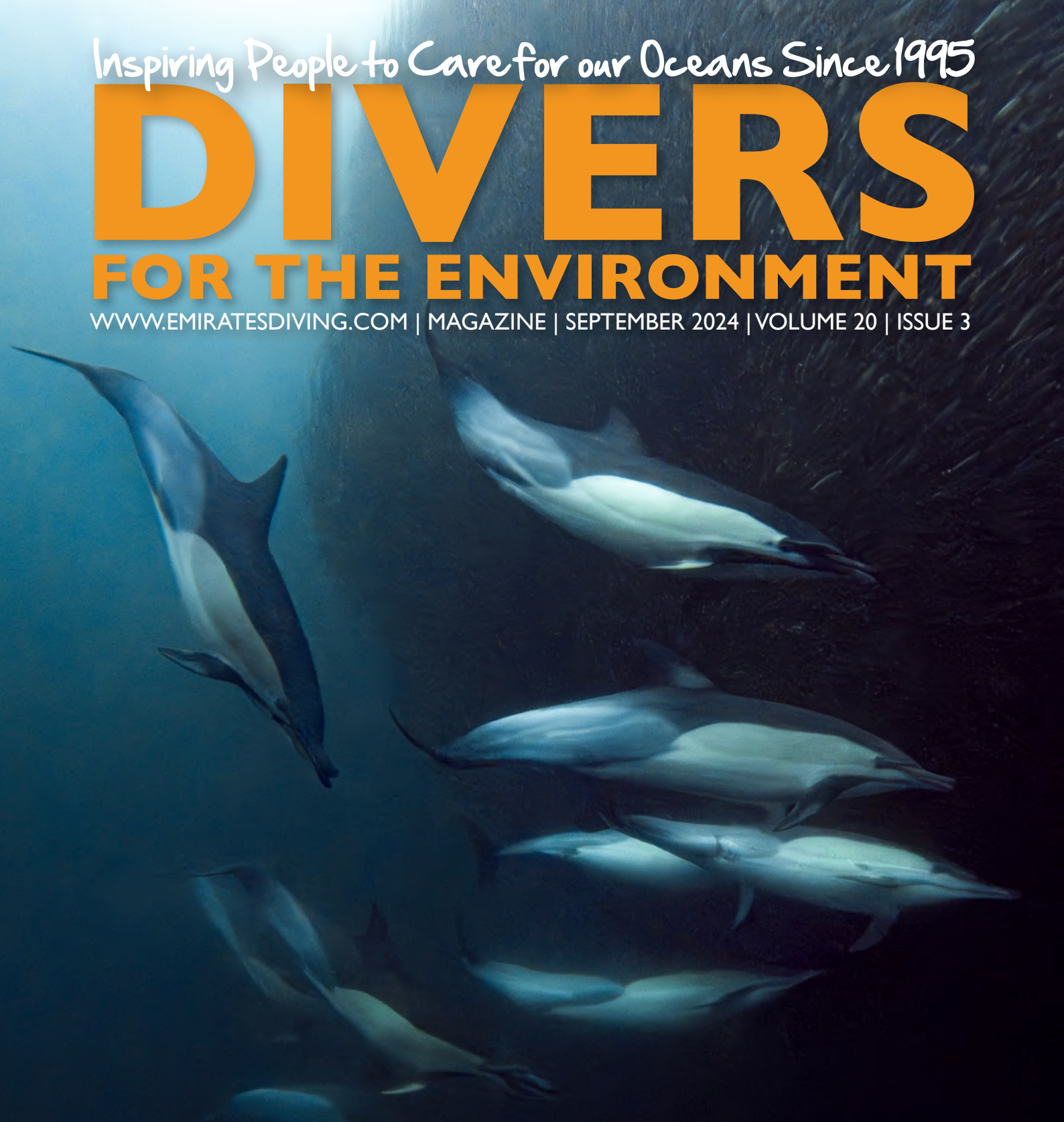

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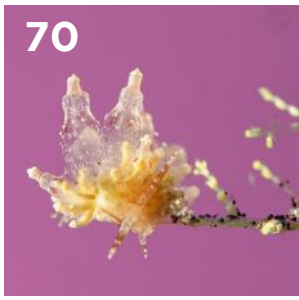


REGULARS

NEWS

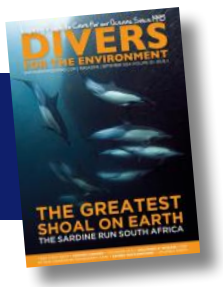
REEF CHECK

DIVERS FOR THE ENVIRONMENT

Please note that EDA's magazine, 'Divers for the Environment' includes articles written by individuals whose opinions', whilst valid, may or may not represent that of EDA's. The magazine is a platform for individuals to voice their opinion on marine and diving related issues. You are welcome to suggest an article for the next issue released in December 2024. Send all articles, feedback or comments to: **magazine@emiratesdiving.com**

COVER

PHOTO BY ALLY LANDES
The Greatest Shoal on Earth, The Sardine Run South Africa



DP WORLD This issue is brought to you by DP World

YOUTHS CORNER

FEATURES

UNDERWATER PHOTOGRAPHY

DIVING DESTINATIONS

HEALTH & SAFETY

EDITOR & GRAPHIC DESIGNER

ALLY LANDES
Ally is EDA's Project Director, Event Planner, Graphic Designer, Editor, and Photographer. She created and introduced 'Divers for the Environment' back in December 2004 as a free educational tool to share information by scientists, conservationists, underwater photographers, and other like-minded individuals from all over the world with a passion to conserve and protect our delicate marine life and underwater world.

THE CONTRIBUTORS

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

TONY SIDGWICK
Tony is a communications professional, writer and diver based in the UAE. He began his diving journey in 2016, and is now passionate about ocean conservation, with a Reef Check certification and several ocean clean-ups under his belt.

HESMA FIVAZ
Hesma is deeply passionate about the ocean and its marine life. She has recently taken up underwater photography as a new hobby. She loves to travel and frequently goes on diving trips with her family to explore vibrant coral reefs and meet fascinating aquatic creatures.
www.instagram.com/hesmafivaz

MARCO GARCIA-LEON
Marco García León, a Chilean environmental lawyer specialised in law of the sea, advises Sea Shepherd on capacity-building projects in Latin America, focusing on illegal fishing. Recognised as one of Chile's "100 Young Leaders" in 2013, he also lectures on ocean governance at marine conservation and law seminars.

UZEYR KAMORA
Uzeyr is a marine mammal observer, conservationist and photographer with a background in veterinary rehabilitation for wild animals. He has worked on sea turtle conservation at the National Aquarium of Abu Dhabi and guides whale watching and swimming trips.
www.instagram.com/uzeyrkamora

AHMED AL-ALI
Ahmed's obsession with wildlife photography started in early 2007. A UAE national from Sharjah, Ahmed took a deep interest in his country's natural history and dedicated most of his time to bird watching. Combining his knowledge and photographic skills, his images have taken a unique and artistic style with educational messages to share. He has won many photography awards, locally and internationally, in addition to his work appearing in published literature, scientific papers and university projects. Ahmed has a Master degree in Science and Environmental Science from UAE University.
www.instagram.com/_ahmedalali

We've had some fantastic presentations + Q&As in Q3 for members to find out how they can get involved in citizen science programmes. **LEFT:** Members with Ada Natoli from the UAE Dolphin Project – Report your Sightings. **RIGHT:** Members with Darryl Owen from Freestyle Divers' Project REEFrame – Become a Marine Conservation Volunteer.

PREPARING
FOR THE LAST QUARTER OF 2024

IBRAHIM AL-ZU'BI
Co-Founder

Welcome to this quarter's jam packed issue of 'Divers for the Environment'. I hope you have managed to explore somewhere new this summer, or at least had some time to recharge your batteries to tackle the final quarter of the year.

I am always overjoyed by the support we receive, not only through our clean-up campaigns – we have achieved 4 clean-ups this year so far, with 2 more to go (all thanks to our Strategic Partner DP World), but also by the quality and quantity of articles we receive from our contributors, fellow divers and friends. They share their experiences with all of us, keeping us updated on international diving, the marine environment, and conservation efforts.

As you all know, the fourth global coral bleaching event was announced this summer with water temperatures at their highest. We have been closely following coral reef news from around the world, and keeping an eye on our own coral reefs here in the UAE and taking photos for our records (example of our photos below were taken at our beloved Martini Bay in Khorfakkan in July). We ask that EDA members continue to report any coral bleaching activity seen at local UAE or Musandam dive sites so we may provide your knowledge to the scientists monitoring the health of our local seas.

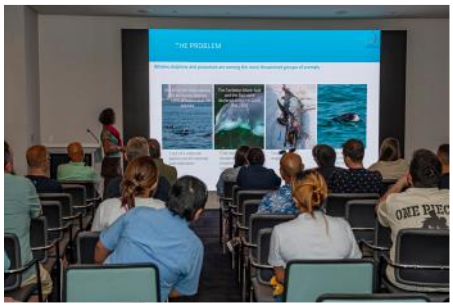
EDA's main annual Cleanup Arabia event is confirmed in Dubai this year on the 9th of November for a huge island clean-up. We will have a smaller underwater clean-up event the week before, on the 2nd of November. We do the best we can to keep our oceans as clean as possible and we look forward to seeing you all there. The island clean-up is set to be our most complex event to date, and we're looking at reaching a record collection for a single event. Due to the incredible volume of rubbish we expect to collect, we will not be able to count individual items, but we will weigh each bag filled to see how many tonnes we can clear in our allocated time. Together, we do make a difference!

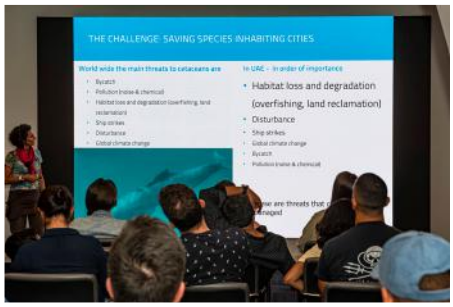
Happy reading and safe diving,

Ibrahim Al-Zu'bi

Ibrahim Al-Zu'bi

EVENTS FOR EDA MEMBERS
UAE DOLPHIN PROJECT + Q&A





Dr Ada Natoli gave an insightful presentation with a Q&A on the UAE Dolphin Project Initiative on Thursday the 30th of May at EDA's state of the art event venue in partnership with Deep Dive Dubai.

Dr Ada Natoli from Zayed University and founder of the UAE Dolphin Project Initiative shared some fascinating information on these species and the results of over a decade of citizen science data, dedicated coastal surveys, and the recent offshore survey conducted on board of OceanXplorer.

Members joined in a "deep dive" into the world of the little-known whales, dolphins and porpoises of the UAE and found out they can also contribute to the conservation efforts towards the protection of these charismatic species so crucial to the marine ecosystem.

The UAE Dolphin Project is an initiative that runs under Zayed University aiming to gather scientific information to support the conservation of cetaceans. OceanX is a non-profit initiative dedicated to marine conservation that utilises cutting edge technology on board the OceanXplorer, the most advanced marine research vessel.

All the information needed on what to do when spotting a whale or dolphin, how species identifications are carried out, and to download the Species Identification Booklet, get photographic tips, and report a sighting, can all be found on the website.

www.uaedolphinproject.org

WANT TO JOIN OUR EVENTS?
Our social events and online EDA Movie Screening options are only accessible to EDA members. Members must register by email to join social events, or to receive the special link (subject to availability) to view the films online.

Acquire EDA membership, or renew it here:
www.emiratesdiving.com/membership-form

EDA'S LADIES GO DIVING FOR PADI WOMEN'S DIVE DAY

We had a fun day with our group of EDA ladies to celebrate PADI Women's Dive Day on Saturday the 20th of July with Barracuda Diving Centre (BDC).

Our first dive was at Martini Bay with a choppy surface, some rough swells and limited visibility, so we chose to move from Khorfakkan back to Fujairah and try Inchcape 10 for our second dive. The visibility got better at depth and we had a great little dive with lots to see in all the nooks and crannies, especially nudibranchs and moray eels.

We unfortunately had 2 unavoidable last minute cancellations, but we had 5 no shows so we deeply apologise to BDC, and to those that were on the waiting list to whom we could not give the opportunity to join us. Please remember that we have limited spaces with a boat booked just for us at a special discounted rate for these special occasions. When you book a space with us, it is a confirmation! If you cannot make it, we require a 24 hour notice by email or a call to the number provided so we can give your space to other members, or for the dive centre to fill the space they have lost with other customers.

A big shoutout goes to Rania Shawki Mostafa, Holly Pelser, Angela Manthorpe, Vickie Langton and Marwa El-Agroudy for a great day out underwater!

THE MENA OCEANS SUMMIT

BLUE ECONOMY | BLUE GOVERNANCE | BLUE SCIENCE | BLUE COLLECTIVE

Under the patronage of the Ministry of Climate Change and Environment, Goumbook launched the second edition of the MENA Oceans Summit, in partnership with High-Level Climate Champions, United Nations - UAE, IUCN, G20 CORDAP (Coral Research & Research Development Accelerator Platform), Gulf Women in Environmental Sciences, and the Emirates Diving Association (EDA) as an impactful way to drive collaborative action for ocean health and biodiversity on the occasion of World Oceans Day.

Hosted on the 10th of June, the MENA Oceans Summit 2024 highlighted regional perspectives and achievements in the lead up to the UN Ocean Conference 2025 (UNOC25). Following last year's major success, the summit brought together an inclusive stakeholder network under four key pillars: Blue Economy, Blue Governance, Blue Science, and Blue Collective.

The day delivered insightful conversations between the moderators and panels, including a keynote address by HE Razan Al Mubarak, the UN Climate Change High-Level Champion for COP28 and President of the IUCN. The opening address was delivered by HE Marwan Abdulla Alzaabi, Assistant Undersecretary for the Regions Sector at the UAE Ministry of Climate Change & Environment.

Both HE Ambassador Nicolas Niemtchinow, Ambassador of the French Republic to the UAE, and Ignace Beguin Billecocq, the Nature Head and Ocean and Coastal Zones Lead for the UN High-Level Climate Champions Team, engaged in an opening fireside chat, discussing the ambitions for the UN Ocean Conference 2025.

Due to the public's demand, the panels were fewer to those of last year (10 in total) to fit longer discussions and introduce questions from the audience.

As HE Razan Al Mubarak mentioned in her keynote, "Discussions highlight the urgent need to integrate ocean-based solutions into national plans. As we advance towards key global environmental milestones such as the UN Ocean Conference in 2025, collaborations and ambitious action is essential. Together, we can ensure that our oceans continue to be a beacon of hope and a source of life for future generations. We need to harness the momentum to protect and sustainably manage our seas."

https://goumbook.com/mena-oceans-summit-amp-exhibition-2024


MENA oceans
COLLABORATIVE PATHWAYS FOR IMPACT
AN INITIATIVE BY GOUMBOOK
PANEL DISCUSSION:
LEVERAGING OCEAN INTELLIGENCE FOR INTEGRATED CONSERVATION MANAGEMENT
PANEL DISCUSSION:
ADDRESSING OCEAN PRESSURES: TACKLING PLASTIC AND POLLUTION IN ALL FORMS
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EDA

EVENTS FOR EDA MEMBERS
PROJECT REEFRAME + Q&A

Darryl Owen from Freestyle Divers gave a fantastic presentation followed by a Q&A on their Project REEFrame on Thursday the 22nd of August at Deep Dive Dubai.

Project REEFrame is a unique scientific community programme that protects and restores coastal ecosystems in the UAE. It brings volunteers, corporates, schools, academia and governments together to actively create positive ocean impacts. It delivers education to people of all ages from 6+ about the ocean and how to protect it.

The project started almost 5 years ago and is run by Freestyle Divers in Dibba. The Phase 2 site will transform a barren sandy area to 10 hectares of new coral reef by 2026.

This presentation talked about the challenges facing the UAE coastal ecosystems on both the East and West coastlines, the conservation approaches being implemented as well as an overview of the unique REEFgrowth "whole site" approach to ecosystem restoration. This nature based solution is designed to re-establish the integration of ecosystem services provided by mangroves, seagrass, molluscs (native oysters and mussels) and coral reefs.

The Q&A session allowed members to get into discussions on the various ways that divers and non-divers can contribute to the success of the restoration efforts.

For more information about how you can get involved in Project REEFrame, go to:
http://tinyurl.com/Project-REEFrame
Or email Freestyle Divers directly, at:
info@freestyledivers.me

[MEMBER SPOTLIGHT]

NEW KNOWLEDGE, NEW ADVENTURES,
NEW FRIENDS, NEW EXPERIENCES, NEW CHAPTER

FEATURE **GILLIAN ROBERTS**

Hi Gilly Roberts here; an avid diver in every sense of the word!

I started diving with Al Boom in my second year of being in Dubai. The sea was something that had always excited me. I loved swimming, so when someone asked me if I wanted to learn to scuba dive; well there was no choice to be made. I donned the gear, got myself prepared and achieved my Open Water certificate in the summer of 2013, (thank you John Bissell, especially for your patience with the mask!).

Now, when you're in the teaching profession, somehow you just can't stop! I decided if I was going to dive, then I needed to get to Divemaster so that I could help and assist other newbies to dive; who could then have the same experiences as myself. So I managed to get my Advanced Open Water and then I did my Rescue and Divemaster certifications with Paul Firth, (thanks Paul).

Then it was Big Mo Helmy, who at this time was a real enigma to me; this giant of a man had such a wonderful way with students. If chocolate tea pots could hold hot tea, Mo would be the one to inspire them to do this!

Under Mo's watchful eye, with his gentle, yet assertive way of teaching and mentoring, I became a PADI Instructor in 2015. As time has passed, I have moved from OWSI to IDC Staff Instructor, all under Mo's wing.

The passion continued to grow and of late I became very interested in coral restoration and eco reef checks.

I now find myself at a cross roads in life. At 62 I want to follow my passion, do what I can to educate society and support Mother Earth; I have therefore decided to do an A Level Marine Science course at TRACC, off the East coast of Borneo. It takes 4 months: so I am hoping to return, possibly to Dubai, maybe elsewhere, with a greater understanding of the ocean to compliment all my dive skills, and then who knows…

It's good to have the opportunity to thank those who have helped you reach a stage in life where you are inspired and want to keep learning. Thanks to John, Paul, Kevin Devine in Cyprus, and Mo, plus all at Al Boom in Dubai for believing in me and empowering me to have this opportunity. I am a very lucky, grateful lady!

Here's to new knowledge, new adventures, new friends and new experiences as I open my new chapter into what some might call, retirement.

TURNING THE TIDE

HOW TACKLING OCEAN PLASTIC POLLUTION IN THE UAE CAN PROPEL US TO BE CARBON NET ZERO

FEATURE **BASSEL OUNAH – APNEA ZONE** PHOTOGRAPHY **ANDRIY NEKRASOV**

Pollution by plastic waste in the seas is undoubtedly one of the most critical environmental problems of the present. Every year, millions of tons of plastic end up in our oceans, polluting the marine environment and dangerous to man's survival. Nonetheless, the battle against ocean plastic is not only about making our beaches and seas safe for aquatic animals; it is also closely connected with the tasks defined in the UAE Clean Growth Strategy: the country's transition to being carbon net zero. The proof that the state of oceans is linked to climate change efforts shows that it is high time we redouble the protection of marine areas.

THE OCEAN'S PLASTIC CARBON CONNECTION

Seas are the world's largest carbon converters, absorbing about 30% of carbon dioxide available in the atmosphere. Healthy sea ecosystems, especially those containing a lot of marine life and beautiful coral reefs, play a key role in absorbing carbon emissions. Plastic pollution affects these ecosystems, interfering with the habitats of the organisms involved in carbon sequestration. Additionally, microplastics hinder the ocean's capacity to mitigate the influence of climate change by reversing its natural cycle to store more carbon dioxide.

Addressing plastic pollution can salvage the vitality of the oceans, increasing their absorbent capacity of carbon dioxide. This restoration is part of the UAE's Clean Growth Strategy, which aims to further the economy by cutting greenhouse gas emissions.

UAE'S CLEAN GROWTH STRATEGY: A FRAMEWORK OF THE COMPANY'S VISION FOR A SUSTAINABLE TOMORROW

The UAE launched a Clean Growth Strategy to identify how cutting carbon emissions can support the country's development. The strategy's foundation is to reduce waste and encourage recycling practices. Reducing plastic pollution can also be a direct target of these goals, as they aim to reduce the production of new plastics, minimise waste, and encourage people to use environmentally friendly products.

It is possible to reduce the use of plastic, which, in turn, dramatically reduces carbon emissions. The generation of plastics requires energy, and the disposal of plastics also involves energy, mainly from fossil energy sources. As people start embracing the use of a few plastics and recycling the existing ones, this will help reduce the carbon footprint being felt due to the production of plastics. Further avoiding plastic pollution and cleaning what is already in the seas also benefits marine life; in return, oceans continue to absorb carbon.

FREEDIVING AND THE FREEDIVER'S PART IN OCEAN PRESERVATION

Being at one with the sea, freedivers hold the key to combating plastic pollution in the world's waters. They have very personal touches on marine ecosystems, and thus, they fully understand their health significance.

Here are several ways freedivers in the UAE can contribute:

ACTIVE CLEANUP EFFORTS: Freedivers can engage in underwater clean-ups collecting plastics and attempting to record the pollution level on the seafloor.

EDUCATION AND ADVOCACY: Although there could be restrictions regarding conservation activities carried out in certain areas, freedivers can reach out to others by giving talks and participating through social media plumbing, events, and so on to educate people on the effects of throwaway plastics on the ocean and the need to conserve water bodies.

SUPPORTING SUSTAINABLE PRACTICES: Freedivers can be essential in spreading this information to other freedivers and divers, such as using ecological equipment and avoiding single-use plastic items.

CITIZEN SCIENCE: Because they can dive deeper, unlike scuba divers, they can assist in environmental research by recording plastic pollution in different aquatic habitats and offering insight to researchers to solve this prevalent menace.

INSPIRATIONAL LEADERSHIP: Such goals can influence others as freedivers prove people should protect the ocean and, by doing so, demonstrate what people should do in their everyday lives to decrease plastic use and support the ocean cause.

A COLLECTIVE EFFORT FOR A BETTER TOMORROW

Reducing plastic pollution is a vital part of the overall carbon net zero battle. By healing damaged oceans, they seize carbon, which reduces climate change impacts worldwide. The UAE has formulated a Clean Growth Strategy outlining the blueprint for this eco-friendly future, noting that waste reduction is critical to recycling.

For this mission of world protection, the freedivers, who are devoted and attached to the sea, have a big part to play. By involving themselves, raising awareness, and campaigning, they can change the situation regarding plastics and thus maintain oceans in good states for future generations. The community can create a cleaner and greener planet, encompassing all the natural products and resources valued rationally and extensively in today's global society.

AS PART OF THE YEAR OF SUSTAINABILITY, EAD RELEASES 214 REHABILITATED TURTLES INTO THEIR NATURAL HABITAT

Abu Dhabi, 10th June 2024: In line with the Year of Sustainability, the Environment Agency – Abu Dhabi (EAD), in partnership with The National Aquarium (TNA) and The Yas SeaWorld Research and Rescue Centre (YSWRRC) has released a group of Green, Hawksbill and Loggerhead rehabilitated turtles into their natural habitats, via the beach at Jumeirah Saadiyat in Abu Dhabi. The National Aquarium oversaw the rehabilitation of 200 turtles while the YSWRRC rehabilitated a group of 14 Hawksbill turtles.

The first release of the turtles took place on 6th June and was attended by Her Excellency Dr Shaikha Salem Al Dhaheri, EAD's Secretary General, Fouad Mashal, President and Vice Chairman of Al Barakah Holding on behalf of The National Aquarium, Capt Saif Al Mheiri, Managing Director, Abu Dhabi Maritime, Shaikha Al Nowais, Vice President Owner Relationship Management, Rotana, Mr Sabri Mohammed Aljabri, General Manager of Shared Facilities Company of Taweelah (SFCO), Taghrid Alsaeed, the Executive Director, Group Communications and Destination Marketing from Miral and Thomas Kaferle, SeaWorld® Yas Island, Abu Dhabi General Manager.

On 8th June there was a second release attended by the general public which was held at Saadiyat Rotana Resort & Villas that involved a series of fun activations.

The release of the turtles is a culmination of the rescue and rehabilitation programme of EAD in collaboration with The National Aquarium since a Memorandum of Understanding (MoU) was signed in 2020 with a total of 1,067 turtles being rescued. EAD also signed an MoU with YSWRRC in 2023, rescuing a group of 23 turtles.

Her Excellency Dr Shaikha Salem Al Dhaheri, EAD's Secretary General on the occasion said, "It is always exciting when it is that time of the year where we release turtles back into their natural habitat. It reveals that all our rescue and rehabilitation programmes, whether in partnership with The National Aquarium or The Yas SeaWorld Research and Rescue Centre have been a great success. This cohort of turtles are a large number of 214 which will allow us to continue building a stable and abundant population of turtles in Abu Dhabi waters. We give special care to the turtles and we do all this work so that we are preserving our marine species for future generations so that they can enjoy a flourishing environment."

She added, "I would like to thank the public and volunteers who have assisted us in rescuing these vulnerable species and our partners who have helped rehabilitate the turtles prior to us releasing them. We greatly appreciate the dedication of the teams ensuring that the turtles get the best possible care."

Fouad Mashal, President and Vice Chairman of Al Barakah Holding said, "Today is a special day for The National Aquarium as we are returning turtle number 1,000 back to the wild. This milestone marks an incredible effort by the team at The National Aquarium who have rescued, rehabilitated and released such a huge number of turtles, making this project one of the most successful in the world. The entire process of turtle number 1,000's rescue and eventual release can be followed on The National Aquarium Instagram page @thenationalaq. The family responsible for the rescue of turtle number 1,000 were present for an emotional and symbolic farewell."

SeaWorld Yas Island, Abu Dhabi General Manager, Thomas Kaferle said, "We are extremely proud of our partnership with the Environment Agency – Abu Dhabi. Today, we celebrate a significant milestone: our contribution to the rehabilitation and release of Hawksbill turtles back into their natural habitat on Saadiyat Island, Abu Dhabi. This achievement underscores our commitment to establishing The Yas SeaWorld Research & Rescue Centre as the region's largest dedicated marine research, rescue, rehabilitation, and return facility. Our goal is to leverage our world-class facility and SeaWorld's 60 years of experience not only to rehabilitate and return these animals but also to support the vision of creating a sustainable future for generations to come."

EAD has been researching, monitoring and protecting marine turtles in Abu Dhabi since 1999 and has succeeded in maintaining a stable population in Abu Dhabi waters. There are four main marine turtle species found in Abu Dhabi – both Green Turtles and Hawksbills frequent the emirate's waters, while Olive Ridley and Loggerheads are occasional visitors.

Decades of research by EAD indicate that several turtles can show signs of cold stunning – a condition in which sea turtles become very weak and inactive from exposure to cold temperatures and therefore become lethargic and are eventually unable to swim causing them to float on the surface of the water. In some cases, cold stunning can also lead to a build-up of barnacles on their shells, which hampers the turtle's ability to move, hence EAD's keenness to save them, nurture them back to life and then release them back into their habitats.

AS THE MAIN CUSTODIAN OF CLIMATE ACTION IN ABU DHABI, **EAD SIGNS PLEDGE TO JOIN THE UAE ALLIANCE FOR CLIMATE ACTION ADVISORY COMMITTEE**

Abu Dhabi, 14th June 2024: The Environment Agency – Abu Dhabi (EAD) has announced it has signed a pledge to join the Advisory Committee of the UAE Alliance for Climate Action (UACA) in support of the country's net zero ambitions.

The UACA was launched at COP27 by environmental charity Emirates Nature-WWF to create a multi-stakeholder alliance for climate action. Its vision is to increase momentum for near and long-term net-zero targets and foster greater collaboration to create a policy environment that supports entities' decarbonisation efforts. The UACA engages sub-national and non-state actors including the private sector, and is endorsed by the UAE Ministry of Climate Change and Environment.

UACA is part of the global Alliances for Climate Action, an accelerator of the Race to Zero global campaign, led by the UN Climate Change High-Level Champions that rallies leadership and support from non-state actors to build momentum around decarbonisation and halve emissions by 2030, in line with the Paris Agreement.

Signing the pledge on behalf of EAD, on 20th May 2024 was Her Excellency Dr Shaikha Salem Al Dhaheri, Secretary General of the Agency, in the presence of the Her Excellency Razan Khalifa Al Mubarak, Chair of the UACA Advisory Committee, President of the International Union for Conservation of Nature (IUCN) and the UN Climate Change High-Level Champion for COP28, along with Laila Mostafa Abdullatif, Director General of Emirates Nature-WWF.

EAD have signed the commitment to join UACA and the UACA Advisory Committee. As part of the UACA Advisory Committee, EAD will be working alongside other members to provide high-level strategic and technical guidance that draws on the sectoral expertise of its diverse leaders, and support UACA's objective of increasing momentum towards a net zero future. The Agency will also work to ensure UACA is a key driver for enhanced domestic sub-national non-state actor commitments, while supporting UACA's outreach by supporting synergies between non state actor decarbonisation learnings and engaging policymakers on findings and recommendations, to accelerate the transition to net-zero.

Moreover, EAD will raise awareness around UACA and its benefits to the UAE, identify strategic opportunities for UACA to contribute to national projects, such as the Climate Responsible Sustainable Companies pledge, and assign a focal point to achieve the UAE's Net Zero by 2050 strategic initiative by sharing information on upcoming policies and relevant information as necessary.

Her Excellency Razan Al Mubarak, on the occasion, said, "The Environment Agency – Abu Dhabi (EAD) is the primary custodian of climate action in the Emirate of Abu Dhabi and it is fitting that the Agency would be a key member of the UAE Alliance for Climate Action Advisory Committee due to its vast years of experience in addressing climate change. Just last year, EAD launched the Abu Dhabi Climate Change Strategy, designed with ambitious targets to reduce emissions in Abu Dhabi as a means of combatting climate change. Therefore, EAD will be a prominent member providing experienced and significant guidance – all with the goal of supporting the UAE's strategic initiative to reach Net Zero by 2050."

Her Excellency Dr Shaikha Salem Al Dhaheri, said, "It is an honour to be chosen by the UAE Alliance for Climate Action as part of the Advisory Committee. We are committed in the emirate of Abu Dhabi to reaching Net Zero by 2050 in alignment with the UAE Government's vision. We look forward to exchanging information and providing counsel to other committee members to create positive change in ensuring that the UAE maintains its leadership position in its remarkable efforts to reduce the impacts of climate change."

Laila Mostafa Abdullatif, Director General of Emirates Nature-WWF said, "Collaboration is key to tackling the urgent climate challenges we face today. Having diverse viewpoints and a whole-of-society approach, including government bodies, around the table is essential. We are delighted to welcome the Environment Agency – Abu Dhabi (EAD) to join UACA and the UACA Advisory Committee, and look forward to leveraging these unique perspectives to advance national ambition and implement effective decarbonisation strategies in the UAE.

Convened by Emirates Nature-WWF, with funding from founding donor HSBC Bank Middle East Limited, UACA is part of the global Alliance for Climate Action (ACA) network, coordinated by WWF International, with other leading climate organisations. Technical partners, such as the Clean Energy Business Council and the Boston Consulting Group, contribute to UACA's comprehensive approach.

The Alliance has grown from five to over 50 members since its launch, demonstrating the readiness among local non-state actors to support the UAE's efforts to achieve its net zero targets.

EAD'S MISSION WITH OCEANX
UNLOCKS NEW DEPTHS OF MARINE RESEARCH

Abu Dhabi, 21st June 2024: The Environment Agency – Abu Dhabi (EAD) has completed a groundbreaking, joint exploration mission of the Arabian Gulf, one of the world's warmest seas, as part of a signed multilateral MoU with M42 Healthcare, Bayanat, and OceanX to explore the impacts of climate change on UAE waters.

Over the course of a 20-day expedition aboard the OceanXplorer, the most advanced research vessel ever built, the team conducted joint research into environmental DNA (eDNA), analysed underwater microbial communities, evaluated nutrient concentrations, studied populations of large marine species, and surveyed the geology and bathymetry of the seafloor around the UAE.

During the expedition, a total of 10 submersible trips were conducted, including the first submersible excursion undertaken by two female Emirati scientists from EAD. The research expedition included 19 dives using remotely operated vehicles (ROVs), collected 926 samples of marine water, biodiversity, and sediment, and supported 9 different studies from the EAD's Abu Dhabi Environment Research Network in the UAE – a pioneering research network launched by the Agency to enhance environmental research in Abu Dhabi.

Scientists involved in this mission included four Emirati scientists engaged in ground-breaking research on deep-sea biology, geology and oceanography around the Arabian Gulf and Gulf of Oman. In addition, onboard were scientists from five entities of ADERN.

A total of 13 DNA samples were extracted from seven different whale and dolphin species. The genomes of the Indo-Pacific bottlenose dolphin, Indo-Pacific finless porpoise, and Indian Ocean humpback dolphin were also fully sequenced.

In addition, a 773-nautical mile aerial survey was conducted, during which 12 sightings of various megafauna were recorded, including bottlenose dolphins, spinner dolphins, sea turtles, hammerhead sharks and manta rays. The first observation of an endangered bramble shark in the UAE was made at a depth of about 850 metres.

A total of 86 deep-water coral specimens were collected, and 1,257 square kilometres of high-resolution, multibeam bathymetry mapping was conducted, revealing active fault systems. By mapping the sea floor, the information gathered will help researchers identify and understand certain types of cracks and moving pieces in the Earth's crust, which, crucially, helps to predict where earthquakes might happen and how underground fluids move in the area.

Ahmed Al Hashmi, Executive Director of the Terrestrial and Marine Biodiversity Sector, at EAD said, "The United Arab Emirates features some of the planet's warmest seas, providing insight into the impact of rising temperatures anticipated with rapid climate change. Gaining a deeper knowledge of these marine ecosystems and their diverse life forms will enhance our ability to foresee the worldwide consequences of future climate change factors."

He added, "Our partnership with OceanX on this expedition covers more than just exploration – it's a commitment to the future. By providing invaluable data and insights into our changing seas, this pioneering work lays the foundation for conservation and policy-making, ensuring the health of marine ecosystems for generations to come."

"Embarking on a groundbreaking mission alongside our esteemed partners in the United Arab Emirates marked a milestone in our pursuit of oceanic understanding and conservation," said Vincent Pieribone, Co-CEO of OceanX. "We are proud to be a partner of EAD and continue to collaborate on our shared pursuits for sustainable future rooted in scientific research and technological advancement."

As well as a detailed exploration of the UAE's deep water coral reefs, OceanX's 20-day mission built on previous projects executed onboard Jaywun to complete marine life genome sequencing, where EAD teamed up with M42 Environmental Sciences and Bayanat for the first ever study of eDNA in the region, analysing 37 eDNA samples collected at 19 sites.

This contributes to the project initiated on Jaywun, which is the first in the region to perform eDNA and fish samples sequencing in a moving vessel and analyse samples in real-time by using advanced technology. This aids in understanding the genetic diversity and makeup of different fish populations, through which scientists can better assess their health, adaptability, and resilience against climate change.

ENVIRONMENT AND PROTECTED AREAS AUTHORITY AND AMERICAN UNIVERSITY OF SHARJAH CONDUCT TOXICOLOGICAL STUDY OF SEA SNAKES IN SHARJAH

FEATURE **FADI YAGHMOUR** AND **FATIN SAMARA**

The Environment and Protected Areas Authority (EPAA) of Sharjah and the American University of Sharjah (AUS) have collaborated on a comprehensive study to examine the levels of organic pollutants in sea snakes from Sharjah, UAE. This toxicological assessment provides crucial insights into the levels and adverse impact of pollutants on these largely misunderstood marine reptiles. Sea snakes are fascinating creatures that inhabit the coastal waters from the Arabian Gulf eastwards into the tropical waters of Asia and Australia, reaching as far as the islands of the southwestern Pacific and northward to Japan and China. They are restricted to warm tropical and subtropical waters due to their sensitivity to ocean temperatures. Despite living solely in marine environments, sea snakes share many similarities with terrestrial snakes, including their air-breathing capability, scaled bodies, forked tongues, lidless eyes, and absence of limbs. They are distinct in having a paddle-like tail which allows them to swim effortlessly.

Sea snakes vary in size, generally ranging from half a metre to a metre in length, with some species, like the Yellow Sea Snake, reaching nearly three metres in length. They are venomous and have proteroglyphous fangs to deliver neurotoxins to subdue prey. Despite their potent venom, sea snakes are generally docile and pose close to no danger to humans unless irresponsibly provoked. In fact, this new study highlights that sea snakes have more reason to fear toxins from human activities than humans have to fear their venom. The global decline in reptile populations is in fact driven by marine pollution along a myriad of harmful human activities such as habitat degradation, introduction of invasive species and climate change.

In marine environments, Persistent Organic Pollutants (POPs) like Polycyclic Aromatic Hydrocarbons (PAHs) and Organochlorine Pesticides (OCPs) persist and accumulate, posing significant threats to marine life. PAHs are a group of chemicals that occur naturally in coal, crude oil, and gasoline, and when these substances are burned. PAHs can be released into the environment through activities such as vehicle exhaust, industrial emissions, and oil spills. These chemicals are harmful because they can cause cancer and other health effects in animals and humans. OCPs are chemicals used in agriculture to control insects ,examples include DDT and chlordane. Although many OCPs have been banned or restricted in various countries due to their harmful effects, their long term usage has led to their persistence in the environment. These pesticides can accumulate in the tissues of animals and humans, leading to adverse health effects like hormone disruption and cancer.

Over the past century, substantial amounts of POPs have been released into the environment through various human activities. These pollutants can accumulate in organisms and magnify as they move up the food chain, particularly affecting long-lived and predatory

species. This makes monitoring POP levels in marine ecosystems crucial for understanding their impact and developing effective conservation measures. Sentinel species (also known as indicator species) are chosen for their sensitivity to environmental changes, and are essential for monitoring pollution. Sea snakes, although under-researched, have many characteristics that make them suitable for this role. They are predators, occupying a similar trophic position as animals consumed by humans, and are sensitive to bioaccumulation of pollutants. Additionally, stranded sea snakes provide a convenient means of obtaining tissue samples for analysis of pollutants. The term "strandings" refers to marine animals found on land that are either dead, injured, or exhibiting abnormal behaviour.

In this study stranded sea snakes were collected through the Sharjah Strandings Response Programme (SSRP). The SSRP is an initiative established under the Environment and Protected Areas Authority to address and investigate strandings. These strandings included various species of sea turtles, sea snakes, seabirds, sharks, rays, dolphins and even whales. Deceased strandings are carefully collected by the SSRP and transported to the laboratory for further investigation, while live strandings were rescued and taken to the Breeding Centre of Endangered Wildlife (BCEAW) for rehabilitation. The strandings used in this study included three species of stranded sea snakes: The Arabian Gulf Coral Reef Sea Snake, the Ornate Sea Snake, and the Spine Bellied Sea Snake, collected from the coastal areas of Sharjah between 2018 to 2020.

Researchers in the Department of Biology, Chemistry and Environmental Sciences at the American University of Sharjah examined the levels of OCPs and PAHs in the liver, muscle, and fat tissues of these sea snakes to determine the extent of pollutants' accumulation and potential sources of contamination. The results revealed that all analysed sea snakes contained POPs, indicating prolonged exposure to harmful chemical discharges in the region. Higher concentrations of OCPs were detected, while PAHs were found in more sea snakes but at lower levels. Researchers observed that pollutant concentrations were greater in longer and heavier specimens, suggesting that these pollutants bioaccumulate in sea snake tissues. Bioaccumulation occurs when an organism absorbs a substance at a rate faster than that at which the substance is excreted. In simpler terms, it means that pollutants build up in the body over time. Not only are PAHs toxic to sea snakes, but the dispersants used to manage petrochemical spills can also increase the bioavailability of these harmful compounds. PAHs metabolise in vertebrates to produce carcinogenic and mutagenic metabolites, posing severe health risks. Chronic exposure to POPs can lead to impaired reproductive performance, immune function, and potential genotoxicity (causing mutations, may lead to cancer). Given these findings, the study highlights the need for continued monitoring and research on the impact of pollutants on marine reptiles. Understanding the toxicological challenges faced by sea snakes and other marine species is essential for developing effective conservation strategies and protecting marine biodiversity in the region.

برنامج الشارقة للاستجابة لجنوح الحياة البحرية

Sharjah Strandings Response Program

ABOUT SSRP:

Sharjah Strandings Response Program

Through the examination of stranded marine reptiles, marine mammals and sea birds, this programme, led by the Environment and Protected Areas Authority (EPAA), aims to expand the existing knowledge on the biodiversity, ecology and threats of marine fauna in the Emirate of Sharjah, UAE.

This knowledge would support the development of evidence-based conservation action and policy in the region as well as educate the wider public on the importance of conserving species and other emerging issues. Additionally, this programme acts as an important tool for the response and rescue of live strandings.

EPAA, AUS, AND ZAYED UNIVERSITY CONDUCT FIRST TOXICOLOGICAL ASSESSMENT OF WHALES IN THE MIDDLE EAST

FEATURE **FADI YAGHMOUR, FATIN SAMARA,** AND **ADA NATOLI**

The Environment and Protected Areas Authority (EPAA) of Sharjah, the American University of Sharjah (AUS) and Zayed University have collaborated on a study to examine the levels of organic pollutants and heavy metals in the tissues of stranded whales from the UAE. This study represents the first toxicological assessment of whales in the Middle East and the wider Northern Indian Ocean. The study focused on the presence and levels of polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), and heavy metals, as well as the ingestion of marine debris in whales. This collaborative effort aimed to address the knowledge gap regarding the exposure risk of marine mammals to toxic chemicals in the region.

Whales play a crucial role in maintaining healthy marine ecosystems. Their migratory behaviour helps distribute nutrient-rich faeces over large distances to nutrient-deficient habitats, boosting marine productivity and thus contributing to food security. Whales also play a vital role in carbon dioxide storage, as their large bodies sequester carbon both through their consumption of food and when their carcasses sink to the ocean floor. Additionally, whale carcasses support marine biodiversity by providing nutrients to various ecosystems, facilitating nutrient cycling, and sustaining deep-sea organisms.

Historically, whales were hunted extensively for their meat and oil, leading to significant population declines, with some species pushed near the verge of extinction. While the 1986 International Whaling Moratorium has helped some populations recover, more conventional threats such as entanglement in marine debris, ship strikes, climate change, noise pollution, and chemical pollution continue to jeopardise their survival. Addressing these ongoing threats is a challenge, especially in regions where information on whale populations is lacking, hindering effective conservation efforts.

Chemical pollutants, such as PCBs, PAHs, OCPs, and heavy metals, pose significant health risks to both whales and humans worldwide. In whales and dolphins high levels of chemical pollutants have been linked to lowering the immune system response, reducing reproduction success and calf survival and decreasing mortality age. Because of their long lifespans, whales can accumulate high levels of these pollutants over time, making them useful for researchers as indicators of marine ecosystem health. The Arabian Gulf and Gulf of Oman, due to their limited water circulation and frequent oil spills, are water bodies particularly vulnerable to such contamination.

PCBs are synthetic organic chemicals widely used in industrial applications until they were banned in the late 20th century due to their environmental persistence and toxicity. PAHs are organic compounds formed primarily from the incomplete combustion of organic matter, such as fossil fuels, and are known to be carcinogenic. OCPs are a class of pesticides commonly used in agriculture until many were banned or restricted due to their long-term

environmental impact and potential harm to wildlife and humans. Heavy metals, such as mercury and lead, are toxic elements that can accumulate in marine organisms and have deleterious effects on their health.

The research team analysed tissue samples from seven stranded baleen whales. The sample included three species: blue whale, humpback whale and Bryde's whale. The results revealed no evidence of exposure to the organochlorine pesticides examined in the stranded whales. The concentrations of heavy metals were also generally lower than those found in other species in the region, suggesting that these whales may not be as heavily impacted by these contaminants. However, low levels of PCBs were detected in two specimens, indicating some degree of exposure to this class of pollutants, suggesting that baleen whales in this region are frequently exposed to PAHs, primarily from petrogenic sources.

Petrogenic PAHs originate from crude oil and its derivatives, highlighting the impact of oil spills, high marine traffic and other petroleum-related activities in the region. This is overall a positive result for the whale populations inhabiting our region, as it suggests that chemical contamination is not a main threat for these species in this region. However, the study collected evidence of other potential threats that should be carefully considered. Signs of trauma and marine debris entanglement were observed in some of the whales analysed, suggesting these factors contributed to their deaths. In two cases, tail fluke amputation and bruising were respectively noted, indicative of entanglement with fishing gear or other marine debris. However, no evidence of marine debris ingestion was found in the examined cases, though this may be due to the advanced decomposition of the specimens or the limited sample size.

Considering the limited sample size and the condition of the specimens, this study underscores the need for maximising the collection of scientific information in the case of whale and dolphin strandings to confirm the data obtained and further investigate other threats that can affect their survival. Such research is essential for understanding and mitigating the threats faced by these species, ultimately aiding effective conservation management. Continued monitoring and analysis of pollutant levels in stranded whales will help identify trends and potential sources of contamination, informing effective conservation strategies. Furthermore, addressing the broader issue of marine pollution as well as reducing the effects of the other threats, requires international collaboration and policy initiatives

In conclusion, whales play an indispensable role in the health and functioning of marine ecosystems. However, they face significant threats from chemical pollutants and other anthropogenic factors. Studies like the one conducted in the UAE are vital for shedding light on these threats and guiding conservation efforts and policies. By understanding the toxicological challenges facing whales, we can better protect these majestic creatures and the ecosystems they support and in doing so, we protect our public health and food security.

برنامج الشارقة للاستجابة لجنوح الحياة البحرية

Sharjah Strandings Response Program

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This knowledge would support the development of evidence-based conservation action and policy in the region as well as educate the wider public on the importance of conserving species and other emerging issues. Additionally, this programme acts as an important tool for the response and rescue of live strandings.

SHARJAH'S ALQURM PROTECTED AREA IN KHOR KALBA RECOGNISED AS IMPORTANT TURTLE HABITAT BY IOSEA MARINE TURTLE MOU

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

The Environment and Protected Areas Authority in Sharjah (EPAA) has announced that the AlQurm Protected Area in Kalba City is now part of the Indian Ocean's South-East Asian (IOSEA) Marine Turtle Memorandum of Understanding (MoU). This addition makes AlQurm the second site in Sharjah, alongside Sir Bu Nair Island Reserve, and the third site in the UAE alongside the Bu Tinah Shoal in Abu Dhabi, to join the IOSEA Marine Turtle MoU. The announcement was made during the UAE's participation in the ninth meeting of the signatory states of the memorandum, held in Dar es Salaam, Tanzania, from the 24th-27th of June 2024.

The MoU on the Conservation and Management of Marine Turtles and their Habitats of the IOSEA provides a framework for states, territories, and various stakeholders to collaborate on conserving marine turtle populations and habitats. It applies to the waters and coastal states of the Indian Ocean and South-East Asia region, including adjacent seas, and is divided into four sub-regions for implementation: South-East Asia and Australia, Northern Indian Ocean, Northwestern Indian Ocean, and Western Indian Ocean. The MoU focuses on six marine turtle species: Loggerhead sea turtles, Olive Ridley sea turtles, Green sea turtles, Hawksbill sea turtles, Leatherback sea turtles, and Flatback sea turtles. The Conservation and Management Plan (CMP) under the MoU aims to reduce threats, conserve habitats, exchange scientific data, increase public awareness, promote regional cooperation, and secure resources for implementation.

The meeting highlighted the role of Sharjah's EPAA in environmental and biodiversity conservation, showcasing its dedication to protecting various species, particularly marine turtles. EPAA Chairperson HE Hana Saif Al Suwaidi expressed her gratitude to HH Dr Sheikh Sultan bin Muhammad Al Qasimi, Supreme Council Member and Ruler of Sharjah, for his pivotal support in preserving biodiversity and protecting natural life. She emphasised the EPAA's commitment to representing Sharjah in global environmental meetings and showcasing its significant achievements.

The AlQurm Protected Area in Khor Kalba is notable for being the only habitat of mangrove trees on the Gulf of Oman coast in the UAE, housing the country's oldest mangrove forest. It is home to the critically endangered Arabian Collared Kingfisher, found only at this site, and hosts the largest known foraging aggregations of juvenile marine turtles on the UAE's east coast. The EPAA continuously investigates the threats faced by these marine turtles through its Sharjah Strandings Response Programme (SSRP).

Furthermore, the site is an ideal location for feeding and nesting over 150 species of local and migratory birds, over 90 species of crustaceans, and 100 species of fish. The Khor Kalba Mangrove Centre within the reserve serves as an educational hub, emphasising the importance of mangrove conservation and housing the only marine turtle rehabilitation centre on the UAE's east coast. This centre serves as a comprehensive centre for research, education,

and conservation initiatives. Official classification of the area as part of the IOSEA network of sites will further enhance conservation efforts by providing policymakers with tangible evidence to the site's environmental value. The area was also designated as a Wetland of International Importance under the Ramsar Convention in 2013.

The Sharjah Government's continuous support for the EPAA's efforts in achieving environmental goals and ensuring the success of conservation initiatives has been instrumental. AlQurm Protected Areas recognition as an important habitat by the IOSEA Marine Turtle MoU underscores the vital need for ongoing conservation and research efforts. Continued dedication to protecting this unique ecosystem is essential for preserving its biodiversity, including endangered subspecies like the Arabian Collared Kingfisher and juvenile marine turtles.

Ongoing research initiatives will enhance our understanding of these habitats, informing effective conservation strategies and ensuring the sustainability of the site's rich natural heritage. The commitment to maintaining and advancing these efforts will play a crucial role in safeguarding the ecological balance and promoting environmental awareness for future generations.

هيئة البيئة والمحميات الطبيعية
Environment & Protected Areas Authority
SHARJAH الشارقة

ABOUT EPAA:

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

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DIVING TALKS CONFERENCE
SHOWCASES GROUNDBREAKING CONTRIBUTIONS TO DIVING AND MARINE SCIENCE

EVENT DETAILS:
- **DATE:** 18-20 October 2024
- **LOCATION:** Lisbon, Cordoaria Nacional, Torreão Poente

The annual Diving Talks conference returns to Lisbon from October 18-20, bringing together the world's leading divers, scientists, and marine biologists. This prestigious event will offer the public an unparalleled opportunity to learn about the latest advancements and contributions to the field of diving, spanning research into diver health and safety, innovations in diving mechanics, and marine conservation projects.

UNMATCHED QUALITY OF TALKS AND PRESENTATIONS

Diving Talks is renowned for its high-quality presentations that cover a wide spectrum of topics relevant to the diving community. Attendees will gain insights into cutting-edge research and innovative practices that enhance the diving experience and contribute to the preservation of marine ecosystems. Diver photographers will also showcase their work, capturing the beauty and challenges of the underwater world through stunning imagery that inspires conservation and exploration.

The conference will feature sessions on:
- **DIVER HEALTH AND MEDICINE:** Latest research on the physical and mental well-being of divers, including advancements in hyperbaric medicine and safety protocols.
- **DIVING MECHANICS:** Innovations in diving technology and equipment, enhancing safety and efficiency for both recreational and professional divers.
- **MARINE CONSERVATION:** New projects and initiatives aimed at protecting marine life and habitats, presented by leading marine biologists and conservationists.
- **DIVING STORIES & PHOTOGRAPHY:** Divers will share captivating stories of their dives and present stunning photographs that showcase the beauty and challenges of the underwater world.

AN INTERACTIVE NETWORKING OPPORTUNITY

At Diving Talks, we believe in the power of knowledge-sharing and fostering connections within the diving community. While all talks are available on our YouTube channel to reach a global audience, attending the conference provides a unique opportunity to interact directly with the world's foremost experts in diving.

This interactive environment encourages attendees to engage with speakers and fellow participants, whether to seek advice, ask questions, or explore potential collaborations on future projects. Connecting with the best of the best in the world of diving can lead to valuable insights and opportunities for professional growth and innovation.

GET YOUR TICKETS

Tickets for the Diving Talks conference are available for purchase online. Don't miss out on this opportunity to be part of an inspiring event that celebrates the spirit of exploration, innovation, and conservation in the diving world.

Get your tickets here:
www.divingtalks.com/tickets

EXCITING LINEUP FOR THIS YEAR'S EDITION

This year's Diving Talks promises to be just as captivating, featuring a remarkable lineup of speakers who are pioneers and experts in their respective fields:

1. **CHRISTINE WEST** is a polar expedition diver and conservation photographer/videographer, documenting Arctic and Antarctic ecosystems.
2. **DARCY KIERAN** is a Course Director and founder of The Business of Diving Institute, providing sales and management training for the dive industry.
3. **FRÉDÉRIC SWIERCZYNSKI** is a French cave diver and world record holder for the deepest cave dive at 308 metres.
4. **GARETH LOCK** founder of The Human Diver, integrates human factors knowledge into diving and is the author of "Under Pressure."
5. **JARROD JABLONSKI** founder of GUE, is an explorer, researcher, and CEO of Halcyon Manufacturing, focusing on conservation and exploration.
6. **JILL HEINERTH** is a renowned technical diver and filmmaker, known for her work with National Geographic and her TED Talks on climate change.
7. **JOANNA WYREBEK** (JoJo) a CCR Cave and Full Trimix Diver, co-founded 'The Cavettes' and participates in ocean conservation projects.
8. **JOÃO RODRIGUES** is a filmmaker, photojournalist, and marine biologist, specialising in natural history documentaries and visual storytelling.

9. **JOSE VENTURA** a Rebreather OEM support specialist at Shearwater, has been a dive professional for almost 25 years and promotes scuba safety.
10. **KIRK KRACK** founder of Performance Freediving International, has trained athletes to world records and worked on the Avatar sequels.
11. **LEIGH BISHOP** is a British shipwreck explorer & deep wreck diving pioneer, known for his work with National Geographic.
12. **MARIA BOLLERUP** a rebreather cave diver and explorer, co-founded Nixie Expeditions and works on PTSD rehabilitation through diving.
13. **NATHALIE LASSELIN** is an underwater cinematographer and environmental advocate, known for her explorations and scientific research.
14. **NUNO GOMES** a CMAS diving instructor and world record holder, has over 5,000 dives and promotes scuba safety and exploration.
15. **PHIL SHORT** is a rebreather, cave, and mine diving expert, works in R&D to improve scientific diving capabilities.
16. **RANNVA JOERMUNDSSON** Head of Sales for Fourth Element, is a cave diver and explorer, advocating for sustainable diving.
17. **RICHARD CULLEN** founder of Deptherapy, has worked in adaptive scuba diving since 2009, advocating for standardised teaching.
18. **RICO BESSERDICH** is an aquatic imaging artist and diver, raising awareness about water through his photography.
19. **SAMI PAAKKARINEN** is a technical and cave diver, who works with the Finnish Coast Guard on underwater search and rescue operations.
20. **SIMON MITCHELL** is an anaesthesiologist and diving physician, is a Professor at the University of Auckland with over 170 scientific publications.
21. **STEFAN PANIS** is a rebreather diver and underwater photographer, capturing stunning underwater images.
22. **XAVIER MÉNISCUS** is a cave diver and photographer, known for his underwater cave explorations and photography.

Let's talk about diving

DIVINGtalks

JOIN DIVING TALKS IN LISBON

Join the event taking place in Lisbon from October 18-20 for an unforgettable occasion that celebrates the spirit of exploration, innovation, and conservation in the diving world.

Whether you're a seasoned diver, a marine scientist, or simply passionate about the underwater world, Diving Talks offers something for everyone.

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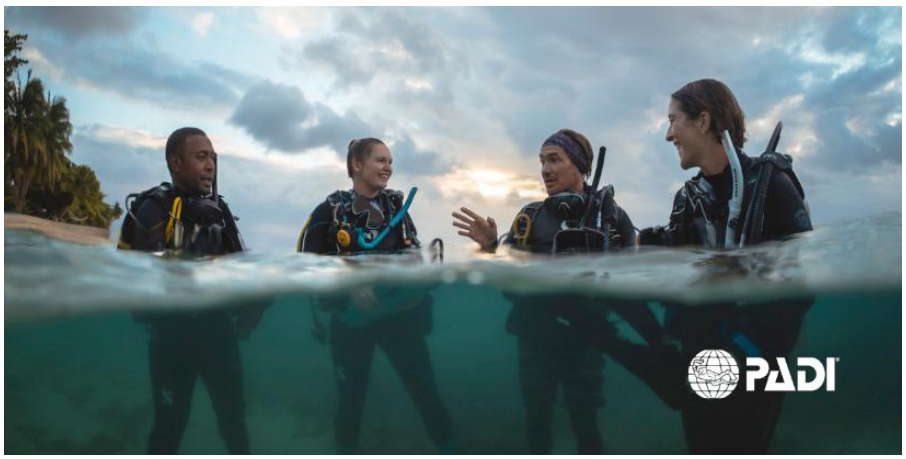
PADI RECOGNISES EMEA MEMBERS
WITH NEW PROFESSIONAL DEVELOPMENT EXCELLENCE AWARD



PADI® (Professional Association of Diving Instructors®) has recently launched their new Professional Development Excellence Award in EMEA (Europe, Middle East and Africa), celebrating PADI Five Star Instructor Development Centres (IDC) that are championing creating more PADI Professionals, at all levels, during the previous calendar year.

"While becoming a PADI Five Star IDC Centre is a prized accreditation amongst members, this exclusive rating comes with the responsibility of training the next generation of divers to become PADI Instructors," explains Dave Murray, Managing Director for PADI EMEA.

"PADI's commitment to a continuing education philosophy encourages divers to realise their dreams of a career as a PADI Pro, teaching others to do what they love – to scuba dive. This new recognition award distinguishes productive PADI Five Star IDC Centres for the time and effort they dedicate to marketing and conducting the professional training needed to grow the scuba diving industry."

PADI's EMEA Professional Development Excellence Award recognises members for reaching specific milestones based on the number of PADI Pro certifications they issue annually. It also provides an extra layer of credentials in their "Pro Development Status" to potential Divemaster and IDC candidates, along with any other prospective Pro-level customers and prospective employees.

The first awards were distributed earlier this year, with 12 PADI Five Star IDC Centres receiving the Platinum Award. This means that they have issued a minimum of 100 PADI Professional certifications from Divemaster to IDC Staff Instructor, which include 30 Core Professional certifications and 70 Continuing Education Instructor level certifications.

The 2025 PADI EMEA Professional Development Excellence Award is already underway and renewed PADI EMEA Five Star IDC Dive Centres and Resorts are automatically eligible. Centres that reach the recognition levels during 2024 will receive their award in the first quarter of 2025.

For more information about the award and to see the full list of award recipients visit here: **https://bit.ly/46rCenh**

PADI LAUNCHES DIVEMASTER INTERNSHIPS WITH MEMBERS,
INVITING NEXT GENERATION OF DIVERS TO GO PRO

PADI® (Professional Association of Diving Instructors®) Dive Centres and Resorts across Europe, the Middle East and Africa are inviting scuba divers to take part in the newly launched PADI Divemaster Internship programme. With over 50 newly added internship opportunities for aspiring professional divers, a career of a lifetime can be launched in dream destinations spanning from Spain and Greece to the Maldives and Mauritius.

"The PADI Divemaster Internship is designed to offer a meaningful way to kick-start a purpose-driven career in scuba diving," explains Kristin Valette Wirth, Chief Brand and Membership Officer for PADI Worldwide. "These internships offer hands-on training and mentorship at world-class PADI Dive Centres and Resorts – learning how to supervise and teach scuba divers while also learning about running a successful dive business. This initiative is part of PADI's ongoing commitment to fostering new talent and promoting growth within the diving industry."

The PADI Divemaster Internship will provide participants with their PADI Divemaster certification as well as hands-on experience, skills and confidence needed to excel in a diving career.

The PADI Divemaster membership rating is recognised globally for employment opportunities and represents a significant milestone in an individual's scuba diving development, and is the pivotal first step in becoming a PADI Professional. The professional rating enables recipients to lead and mentor other divers, assist PADI Instructors in training, and conduct certain diving activities independently. Many PADI Divemasters continue careers in marine conservation, film and television, the Armed Forces and underwater archaeology, while also having the option to work all around the world as a PADI Professional.

To qualify for the PADI Divemaster Internship, participants will need to have logged 40+ dives and show completion of the PADI Open Water Diver, PADI Advanced Open Water Diver, PADI Rescue Diver course, Emergency First Response Primary and Secondary Care courses (or qualifying certifications from other organisations) and be medically cleared for diving by a physician within the past 12 months.

"We are inviting the next generation of scuba divers to join the world's largest purpose-driven diving organisation and start their careers as PADI Professionals who are playing a key role in inspiring others to seek adventure and save the ocean," continues Valette Wirth. To find and apply for a PADI Divemaster Internship head over to the PADI Jobs board or reach out to your local dive centre.

PADI LAUNCHES MASTER SCUBA DIVER CHALLENGE, OFFERING FREE RENEWALS FOR MEMBERS AND A DREAM TRIP TO THE MALDIVES FOR SCUBA DIVERS

PADI® is challenging members around the world to grow PADI Master Scuba Diver™ ratings with the Master Scuba Diver Challenge. Taking place until 31 December 2024, members showing the most percentage growth in Master Scuba Diver ratings compared to the year prior will win their competitor category.

"The PADI Master Scuba Diver rating is considered the 'black belt' of recreational diving," says Lisa Nicklin, Vice President of Growth and Marketing for PADI Worldwide. "We are rallying PADI members to challenge more scuba divers to continue their education and transform them into confident and prepared divers."

MEMBER PARTICIPATION, PRIZES AND HOW TO WIN

The Master Scuba Diver Instructor Challenge is open to any qualified PADI Member, with the first-place prize of a free 2025 PADI Membership Renewal online. In addition, every participating member in the competition will have their Master Scuba Diver application fees waived for 2024.

Members will only compete against others in specific competition groups, with PADI Individual Members and PADI Dive Centres or Resorts evaluated separately for each region and based on their previous rating statistics. Each competitor group (four for individuals and four for dive centres + resorts per region) will be awarded one first-place winner, for a total of 24 first-place prize winners overall.

For more details on the eligibility, competition groups and winner selections view here: **https://bit.ly/4c1E0wH**
Individual Members can register here: **https://bit.ly/4cbFB3i**
and Dive Centres and Resorts can register here: **https://bit.ly/3yhGf11**

THE BONUS DREAM DIVE TRIP GIVEAWAY FOR STUDENTS

In addition to providing members with their own prize incentive, PADI is also offering participating members an extra incentive to their customers: a dream dive trip giveaway to the Maldives, where the winner will receive roundtrip airfare for two people to Male and six nights' full board accommodation with two dives per day at Vilamendhoo Island Resort & Spa. Two additional winners will receive a recreational PADI eLearning course of their choice.

This giveaway is open for all students who work towards receiving their PADI Master Scuba Diver rating during this competition period. To become a PADI Master Scuba Diver, students must complete their Advanced Open Water Diver course, five Speciality courses, and the Rescue Diver course – in addition to having completed 50 logged dives.

To enter the giveaway, participants will sign up at padi.com and answer the question: "Why do you want to be a PADI Master Scuba Diver?" Additional entries will then be given to participants based on the amount of PADI Courses completed en route to becoming a PADI Master Scuba Diver. This includes:

- PADI Master Scuba Diver rating – 10 entries
- PADI Rescue Diver certification – 5 entries
- PADI Advanced Open Water Diver certification – 3 entries
- PADI Specialty certification – 2 entries
- PADI Open Water Diver certification – 1 entry
- PADI Club member – 5 entries

For more details on how scuba divers can enter PADI's Dream Dive Trip Giveaway to the Maldives visit: **padi.com/education/continue-learning#msd**.

PADI INFLUENCING STRONG GLOBAL PLASTIC TREATY

RALLIES OCEAN ADVOCATES TO SIGN PETITION THAT CREATES POSITIVE OCEAN CHANGE

PHOTOGRAPHY **PADI – JAY CLUE**

PADI® and their global non-profit the PADI AWARE Foundation™ are leading the charge to help end the global marine debris problem, having an influential presence at the ongoing Global Plastics Treaty discussions of the United Nations' Intergovernmental Negotiations Committee (INC). The Global Plastics Treaty represents a unique and crucial opportunity for a worldwide coordinated initiative that effectively resolves the ongoing plastic pollution crisis.

"This year we have an incredibly significant opportunity to turn the tide on plastics and are taking on the responsibility for being the voice for the ocean and the global scuba diving community known as Ocean Torchbearers," says Danna Moore, Director of PADI AWARE™.

In March 2022, a historic resolution was adopted to develop an international legally binding instrument on plastic pollution, including the impacts on the marine environment. Four of the five INC sessions to negotiate the terms of this Global Plastics Treaty calling for common, global rules for plastics across its entire lifecycle have taken place so far, with the INC-5 negotiation meeting set to take place in Busan, South Korea this November. PADI continues to take an active role in negotiations as it is debated by governments, informing decisions with critical data detailing plastic marine debris found on the bottom of the ocean floor and ensuring governments address the marine debris crisis and institute methods to safely eradicate it in the Treaty.

"The current desire to develop a binding Global Plastics Treaty presents a once-in-a-generation opportunity to put in place a legal instrument to end plastic pollution. It also offers a major leap forward towards meeting PADI's Blueprint for Ocean Action goal to reduce marine debris by 50% in targeted countries," says Moore. "PADI and PADI AWARE Foundation are the only organisations representing the global recreational dive community in the ongoing official negotiations leading up to the anticipated agreement of the treaty in 2025. By taking part, we are informing and influencing decisions that affect our shared blue planet."

IMPLEMENTING THE WORLD'S LARGEST MARINE DEBRIS DATABASE INTO THE GLOBAL PLASTICS TREATY

PADI's Dive Against Debris®, the world's largest citizen science underwater marine debris database, is run through the AWARE Foundation. Since 2011, Ocean Torchbearers™ have removed and reported marine debris into the database and played an integral role in informing and advancing solutions to the global pollution problem. This includes:

- Removing and reporting over 2.4 million pieces of marine debris across 121 countries, with 70 percent of all items reported globally being plastic.
- Training and mobilising over 100,000 citizen scientists to contribute to the database, helping advance ground-breaking marine research and advocating for public stakeholders to implement governmental policies.
- Releasing more than 35,000 entangled marine animals from human-induced marine debris.
- Influencing various governmental policies at a localised level, with recent success solidifying Vanuatu's ban of plastic bags and informing single-use plastic policies in Australia.

Now, PADI is seeking to implement the Dive Against Debris programme into the Global Plastics Treaty as part of the global solution to remove and monitor marine debris, which is currently under consideration in Article 11 of the Treaty. If included, this means that the programme would be recognised as an approved methodology for governments to leverage as a solution for monitoring and reporting marine debris – with the ability to influence data-driven policies that can ultimately create changes to waste-management systems and plastic supply chains around the world.

"If included, we are prepared to work with governments to ensure that the removal of plastic pollution does not damage marine habitats," explains Moore. "Dive Against Debris is currently the only global debris removal activity that does not have a detrimental impact on fragile habitats such as seagrass and coral reefs and is an important component of creating positive ocean change."

BE A SUPERHERO FOR THE OCEAN AND SIGN THE PETITION

PADI is calling upon all Ocean Torchbearers to help create positive ocean change by signing their petition that also tackles the marine debris crisis, holding governments and the plastic production industry accountable by having the Dive Against Debris programme included as part of the solution.

"Over the last three years in particular, PADI's community of ocean advocates have helped secure significant wins for the ocean through signing similar petitions," explains Moore. "In 2021 they helped us secure protection for Mako Sharks at the International Commission for the Conservation of Atlantic Tuna (ICCAT) and in 2022 they helped us secure protection of requiem sharks (54 species of sharks and rays) at the Convention on International Trade of Endangered Species (CITES). These were both accomplished by Ocean Torchbearers signing our petitions to urge their own local governments to take action. Now, we are rallying the global community once again for 100,000 signatures so that we will be one step closer to a plastic-free ocean."

Achieving a strong Global Plastics Treaty means ensuring that:

1. The rate at which plastics enter the ocean is substantially decreased.
2. Avoidable plastic products that commonly enter the ocean are eliminated.
3. Governments recognise diving communities are critical in tracking the impact of the treaty.

In addition to signing the petition, PADI encourages all scuba divers to get their Dive Against Debris certification and take part in underwater clean-up events with their 6,600 PADI Dive Centres and Resorts around the world to help keep the data flowing to inform policy in real-time.

"For 30 years PADI has been ridding the underwater world of plastic and, together, we can finally turn the tide," urges Moore. "With an estimated 14 million tons of plastics going beneath the surface every single year, we need all the help we can get. Join us in being a voice for the ocean and sign the petition!"

LEARN MORE & SIGN THE PETITION

To learn more about PADI's involvement in the Global Plastics Treaty and to sign the petition, visit:
www.padi.com/global-plastics-treaty

Reef Check
UNITED ARAB EMIRATES

Join the Reef Check
ECODIVER CERTIFICATION COURSE

LEARN TO CONDUCT REEF CHECK SURVEYS TO COLLECT DATA ON REEF HEALTH, AND HELP ASSESS CLIMATE CHANGE IMPACTS

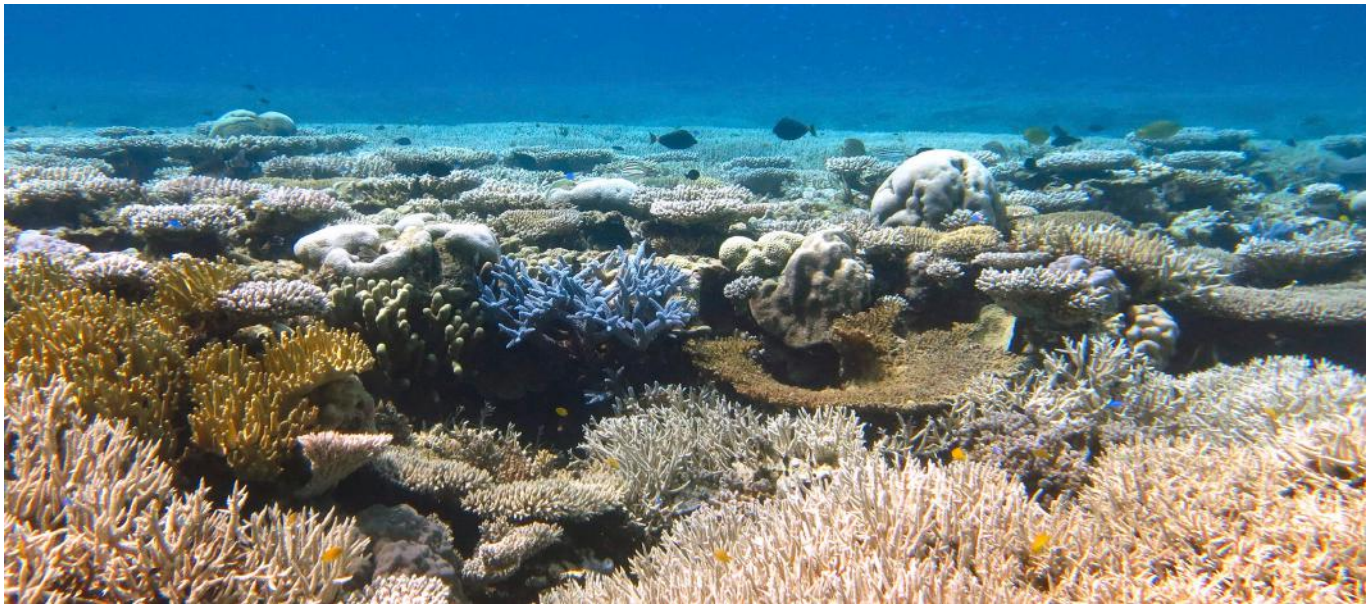
When you join a Reef Check EcoDiver Training Course, you will learn about our local ecosystems and you will be able to participate in our regular survey dives which will help us to understand the threats our corals are facing by providing important data.

EDA
جمعية الإمارات للغوص
Emirates Diving Association

EMAIL: reefcheck@emiratesdiving.com **WEBSITE:** www.emiratesdiving.com/events/reef-check

EDA IS A NON-PROFIT NGO ACCREDITED BY UNEP AS AN INTERNATIONAL ENVIRONMENTAL ORGANISATION

CORAL BLEACHING:
THE CANARY IN THE COAL MINE FOR CORPORATE GREED AND ENVIRONMENTAL DESTRUCTION



The Reef Check Foundation, Biosphere Expeditions' partner for its coral reef citizen science work, has confirmed that a fourth global coral bleaching event is currently underway. This is an urgent wake-up call to the world, it being the second global mass bleaching in the past decade. It heralds a new reality of more frequent and severe bleaching events as ocean temperature records continue to be broken. Cycles of decline and recovery are normal for coral reefs, but bleaching events, which kill whole swathes of reef, are now so frequent that they are threatening coral reef survival around the planet.

THE VALUE OF REEFS

"A world without coral reefs will be a major problem for humanity because coral reefs have an estimated global value of €8 trillion each year, due to their contribution to the fishing and tourism industries, as well the coastal protection they provide", explains Dr Matthias Hammer, Executive Director of Biosphere Expeditions, the international citizen science NGO at the forefront of wildlife conservation. "More than 500 million people worldwide depend on reefs for food, jobs and coastal defence."

FIGHTING THE DECLINE ACROSS THE WORLD

For Biosphere Expeditions, these increasingly frequent and devastating bleaching events are nothing new, of course. The NGO, celebrating its 25th anniversary this year, has worked in coral reef conservation for decades, with a string of findings, achievements and successes.

In Oman, for example, Biosphere Expeditions' citizen scientists showed that corals in Oman thrive in extreme conditions such as high salinity and temperatures which would be considered marginal and highly challenging environments for corals in other parts of the world. Indeed, this remarkable ability may hold the key to coral survival in the face of global warming and its devastating effects on reefs across much of the planet. Further in Oman, Biosphere Expeditions' citizen scientists gathered data for five years before fishing was banned in 2013 in two secluded bays in the coral-rich waters of the country's Musandam peninsula by ministerial decree, and the areas made MPAs.

In parallel, Biosphere Expeditions ran an education and empowerment programme for Omanis resulting in historic first community-based reef surveys and the creation of Oman's first reef protection NGO with two Omani citizen scientists, now playing a leading role in Oman's reef conservation efforts.

In the Maldives, the NGO has been working since 2010, surveying for eight successive years an outstanding coral reef site called 'Rasdhoo Madivaru' until it was finally declared an MPA (marine protected area) by the Maldivian authorities in 2019. The site is both resilient to the worst effects of coral bleaching and harbours large megafauna such as sharks, manta rays, turtles and Napoleon wrasse. Besides this, Biosphere Expeditions has shown remarkable reef resilience and been instrumental in the creation of an educational local community reef surveying programme.

In Malaysia, coral reef expeditions to Tioman Island provided vital data on coral reef health and human-induced threats within the Tioman archipelago to which data was previously unavailable. This also helped build the foundation for 'Cintai Tioman', a long-term programme to increase social and ecological resilience on the island.

Finally, in Honduras, Biosphere Expeditions assisted the Cayos Cochinos Marine Protected Area with managing and protecting their coral reefs.

CORPORATE GREED & ENVIRONMENTAL DESTRUCTION: REEFS ARE THE CANARY IN THE COAL MINE

"We must do all we can to protect the planet's reefs", says Hammer, "not just because they are a canary in the coal mine of how humanity treats this planet, but also because we owe it to the people who rely on reefs and to those who come after us not to wreck this planet which sustains us, and of which we only have one." Hammer continues, "sure we can do our five R's as individuals and people can come and help us as citizen scientists to fight the decline, which is utterly commendable, but in the end it will be about humanity reigning in corporate greed and destruction before it is too late. Because I concur that trashing the planet and hiding the money isn't a perversion of capitalism, it is capitalism. This system is no longer fit for purpose, indeed it is at the root of the vast majority of environmental problems we are facing now."

REEF CHECK AUSTRALIA MAKES A SPLASH AT THE AUSTRALIAN CORAL REEF SYMPOSIUM

BY **JODI SALMOND, GENERAL MANAGER, REEF CHECK AUSTRALIA**

Our team was thrilled to be a part of the recent Australian Coral Reef Symposium (ACRS) held in Perth!

We presented two exciting talks based on upcoming research papers utilising valuable data collected by Reef Check Australia volunteers.

- One presentation focused on coral bleaching trends in Southeast Queensland (SEQ).
- The other explored the power of citizen science over 17 years, analysing reef health data from SEQ.

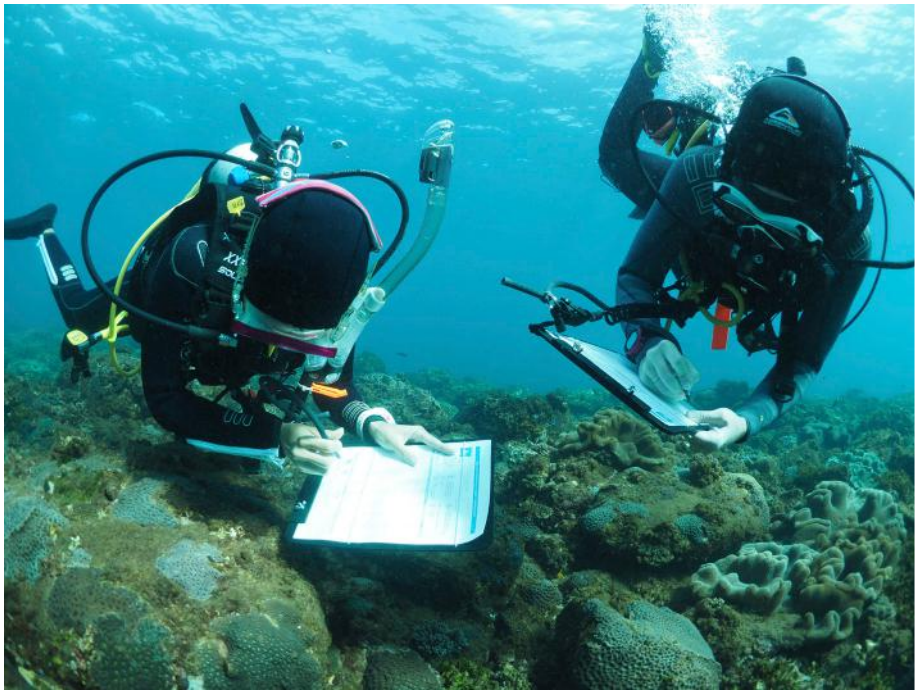
The response was fantastic! We connected with attendees from across Australia, all passionate about protecting our coral reefs. It was also a great opportunity to see so many old friends still working in the industry, as well as so many new faces.

The ACRS covered a wide range of crucial topics, including bleaching, recovery and resilience, citizen science and innovative technologies. It was inspiring to see such broad representation and enthusiasm for coral reef conservation.

Stay tuned for upcoming publications based on the research presented at ACRS!

REEF CHECK AUSTRALIA ECODIVER SURVEY REPORT FROM THE SUNSHINE COAST

BY **MISA NISAWARA**



After four months of high seas, strong winds and plenty of rain, the Reef Check Australia team eagerly set out to survey Mudjimba (Old Woman) Island, a site we visit annually and last surveyed in April 2023.

We were happy to discover a relatively small amount of coral bleaching at this particular Mudjimba Island site, with only 5% of the overall population bleached. However, those bleached colonies were heavily impacted, with an average of 60-70% bleaching. We also recorded a number of bleached anemones without fish. This is the first time bleached anemones have been documented at this site, illustrating the changes in the environment over time.

At Mudjimba shallow reef, a mix of hard corals, soft corals, rocky substrate and algae provides habitat for many species, from small invertebrates to larger animals. For instance, we recorded nudibranchs, a lobster, wobbegong sharks blending into the reef floor and a sea turtle feasting on algae. If devastating bleaching was to occur at a mass scale at Mudjimba Island, it would affect all these creatures who call this reef home. Sadly, we also recorded entangled fishing line and boat anchor damage on both hard and soft corals.

As a new member of Reef Check Australia, this was my in-water training day to become a scuba surveyor and a Reef Check EcoDiver. The instructor was very knowledgeable and made it a very fun experience for the whole team. I am very excited for my upcoming journey with Reef Check Australia.

www.reefcheckaustralia.org

A VOLUNTEER'S PERSPECTIVE:

A DEEP DIVE INTO MARINE CONSERVATION WITH REEF CHECK ITALIA

BY **JIA CASHON**

Reef Check Italia's expedition to Bangka Island, North Sulawesi, Indonesia is a must for divers interested in beginning their journey in scientific diving and coral monitoring. This course, set in a stunning location with some of the best diving I have ever experienced, teaches some of the most commonly used scuba monitoring techniques worldwide. We learned how to assess benthic invertebrates, fish populations, and conduct CoralWatch bleaching surveys. Additionally, we were taught how to interpret data and identify trends over the years.

BEFORE THE COURSE

If you can arrive in Manado early, there are a variety of activities you can enjoy. On land, many visitors explore Tangkoko National Park, which is renowned for its rich biodiversity and opportunities to see unique wildlife such as tarsiers, crested black macaques, and various endemic bird species. For underwater adventures, Bunaken Island offers a marine protected area with numerous beautiful dive sites. Located in the Indo-Pacific region, Bunaken boasts the highest marine biodiversity on earth, featuring vibrant coral reefs, an abundance of fish species, and the chance to see megafauna such as turtles and reef sharks.

WHAT TO EXPECT

For beginner divers, the best preparation for this course is to practice buoyancy. I cannot stress this enough: to handle surveys and maintain the workload they require, you need to have perfect buoyancy. The reefs in North Sulawesi are teeming with life, and there are many delicate corals that protrude from the benthos. Fins should never touch the bottom so as to not break the corals. Some dives may be wall dives, but expect most to have the reef on the bottom. Familiarity with your dive computer is highly recommended. If the current is strong or if you happen to be separated from the group, you should be comfortable enough to make a safety stop and surface with an SMB on your own. Expect to have your hands always occupied and to work with the current as well.

RECORD YOUR MEMORIES!

Plan on bringing a camera, as identifying reef species can be overwhelming. Photographing organisms that you are curious about, or if you need to know them for the course, is the best way to identify and understand what you're looking at. It also provides you with a record of what you saw. I brought an Olympus TG-6 and found it a great camera for underwater photography while travelling since it is small and compact. This camera takes excellent macro shots and has a built-in flash to colour adjust for smaller organisms. Many people also brought GoPros for video footage as well.

WHAT WE SPOTTED

We saw an incredible array of marine life, but overall, the highlights were the smaller organisms. Among the most memorable were the vibrant nudibranchs, a personal favourite of mine, as well as tiny shrimp and seahorse species, cuttlefish, peacock mantis shrimp, blue-ringed octopus, and frogfish. These encounters provided excellent opportunities for honing our photography skills as well as making every dive memorable and exciting. Each dive brought new discoveries which made the experience both educational and thrilling.

END REMARKS

If you're an experienced diver interested in scientific diving, this programme will enhance your diving skills and understanding of marine conservation. Diving in the Coral Triangle is also unparalleled to anywhere else on this planet. Participating in the Reef Check Italia course is not just about a dive holiday, but a commitment to protecting our ocean's coral reefs through the knowledge of scientific diving – something I hope you may one day get to experience.

CORAL BLEACHING AND GHOST NETS
MARK START OF MALAYSIA SURVEY SEASON

BY **REEF CHECK MALAYSIA**

Spring has signalled the beginning of Reef Check Malaysia's 2024 survey season. With annual surveys scheduled at over 200 sites across the country, EcoDiver monitoring teams have a lot of work ahead of them! In addition to EcoDiver training, RCM has also held dive courses for local communities, getting them poised to join future surveys and activities. Tackling destructive ghost nets, rolling out a new waste management programme and monitoring coral bleaching as it happens have also been priorities these past few months.

SKILLS TRAINING COURSES FOR LOCAL STAKEHOLDERS

Reef Check Malaysia conducts annual surveys at more than 200 sites across the country. Our EcoDivers are volunteer divers, and we're glad to have the local community we work with show interest and come on board with our efforts. Our survey data is published as a report every year, made available on our website.

Our team has been actively training and organising training sessions for various stakeholders, equipping them with new dive-related skills. In the Mersing group of islands, we recently organised an Open Water Dive course for six representatives from the local community. All are now certified scuba divers, bringing the total of local divers to 10! These islanders will now be able to gear up for advanced training in marine conservation and rehabilitation efforts, such as getting certified as Reef Check EcoDivers.

Besides the Open Water Dive course, our colleagues from RCM conducted an EcoDiver Training with the local communities from Kg. Tajau Laut and Kg. Malubang, Kudat. Organised by Sabah Parks, this training aimed to empower divers from the two villages to participate in reef conservation efforts and monitor the health of their marine ecosystems. We've conducted similar training for other local community members from other islands, and these representatives were able to join us for activities such as reef rehabilitation and Reef Check surveys. Our team also completed the EcoDiver training course with nine Sabah Parks staff, who are based at several marine parks around Sabah.

RCM also carried out a Coral Bleaching Monitoring Training with representatives from Sabah Parks, as well as the Borneo Marine Research Institute (BMRI) from University Malaysia Sabah. This training was held in response to the NOAA Coral Reef Watch Satellite Bleaching Alert. Sessions included a detailed look at bleaching, as well as understanding the coral bleaching watch protocol used to monitor coral reefs affected by rising water temperature.

TACKLING GHOST NETS

Ghost nets contribute to ocean pollution by causing extensive social, economic and environmental impacts. They trap and entangle marine life, besides smothering and damaging important ecosystems such as coral reefs and seagrass beds.

Reef Check Malaysia's teams on the islands have been receiving reports of ghost nets and working hard to remove them from the marine environment before they cause extensive damage. In just the first quarter of 2024, our local group on Redang Island, the Redang Marine Conservation Group (RMCG), successfully removed approximately 140kg of ghost nets, all found near the village jetty! The nets collected were given to the local youth of the island who planned to recycle them into football goalpost nets.

There has been limited data on ghost nets in Malaysia, specifically from Tioman Island. RCM began training the local Tioman islanders in 2015 to locate and remove ghost nets from any reefs and beaches around the island. We also helped set up a reporting hotline to gather information about ghost nets. From

2016 until 2022, we recorded a retrieval of 145 ghost nets, weighing more than 21 tonnes (21,000kg) from around Tioman Island alone. Today, most of the retrieval work on the island is done by the Tioman Marine Conservation Group (TMCG), with the help of volunteers from local dive shops.

Due to the extensive work done on ghost nets, our colleagues on Tioman Island and a member of TMCG recently published a paper titled "Incidence of ghost nets in the Tioman Island Marine Park of Malaysia". It details the amount of nets collected, where and when they were found, and offers recommendations to help deal with this issue.

NEW WASTE MANAGEMENT AND RECYCLING PROGRAMME IN MERSING

In the last few months, our waste management and recycling programmes have been progressing well in Mantanani and Mersing Islands. In Mantanani, we began a trial on composting, which is now slowly being adopted by the local community.

Meanwhile, consultation activities with the communities of Pulau Aur and Pulau Pemanggil in Mersing have determined that most of the island residents support starting a community recycling programme on their island, similar to the recycling programme that has been conducted on Pulau Sibu and Pulau Tinggi for the past two years.

Waste management is a challenge faced by many communities in the Mersing islands. Unlike the mainland, solid waste on the islands is managed by individual households themselves. The community recycling programme is a simple yet effective initiative to reduce the impact of waste on the environment, contributing to the preservation of the island's marine ecosystem.

CORAL REEF SURVEYS IN MALAYSIA

Our colleagues here at RCM have begun conducting Reef Check surveys around the country, with several sites in Tioman, Redang, Mersing, Sabah and Sarawak already completed. These surveys are usually led by RCM staff, with assistance from volunteer EcoDivers, or volunteers from other NGOs or government partners.

Aside from the Reef Check surveys, our team has also been actively monitoring coral bleaching. In Malaysia, we are now experiencing the 4th global coral bleaching event. Our surveys over the recent weeks show that, in some areas, over 80% of corals are bleaching. The normal recorded water temperature off the East Coast of Malaysia stands at 28-29°C, which has increased to 32°C in the last few days. This temperature is alarming, as it is beyond the temperature corals start bleaching (which is approximately about 30°C).

There is little we can do on a local level, but we are doing what we can. Bleached coral reefs are vulnerable to attack by predators including the crown-of-thorns sea stars (COTs) and drupella snails – both are corallivores, eating corals. Our field teams are doing their best to identify sites worst affected by these corallivores and will try to remove them where possible. If you go diving in Malaysia, please help us by letting us know (email us at hello@reefcheck.org.my) if you see a site with either COTs or drupella.

AN EDA YOUTH PROGRAMME: CORAL VITA FARM VISIT

We organised a fun and educational field trip for our youth members on the 31st of May at Coral Vita with DP World.

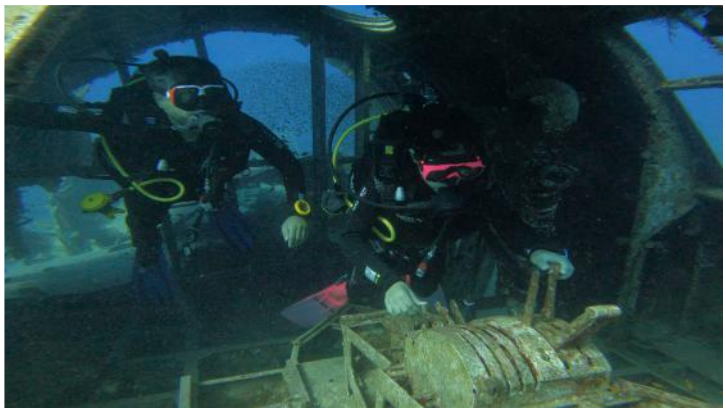
They learnt how the Coral Vita team raise healthy corals from fragments taken from local corals found in Dubai in their farm, with the aim to out-plant them back into the sea at a restoration site once they are mature. Their microfragmenting method allows them to accelerate coral growth rates by up to 50 times, growing mature species in months rather than decades.

Thank you to Ahmed Hamdy, Coral Vita's Dubai Aquaculture Operations Manager for taking the time to explain and answer everyone's questions.

www.coralvita.co

DIVING INTO THE HERCULES C-130

BY **TISYA PANIGRAHI (14) – JUNIOR ADVANCED OPEN WATER DIVER**



Diving into the depths of the Red Sea was an experience I'll never forget. My father (who is also an Advanced Open Water diver) and I embarked on an extraordinary adventure that took us 55 feet below the surface, where we explored a sunken Hercules C-130 aircraft. This dive was not just a typical underwater exploration – it was an opportunity to connect with history, marine life, and the wonders of the ocean in a way I had never expected.

The Hercules C-130 is an iconic aircraft, known for its impressive size and its service in the military of over 70 countries since the 1950s. The specific aircraft we dove into was donated by the Royal Jordanian Air Force and transformed into an artificial reef in 2017. As we descended into the clear waters of Aqaba, Jordan, the massive structure of the plane gradually came into view, creating a surreal and awe-inspiring sight.

Upon reaching the aircraft, we entered through the middle section and made our way to the cockpit. The experience of being inside such a large and historically significant aircraft, now serving as a home to a variety of marine life, was truly unique. I even had the chance to sit in the cockpit and handle the controls, as well as get spooked by a skeleton which was fake (or at least, I hope it was fake). It was simply surreal to be in the cockpit and instead of looking into the sky, I was looking at a complex ecosystem of fish swimming back and forth interacting with each other.

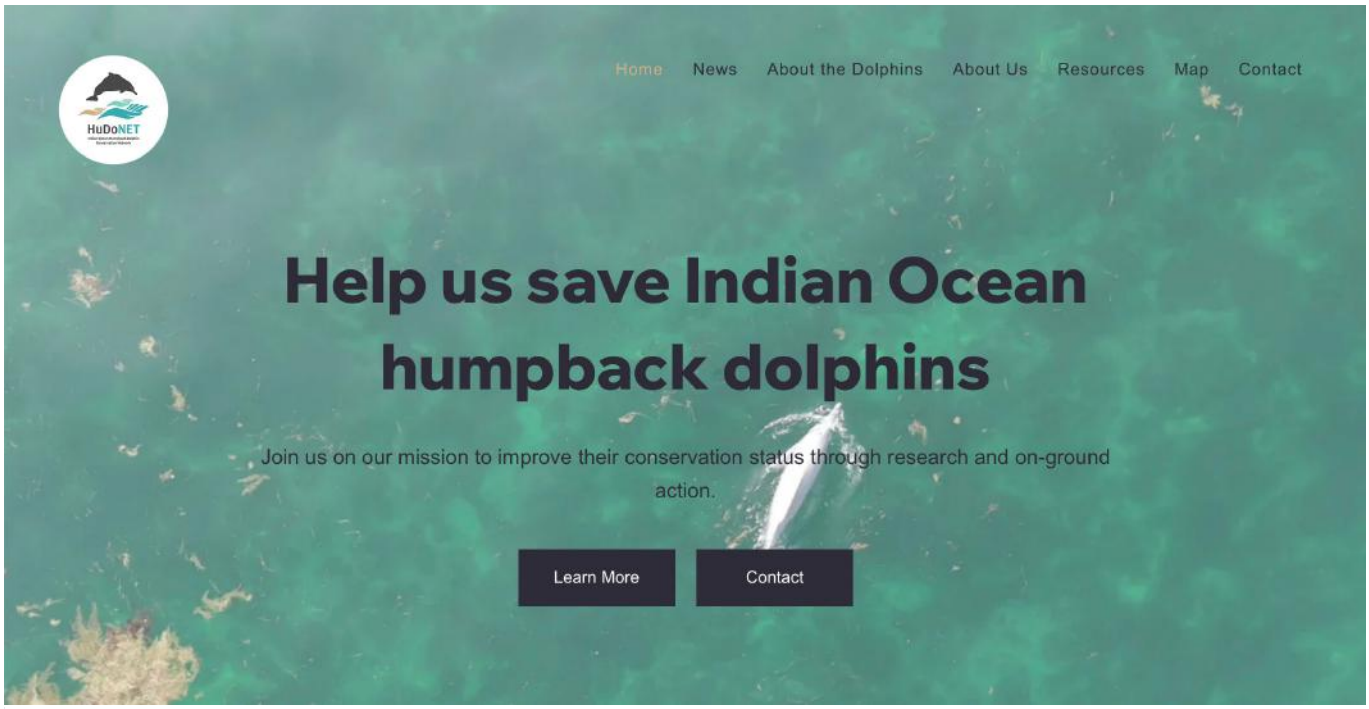
This experience also deepened my appreciation for the ocean and its ability to transform something as complex as an aircraft, into a vibrant marine habitat. Seeing fish swim through the plane's fuselage and corals growing on its wings, highlighted the resilience of nature and the importance of preserving our oceans.

This dive was more than just an adventure; it was an opportunity to witness firsthand how nature can reclaim and transform, creating beauty and life where one might least expect it. It's an experience I will carry with me, both as a diver, and as someone deeply committed to understanding and protecting our oceans.

A CROSS BORDERS COLLABORATIVE APPROACH TO VITAL SPECIES CONSERVATION

FEATURE **CAITLIN MCFARLANE & ADA NATOLI**

New era for Indian Ocean humpback dolphins: Conservation efforts for the species are on the rise with the creation of 'The Indian Ocean Humpback Dolphin Conservation Network' – www.hudonet.org



ABOVE: HuDoNet's website homepage: www.hudonet.org. **LEFT:** Indian Ocean humpback dolphins were observed during the Dubai Dolphin Survey just twice in the three years from February 2021 to June 2024. This image is from the second sighting in February 2023. Photo by Bryana Cope. **RIGHT:** Inhabiting areas in proximity of high human populations, this species is frequently subject to disturbance and harassment by seagoers, especially in regions when guidelines on how to approach dolphins to minimise disturbance are not public knowledge.

The Indian Ocean humpback dolphin is a fascinating species, distinguished by their unique dorsal ridge, which appears as a pronounced hump as in the much bigger and more famous humpback whales. From its last IUCN Red List global assessment, conducted in 2022, it is listed as Endangered, and its population is declining globally: **www.iucnredlist.org/species/82031633/230253271**.

The species ranges across 23 countries from the coastal waters of the Eastern coast of Africa, to the southern tip of India and Sri Lanka, including the Red Sea and the Arabian Gulf. They are inhabitants of shallow coastal waters that are no more than 25m in depth and usually within 2km of shore. However, it is believed that this occurrence is not continuous across its range, suggesting a tendency toward population fragmentation.

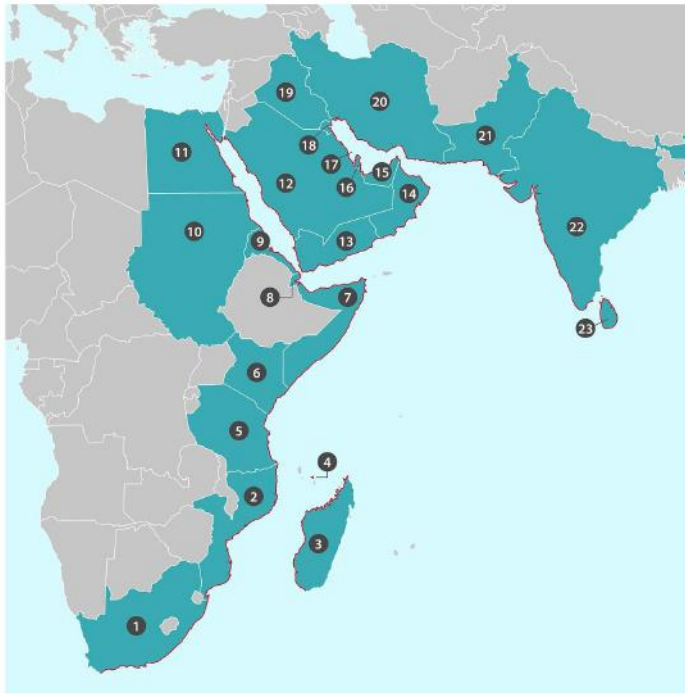
The recent Red List assessment states that 50% of the population has declined with main threats identified as fishery interactions, both bycatch in small artisanal fisheries and direct takes, habitat degradation, including land reclamation, dredging and port activities, and exposure to contaminants. More info can be found here: **www.hudonet.org/aboutdolphins**. The Indian Ocean humpback dolphin is a relatively recent discovery. It was only recognised as a distinct species in 2014. Genetic and morphological features differentiate it from its close relative, the Indo-Pacific humpback dolphin which inhabits the coastlines of Eastern Asia.

Little is known about this species, and this makes conservation efforts challenging to implement. This is further aggravated by the fact that over half of the countries within their range are rated as low-income countries, leaving them with few resources for marine research or conservation efforts.

Now with the target to accelerate conservation actions, 71 researchers across the species' range are joining efforts under the 'The Indian Ocean Humpback Dolphin Conservation Network' (HuDoNet), an initiative led by Zayed University, United Arab Emirates, University of Pretoria, Republic of South Africa, and St. Andrews University, United Kingdom with the mission to: foster and facilitate collaborative research and management efforts, sharing expertise to support initiatives for Indian Ocean humpback dolphins across their range.

The Network aims to galvanise action to improve the conservation status of the Indian Ocean humpback dolphin throughout its global range. The three initial objectives set out by the network have the ultimate goal of creating and executing a Species Action Plan, identifying critical gaps and threats to the species: highlighting the importance of collaborative research on the species throughout its range; capacity building among local stakeholders; and emphasising the value of conservation management on a local level with support from the global network.

These objectives will be met by working on five identified themes to meet the targets:



Distribution of Indian Humpback dolphin sousa plumbea. Click on the location to read more.

01	South Africa	13	Yemen
02	Mozambique	14	Oman
03	Madagascar	15	United Arab Emirates
04	Mayotte	16	Qatar
05	Tanzania	17	Bahrain
06	Kenya	18	Kuwait
07	Somalia	19	Iraq
08	Djibouti	20	Iran
09	Eritrea	21	Pakistan
10	Sudan	22	India
11	Egypt	23	Sri Lanka
12	Saudi Arabia		

ABOVE: Map of the geographical range of the Indian Ocean humpback dolphin identified on HuDoNet. **BELOW:** Indian Ocean humpback dolphin habitats frequently overlap with highly populated coastal areas. It is not uncommon to find them in urban waters, which make implementing effective conservation measures a challenge.

Biological Research, Threats & Solutions, People, Policy and Network success. Working groups have already been established for each theme and are soon to begin working on the objectives set forth.

"Our work concentrates on these aspects of understanding the system in a solution-focused way to empower researchers and conservationists to work with stakeholders to design conservation plans that are grounded in science."

The network provides a platform to propel conservation efforts through collaboration and capacity building. The nature based solution-focused aim of the Network not only hopes to identify the issues the species face, but also to identify the research needed to improve and remedy them. Please head to **www.hudonet.org**, to learn more about the species, its range, and the conservation goals of the Network.

In the United Arab Emirates, the Indian Ocean humpback dolphin is one of the three most common small cetacean species resident in the Gulf coastal waters that surprisingly is also frequently found in the Dubai and Abu Dhabi busy city waters. This makes them the small cetacean species at highest risk in the whole Arabian Gulf. Previous studies reported that the UAE waters support the biggest population of Indian Ocean humpback dolphins in the world, but recent data both from scientific surveys and citizen science contributions suggest a rapid decline in the past 10 years that need urgent attention.

The UAE Dolphin Project Initiative, through the citizen science programme "Report a Sighting", has identified the occurrence of humpback dolphins and other species in areas where the current surveys are absent.

Please report any sighting or strandings of whales, dolphins, and porpoises to **sighting@uaedolphinproject.org** or to the other links provided in the info box and help contribute to the ongoing research in the country.

U.A.E. DOLPHIN PROJECT

REPORT YOUR SIGHTINGS!

If you encounter a whale or dolphin, collecting information is extremely useful to us.

1. Take videos or photos (if you can). You are there in that moment so you become the scientist. Every image of any quality is better than nothing and will help experts to confirm the species. If you can take photographs and videos when you are on the side of whales or dolphins when fins are clearly visible, it can help scientists track the individuals, but please keep a safe distance!

2. CALL as soon as possible if you are witnessing a special sighting, or you encounter a dead animal so experts can hopefully reach the site and gather more information.

3. Take note of the date, time, and approximate location – if GPS is not available, a dot on google maps works great! Also report how many individuals you see.

4. You can send your data to us via:

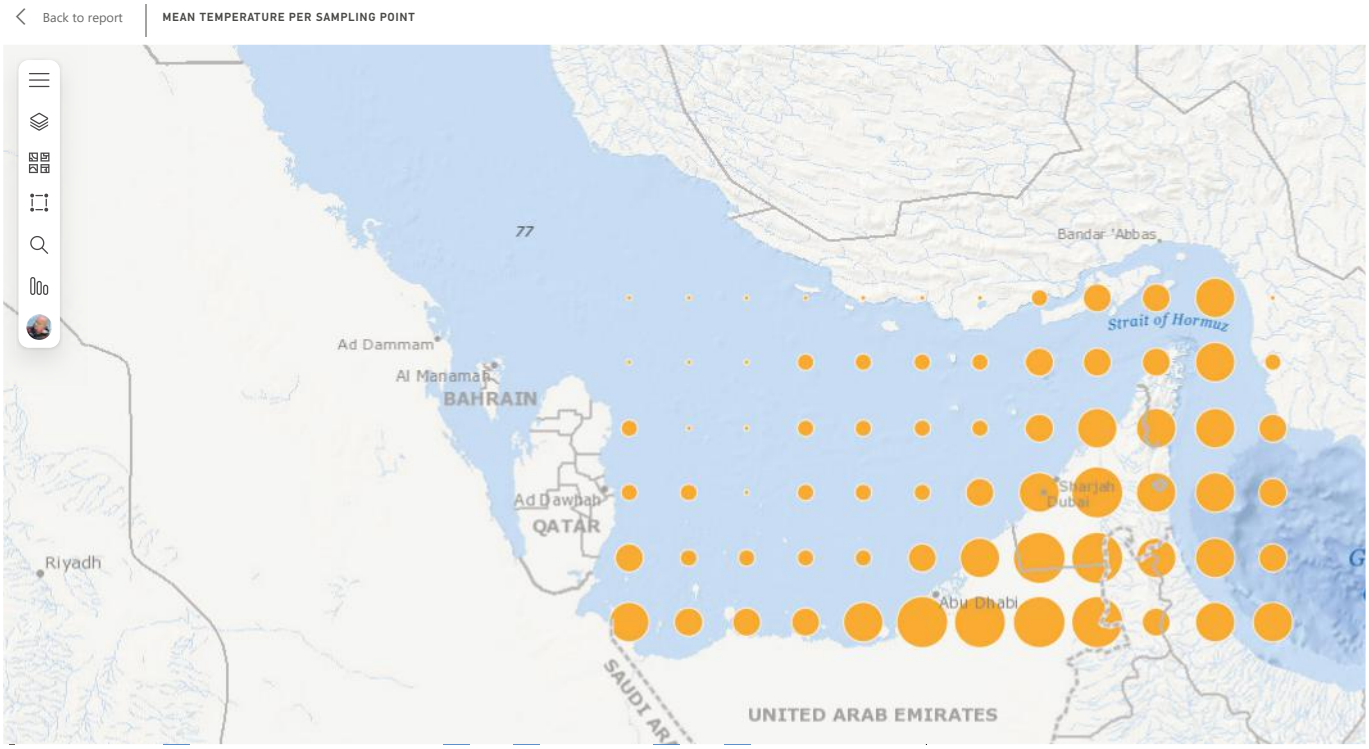
sightings@uaedolphinproject.org
www.uaedolphinproject.org
www.facebook.com/UAEDolphinProject
www.instagram.com/uaedolphinproject
+971 56 671 7164
+971 50 955 1742 or +971 56 671 7164

DIVING INTO THE FUTURE:
THE POWER OF ENVIRONMENTAL FORECASTING IN MARINE ECOSYSTEMS

FEATURE **JUAN DIEGO URRIAGO SUAREZ**

As divers, we're intimately connected to the ever-changing marine environment.
But have you ever wondered how scientists predict the conditions we'll encounter beneath the waves?


SPORTSWEAR



As divers, we're intimately connected to the ever-changing marine environment. But have you ever wondered how scientists predict the conditions we'll encounter beneath the waves? Welcome to the fascinating world of environmental forecasting – a cutting-edge field that's revolutionising our understanding of the oceans and empowering us to make more informed decisions about when and where to dive.

In this article, we'll explore the significance of environmental forecasting and the fundamental role prediction tools play in our lives, both above and below the surface. From predicting algal blooms to forecasting sea temperatures, these powerful tools are changing the way we interact with the marine world. Join us as we dive deep into the science behind environmental forecasting and discover how it's shaping the future of marine conservation and the diving industry.

THE IMPORTANCE OF ENVIRONMENTAL FORECASTING

Environmental forecasting is the science of predicting future environmental conditions based on current and historical data. In the marine world, this encompasses a wide range of factors, from water temperature and salinity to ocean currents and marine life distributions. But why is this so crucial for divers and marine enthusiasts?

SAFETY FIRST

Accurate forecasts of sea conditions, including wave height, currents, and visibility, are essential for planning safe diving expeditions. By knowing what to expect, divers can avoid potentially dangerous situations and make informed decisions about when and where to dive.

The UAE regularly experiences Shamal winds, which can cause sudden and dangerous increases in wave heights and currents in the Arabian Gulf. Environmental forecasting helps predict these events, enabling divers and marine operators to plan safer expeditions. For instance, the UAE's National Centre of Meteorology (NCM) issues marine warnings and provides detailed forecasts to ensure the safety of maritime activities, including diving and offshore operations.

OPTIMISING DIVE EXPERIENCES

Environmental forecasts can help divers choose the best times to observe specific marine life or phenomena. For example, predictions of plankton blooms can guide divers to areas with higher concentrations of filter-feeding animals like whale sharks or manta rays.

The waters around Fujairah, on the east coast of the UAE, are popular for diving due to their rich marine life. Forecasting tools are used by dive operators to predict when conditions will be ideal for spotting specific marine species, such as whale sharks and manta rays. These predictions are often based on factors such as water temperature and the presence of plankton blooms, helping divers plan their trips to maximise their chances of encountering these animals.

CONSERVATION EFFORTS

Forecasting tools play a vital role in marine conservation. By predicting changes in ocean temperatures or the likelihood of coral bleaching events, scientists and conservationists can take proactive measures to protect vulnerable ecosystems.

The Emirates Nature-WWF in collaboration with the Ministry of Climate Change and Environment (MOCCAE) uses environmental forecasting to monitor coral reefs in the UAE. By predicting temperature anomalies that could lead to coral bleaching, conservationists can implement timely interventions, such as temporary shading or increased monitoring, to protect these vital ecosystems.

CLIMATE CHANGE MONITORING

Long-term environmental forecasts are crucial for understanding and adapting to the impacts of climate change on marine ecosystems. This information helps policymakers and environmental managers develop strategies to mitigate these effects.

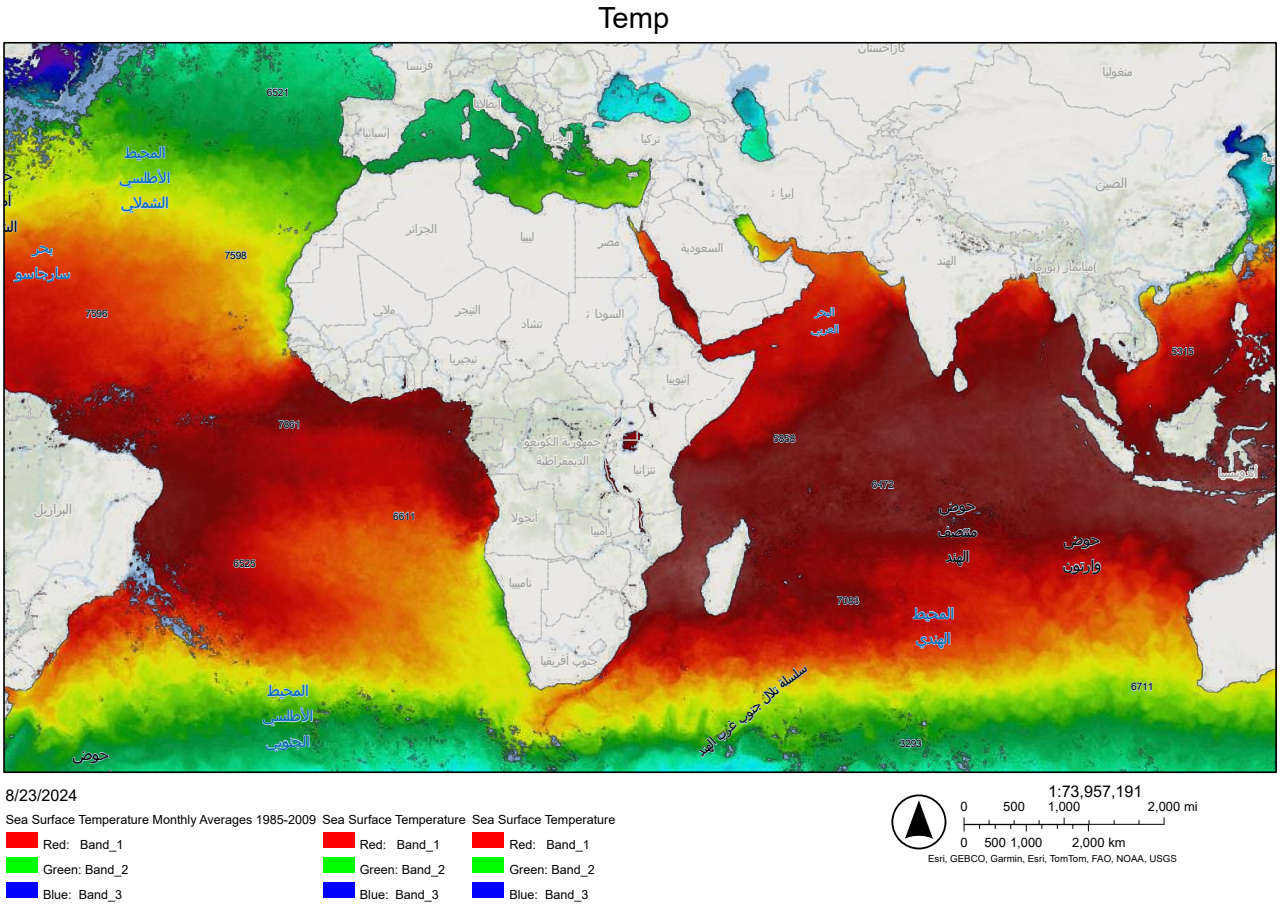
The UAE is actively involved in climate change monitoring through the UAE Climate Change Research Network. This network uses long-term environmental forecasting to study the impacts of rising sea temperatures on marine ecosystems. For example, they monitor the effects of warming waters on the health of coral reefs and marine biodiversity in the Arabian Gulf, providing data that informs national climate adaptation strategies.

SUPPORTING THE BLUE ECONOMY

From fisheries management to marine tourism, environmental forecasting provides valuable insights that support sustainable economic activities in coastal areas.

The UAE's fisheries management heavily relies on environmental forecasting. The Abu Dhabi Environment Agency (EAD) uses forecasting models to predict fish stocks and ensure sustainable fishing practices. This not only supports the local fishing industry but also aligns with the UAE's broader blue economy goals, which include balancing economic development with marine conservation.

THE THREE CRUCIAL STEPS OF ENVIRONMENTAL FORECASTING



As our understanding of marine ecosystems grows and technology advances, environmental forecasting is becoming increasingly sophisticated and reliable. For divers, this means more than just knowing whether it's going to rain on the boat ride – it's about gaining a deeper understanding of the underwater world we love to explore. Environmental forecasting is a complex process that relies on advanced technology and sophisticated analytical techniques. Let's dive into the three crucial steps that make accurate marine forecasts possible.

I. PROCESSING HISTORICAL DATA

The foundation of any good forecast is high-quality historical data. This wealth of information is then processed using advanced statistical techniques and machine learning algorithms to identify patterns, trends, and anomalies in the data. In marine environments, this data comes from various sources:

- **In-situ Measurements:** Buoys, underwater observatories, and research vessels collect real-time data on water temperature, salinity, currents, and other parameters.
- **Remote Sensing:** Satellites provide a broader view, capturing data on sea surface temps, ocean colour (indicating plankton concentrations), and sea level variations.
- **Citizen Science:** Data from divers, fishermen, and other ocean users contribute to our understanding of marine ecosystems.

II. MODELING SELECTION, TRAINING, VALIDATION, AND PREDICTION

With historical data at hand, scientists develop and refine predictive models:

- **Model Selection:** Different types of models are used depending on the forecasting goal. For example, physical models based on fluid dynamics might be used to predict ocean currents, while statistical models might be employed for species distribution forecasts.
- **Training and Validation:** Models are trained on historical data and then validated against independent datasets to ensure their accuracy and reliability.
- **Ensemble Approaches:** Often, multiple models are combined to create more robust predictions, like how meteorologists use various models for weather forecasting.

III. VISUALISATIONS AND USER-FRIENDLY DASHBOARDS

- **Interactive Maps:** Many marine forecasting tools now offer interactive maps that allow users to explore predictions for specific locations and time periods.
- **Mobile Apps:** User-friendly apps bring environmental forecasts directly to divers' smartphones, helping them plan their dives on the go.
- **Customised Alerts:** Some systems can send alerts to users when specific conditions are forecasted, such as ideal visibility for underwater photography or potential hazards like strong currents.

By following these three steps – data processing, modelling, and visualisation – environmental forecasting provides invaluable insights for divers, marine researchers, and anyone interested in the health of our oceans. As technology continues to advance, we can expect even more accurate and detailed forecasts in the future, further enhancing our understanding and enjoyment of the underwater world.

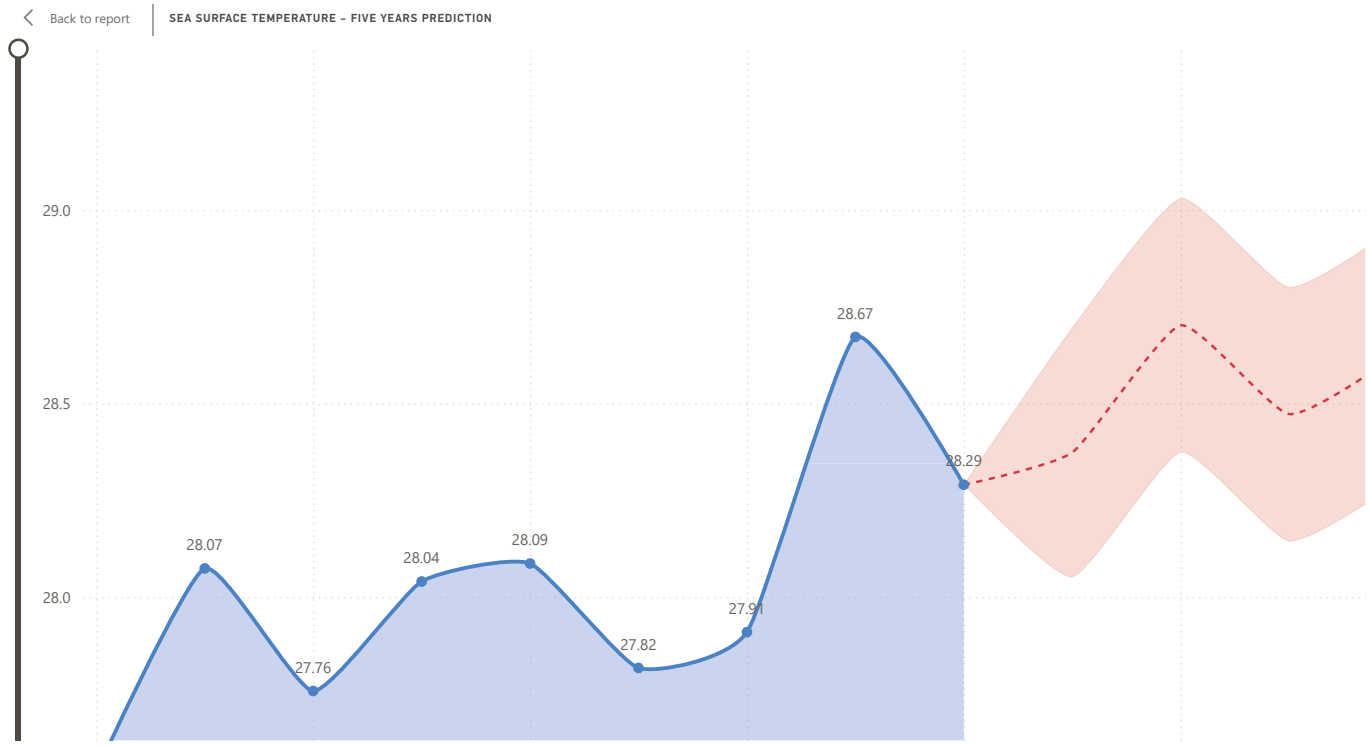
CASE STUDIES

PREDICTING CORAL BLEACHING EVENTS

One of the most critical applications of environmental forecasting in marine ecosystems is the prediction of coral bleaching events. The National Oceanic and Atmospheric Administration (NOAA) uses satellite data and ocean models to create the Coral Reef Watch programme. This system provides near-real-time monitoring of environmental conditions that can lead to coral bleaching.

In 2016, the Great Barrier Reef experienced a severe bleaching event. Coral Reef Watch's predictions allowed researchers and park managers to mobilise resources quickly, document the event's progression, and implement measures to minimise additional stressors on affected reefs. Forecasting Harmful Algal Blooms (HABs). HABs can have devastating effects on marine ecosystems and pose risks to human health. Environmental forecasting tools help predict when and where these blooms are likely to occur.

The Gulf of Mexico Harmful Algal Bloom Forecast system, developed by NOAA, uses satellite imagery, field observations, and mathematical models to predict the location,



extent, and movement of red tide blooms. This information is crucial for local authorities, fisheries, and tourism operators in managing the impacts of these events.

OPTIMISING DIVE SITE SELECTION

For recreational and professional divers, environmental forecasts can significantly enhance the diving experience by helping to choose the best sites based on current and predicted conditions.

The Diving Forecast tool developed by Surf Nerd combines data on wave height, wind speed, water temperature, and visibility to provide divers with a comprehensive forecast for specific dive sites. This allows divers to plan their trips more effectively and safely.

SUPPORTING MARINE PROTECTED AREA MANAGEMENT

Environmental forecasting plays a crucial role in the management of Marine Protected Areas (MPAs) by predicting changes in habitat suitability for key species.

In the Channel Islands National Marine Sanctuary off the coast of California, researchers use environmental forecasts to predict shifts in the distribution of important fish species. This information helps managers adapt protection measures and inform sustainable fishing practices in the surrounding waters.

MITIGATING IMPACTS ON MARINE MAMMALS

Forecasting tools are increasingly being used to reduce human impacts on marine mammals, particularly in areas with high shipping traffic.

The Whale Watch programme, developed by NOAA, uses environmental data and species distribution models to predict areas where blue whales are likely to be present off the US West Coast. This information is used to alert ship captains, reducing the risk of collisions with these endangered animals.

These case studies demonstrate the wide-ranging applications of environmental forecasting in marine environments. From protecting vulnerable ecosystems to enhancing recreational experiences, these tools are becoming indispensable for anyone working in or enjoying our oceans. As technology continues to advance, we can expect even more innovative applications that will further our understanding and stewardship of the marine world.

THE ROLE OF PREDICTION TOOLS IN ENVIRONMENTAL FORECASTING

Prediction tools are the backbone of modern environmental forecasting, enabling scientists and researchers to process vast amounts of data and generate accurate predictions. These tools range from sophisticated computer models to user-friendly mobile applications. Let's explore some of the key prediction tools used in marine environmental forecasting:

NUMERICAL WEATHER PREDICTION (NWP) MODELS

NWP models form the foundation of many marine forecasts. These complex mathematical models simulate the atmosphere and oceans, considering factors such as temperature, pressure, wind, and currents. Examples include: The Global Forecast System (GFS) and The European Centre for Medium-Range Weather Forecasts (ECMWF) model. These models provide the basis for many of the marine forecasts we rely on, from wave heights to wind speeds.

OCEAN CIRCULATION MODELS

These models focus specifically on predicting ocean currents, temperature distributions, and salinity patterns. Examples include: The Hybrid Coordinate Ocean Model (HYCOM) and The Regional Ocean Modelling System (ROMS). Ocean circulation models are crucial for predicting phenomena like El Niño events, which can have far-reaching impacts on marine ecosystems.

ECOSYSTEM MODELS

These tools aim to predict changes in marine ecosystems by integrating physical, chemical, and biological data. Examples include: Ecopath with Ecosim (EwE) and Atlantis. Ecosystem models help scientists understand how changes in environmental conditions might affect marine food webs and species distributions.

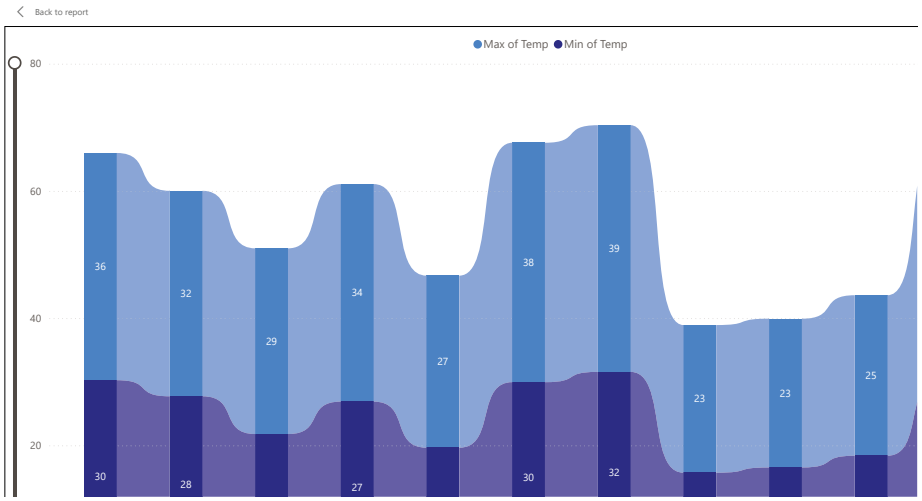
MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE

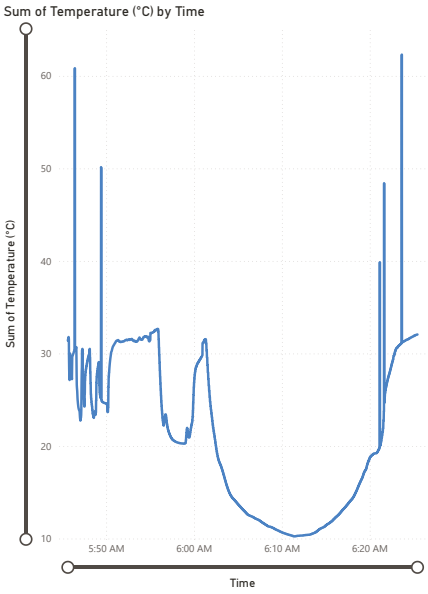
Increasingly, machine learning algorithms are being employed to improve the accuracy of environmental forecasts. Identifying patterns in complex datasets that may be missed by traditional statistical methods, improving the accuracy of short-term forecasts by learning from past prediction errors, and filling data gaps in areas where direct observations are often limited.

REMOTE SENSING TOOLS

Satellite-based tools play a crucial role in environmental forecasting by providing real-time data on a global scale. Key technologies include:

- Synthetic Aperture Radar (SAR) for measuring sea surface roughness and detecting oil spills.
- Altimetry for measuring sea surface height and inferring ocean currents.
- Ocean colour sensors for detecting phytoplankton blooms and assessing water quality.





USER-FRIENDLY INTERFACES & MOBILE APPS

While the backend of environmental forecasting relies on complex models and algorithms, user-friendly interfaces make this information accessible to divers, boaters, and other ocean users. Examples include:

- Windy.com for visualising wind, wave, and temperature forecasts.
- Surfline for surf and dive condition predictions.
- NOAA's nowCOAST for real-time coastal observations and forecasts.

These tools democratise access to environmental forecasts, allowing users to make informed decisions about their marine activities. The continuous development and refinement of these prediction tools are crucial for improving the accuracy and reliability of environmental forecasts. As we face increasing environmental challenges, including climate change and its impacts on marine ecosystems, these tools will play an ever more important role in helping us understand, predict, and respond to changes in our oceans.

THE FUTURE OF ENVIRONMENTAL FORECASTING

As technology continues to advance at a rapid pace, the future of environmental forecasting in marine ecosystems looks incredibly promising. Here are some exciting developments we can expect to see in the coming years:

- **Improved Resolution and Accuracy**

With the increasing power of supercomputers and the refinement of modelling techniques, we can expect to see environmental forecasts with higher spatial and temporal resolution. This means more localised and accurate predictions, which will be particularly beneficial for divers and marine conservationists working in specific areas.

- **Integration of Big Data and Internet of Things (IoT)**

The proliferation of sensors and connected devices in our oceans will provide an unprecedented amount of real-time data. This "Internet of Underwater Things" will feed into forecasting models, allowing for more dynamic and responsive predictions.

- **Artificial Intelligence and Machine Learning Advancements**

AI and machine learning algorithms will continue to improve, allowing for more sophisticated pattern recognition and predictive capabilities. These technologies could lead to breakthroughs in forecasting complex phenomena like ecosystem shifts or the long-term impacts of climate change on marine environments.

PERSONALISED FORECASTS

As forecasting tools become more user-friendly and customisable, we can expect to see more personalised environmental forecasts. Divers might receive tailored predictions based on their specific interests, skill levels, and preferred diving locations.

VIRTUAL AND AUGMENTED REALITY INTEGRATION

Imagine being able to "dive" into a forecast, exploring predicted conditions in a virtual underwater environment before your actual dive. VR and AR technologies could revolutionise how we interact with and understand environmental forecasts.

IMPROVED CLIMATE CHANGE MODELLING

As our understanding of climate change impacts on marine ecosystems grows, environmental forecasting will play a crucial role in predicting and mitigating these effects. We can expect to see more sophisticated models that integrate multiple factors to provide long-term forecasts of ecosystem changes.

CITIZEN SCIENCE & CROWDSOURCED DATA

The integration of data from citizen scientists, including divers and other ocean enthusiasts, will become increasingly important. This crowdsourced information will help validate and improve forecasting models, especially in areas where traditional data collection is challenging.

INTERDISCIPLINARY APPROACHES

The future of environmental forecasting will likely see more collaboration between different scientific disciplines. Oceanographers, marine biologists, data scientists, and climate experts will work together to create more comprehensive and holistic forecasting models.

As these advancements unfold, environmental forecasting will become an even more powerful tool for understanding and protecting our marine ecosystems. For divers, it will mean safer, more rewarding experiences underwater. For conservationists, it will provide crucial insights for protecting vulnerable species and habitats. And for all of us who care about the health of our oceans, it will offer a window into the future of these vital ecosystems, helping us make informed decisions to ensure their preservation for generations to come.

foresea

GET MORE INFO

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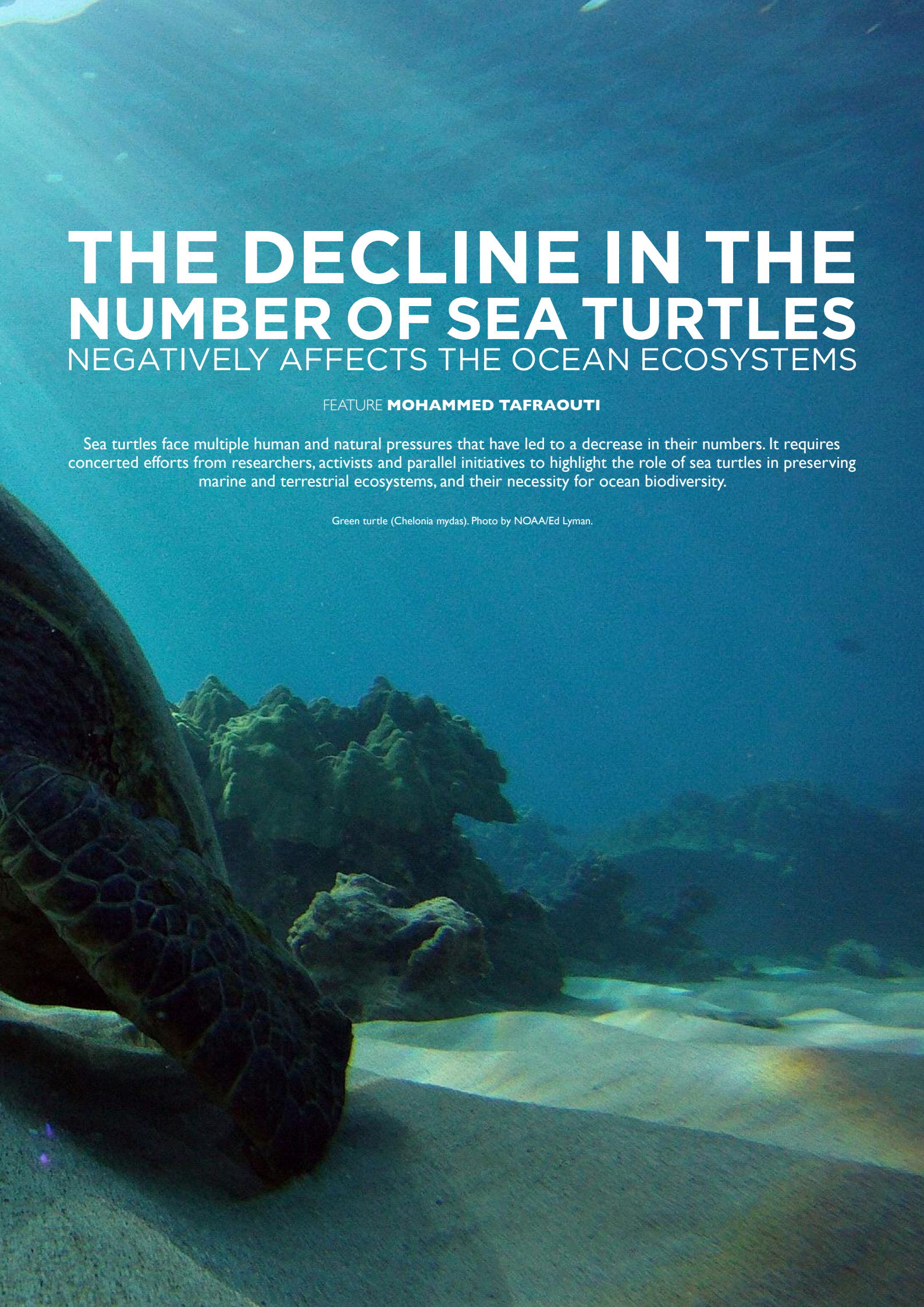
DR JUAN DIEGO URRIAGO SUAREZ

Juan is a passionate marine biologist and the Co-founder and Chief Scientific Officer at ForeSea.ai, a marine environmental forecasting company in Dubai. Utilising satellite data, remote sensing, and complex mathematical models, he transforms historical mega datasets into accurate marine environmental models and user-friendly dashboard visualisations, facilitating operations for large-scale corporations, revolutionising marine environmental management.

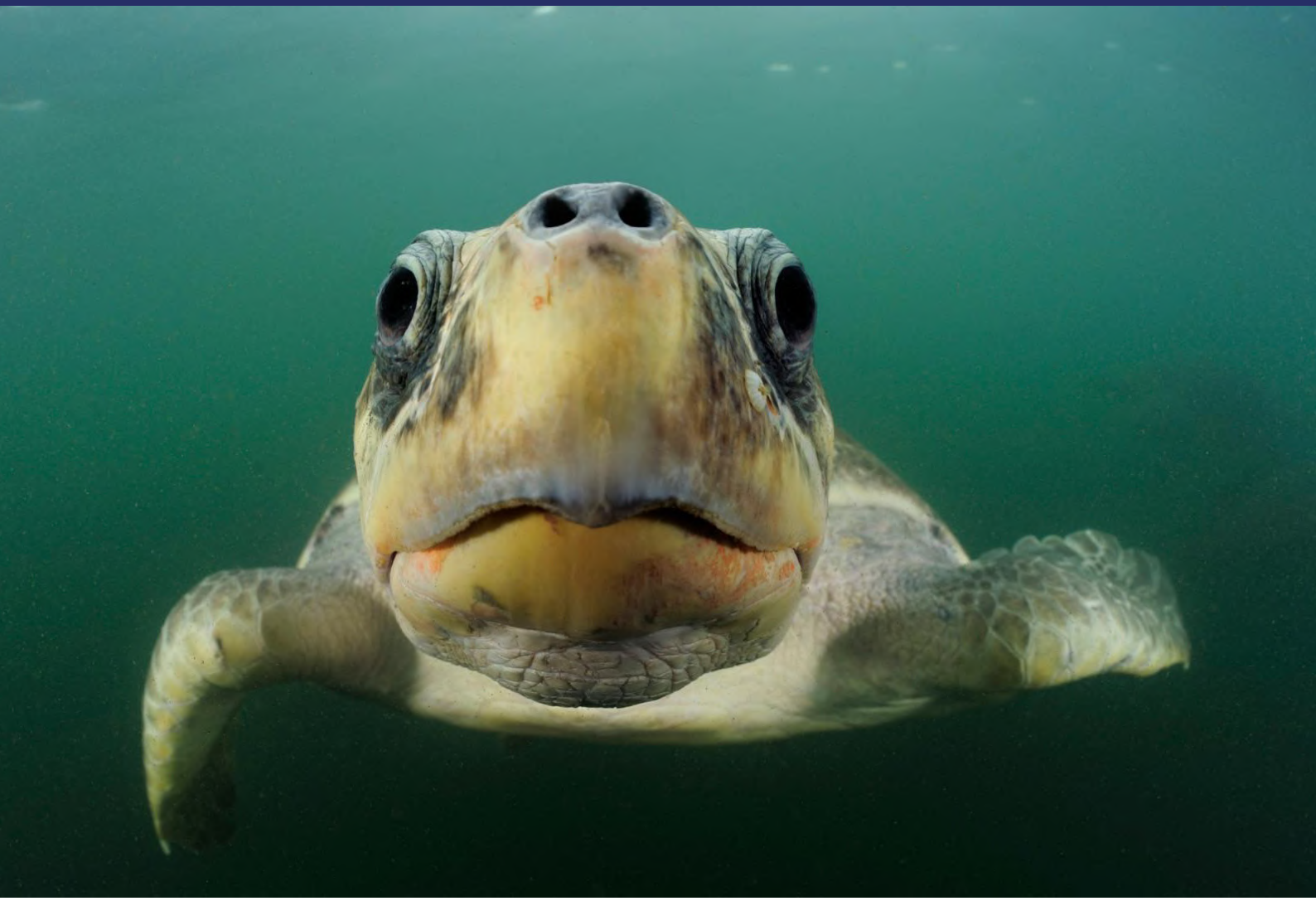
THE DECLINE IN THE NUMBER OF SEA TURTLES NEGATIVELY AFFECTS THE OCEAN ECOSYSTEMS

FEATURE **MOHAMMED TAFRAOUTI**

Sea turtles face multiple human and natural pressures that have led to a decrease in their numbers. It requires concerted efforts from researchers, activists and parallel initiatives to highlight the role of sea turtles in preserving marine and terrestrial ecosystems, and their necessity for ocean biodiversity.



Green turtle (Chelonia mydas). Photo by NOAA/Ed Lyman.



Green turtle (*Chelonia mydas*). Photo by WWF.

Film director, Marcus Altuve has excelled in his short film 'The Eyes of the Land' when he talked about the Moroccan tortoise as an endangered species. Determining the population of this species in the wild requires the cooperation of scientists who know the secrets of the earth. The same approach necessitates itself towards sea turtles, as they face multiple human and natural pressures that have led to a decrease in their numbers. It requires concerted efforts from researchers, activists and parallel initiatives to highlight the role of sea turtles in preserving marine and terrestrial ecosystems, and their necessity for ocean biodiversity.

The founding of some fossils revealed a discovery in Morocco of remains of a turtle, which has a tubular nose that ends with a small rounded mouth that opens forward, much like the head of a hippopotamus. The researchers confirmed that it was a giant tortoise found in the mud in a mining basin on the outskirts of Khouribga (a mining city), and it is believed to date back to the Cretaceous period, 67 million years ago.

In recent times, most Moroccan families used to, and still do, host wild turtles in their homes and pamper them, believing that they bring many benefits, while sea turtles suffer from bycatch, falling into nets, swallowing plastic waste in the sea, and getting into collisions with ships. Fortunately, Moroccans do not love their meat and it is not consumed in Moroccan cuisine, and has no place on the Moroccan table.

It is said that turtles helped many sailors discover new lands, and to survive, but man turned out to be ungrateful, and turtles ended up on the International Union for Conservation of Nature's Red List of Endangered Species.

Various researchers confirm that turtles have amazing navigational capabilities, as they accurately determine the place of their birth, and females return to the same beaches to nest. Even after so many years they remember the place of their birth, supposedly guided by the Earth's magnetic field. There is however, another opinion that says it is nothing more than the use of a strong sense of smell.

Sea turtles play an important role in marine ecosystems and help maintain healthy coral reefs and seagrass meadows. They feed by digging and bottom carving, contributing to the recycling of important nutrients and maintain the balance of bottom sediments. They also carry different types of plants and small animals on their shell, which in turn serves as an important refuge for different species and organisms.

They look meek and graceful as they navigate the seas with their streamlined bodies and oar-like flippers that enable them to swim tirelessly, and help the females dig nests. They spend most of their lives in the water, but it is only the females who go to the beach to lay their eggs during the periodic migration.

During the hatching season, the young sea turtles emerge from the nests, rushing towards the ocean waters to survive. Only a few of them will survive, with an average life expectancy of 80 years.

The land turtle is slow, but the sea turtle is fast. Its movement in the water can reach 35 kilometres per hour, especially the leatherback turtle. Adapted to life in the sea, it maintains strong ties with land at the same time.

Sea turtles are large reptiles with two lungs. Their large upper eyelids protect their eyes when foraging amongst coral reefs. They have no teeth, and their ears are not visible. They hear better at lower frequencies, and their sense of smell is strong. Males have a longer and stronger tail than that of the females. They also have longer claws on their front flippers,

Leatherback turtle (*Dermochelys coriacea*) in the Kei Islands. Photo by Scubazoo/Jason Isley/NOAA.

which help them hold on to the females' shell when mating. They have a convex shell at the top, consisting of a bony base that helps protect them from their main predator, the shark, and avoids them from being hurt by coral reefs and sharp rocks. Some species are primarily carnivorous and feed on jellyfish, snails, crabs, shrimp, crustaceans, fish, and molluscs, and others are vegetarian that prefer seaweed and algae.

The reduction in the number of green sea turtles feeding on seagrass leads to an increase in vegetation cover, which in turn blocks the access of light to the seabed and accelerates the decomposition process leading to a growth of slime. The seabed as a result becomes crowded with algae, fungi, microorganisms and invertebrates.

Mustapha Aksissou, a professor at the Faculty of Science at Abdelmalek Essaadi University, confirmed that there are two types of sea turtles along the Mediterranean coast in Morocco, the loggerhead turtle (*Caretta caretta*) and the leatherback turtle (*Dermochelys coriacea*).

The exploration of hatching sites and stranding spots along the Moroccan shores of the Mediterranean Sea and Atlantic Ocean started in 1999 with Dr Manjula Tiwari in collaboration with the National Institute for Fisheries Research (INRH), and later in 2003 with Abdelmalek Essaadi at the University of Tetouan. Some reports which date back to the 1950s reported possible nesting sites for the loggerhead turtle (*Caretta caretta*), and the green turtle (*Chelonia mydas*) in southern Morocco. However, recent studies of the Moroccan coasts seem to indicate a significant decline and disappearance of nesting spots from these coasts. Carcasses and shells of turtles accidentally caught in nets or stranded on the beaches were found. Surveys have reported that fishermen regularly encounter sea turtles and often catch them in fishing nets, adds Professor Mustapha Aksissou.

The digestive tract contents of a stranded loggerhead sea turtle (*Caretta caretta*) along the northwest coast of Morocco was analysed in order to understand the feeding areas or habitat of sea turtles and to avoid the impact of bycatch. The digestive contents of twenty dead loggerhead turtles in northwest Morocco were examined between 2002 and 2007. Content weight showed a variation in diet, 41 species have been identified belonging to 8 families, dominated by fish, crustaceans and molluscs. Plastic waste has also been found in the contents of the digestive tract. Adult turtles feed largely on bottom prey, while young ones feed on marine prey in large quantities. The class between 50 to 70cm in size and shell length (semi-adults) consume 63 percent of benthic prey and 37 percent of marine prey. The variety of prey species consumed increases with the size of the turtles.

A specialised scientific team conducted research on a spatial scale, about 324km with a large temporal spanning of about 24 years, from 1998 to 2022 in north-western Morocco. A total of 208 stranded turtles were recorded. Of these, 184 loggerhead turtles (*Caretta caretta*) 88.47%, 21 leatherback turtles (*Dermochelys coriacea*) 10.09%, and 3 are unknown at 1.44%.

The largest number of strandings occur in the summer and early spring, when the large trawlers, purse seines, and longlines are active near the Moroccan coast. The majority of loggerhead turtles measured were sub-adult individuals (81%), while leatherback turtles included sub-adults and adults. The data showed that Moroccan coastal waters provide an important foraging habitat and/or migratory refuge for loggerhead and leatherback turtles, and bycatch and boat strikes in fisheries may be among the main threats to sea turtles in Moroccan waters. This

Professor Mustapha Aksissou, a professor at the Faculty of Science at Abdelmalek Essaadi University conducts his research on this loggerhead sea turtle (*Caretta caretta*). Photo by Environmental Perspectives.

study constituted an important baseline for the development of efforts to conserve sea turtles in the waters near the Moroccan coast of the Mediterranean Sea.

This study is the first long-term study of sea turtle populations along the northwest Moroccan coast. It provides useful information for the conservation of these reptiles in the Mediterranean Sea and the Atlantic Ocean. The results of the current study illustrates some aspects of sea turtle biology and the causes of their mortality in northwest Morocco. However, knowledge of sea turtles in Moroccan waters is still limited, and efforts must be intensified and focused on understanding their presence in foraging areas. Highlighting the need for additional studies to determine seasonal movements and habitats, and characterise their numbers and demographic structure to facilitate conservation and management efforts.

Dr Wafae Benhardouze, a specialist in marine biodiversity and secretary of the Association for the Protection of Sea Turtles in Morocco (ATOMM), said that before the year 2000, the studies on sea turtles were almost non-existent as it was limited to only some observations of the death of these creatures along some beaches of the Kingdom of Morocco. She suggested that measures to conserve these marine organisms necessitate first conducting scientific studies and research in various fields related to their life cycle.

Since 2002, she has conducted a study in preparation for a doctoral dissertation on turtles under the supervision of Professor Mustafa Aksissou. The study was considered the first of its kind and was a part of a partnership project between the Faculty of Sciences of Tetouan and the American Organisation,the National Oceanic and Atmospheric Administration (NOAA). It covered various coasts of the Kingdom along the Atlantic Ocean from Tangiers to Laayoune and in the Mediterranean Sea to Nador, as well as the Strait of Gibraltar. The study included a group of researches on the problem of mortality, diet, genetic factor and bycatch. The results of these studies proved the presence of three types of sea turtles: loggerhead turtles (*Caretta caretta*) by 95%, leatherback turtles (*Dermochelys coriacea*) by 4%, and green turtles (*Chelonia mydas*) by 1%. It was also concluded that the diet of loggerhead turtles consist mainly of molluscs, fish and cnidarians, the most important of which is jellyfish. As for the diet of the leatherbacks, they depend mainly on jellyfish. The autopsy results also showed the presence of bags and other plastic materials, as well as fishing remnants such as hooks and fishing lines and nets.

Depending on the results of the age group and genetic tests, it was found that the most prevalent age groups found on Moroccan beaches are juveniles and semi-adults nesting on the western shores of the Atlantic Ocean and the eastern shores of the Mediterranean Sea. Based on genetic analyses taken from samples of dead turtles caught by bycatch it is accordingly assumed that the Moroccan beaches are a feeding place for sea turtles migrating from the western shores of the Atlantic Ocean and the eastern shores of the Mediterranean Sea.

In the context of studying the relationship of the massive spread of jellyfish along the northern beaches of the Kingdom of Morocco, especially in recent years, Dr Wafae Benhardouze added that it was then assumed that pollution and climatic changes led to a change in the chemical and physical factors of the Mediterranean. As it is a narrow and semi-closed sea, any change in physiochemical factors will have a faster and greater effect. Amongst the results of change in these factors, is the increase in the rate of jellyfish. Since sea turtles are considered among the most important predators of jellyfish, especially in the northern beaches of the Kingdom which are considered a place for feeding sea turtles, the decrease in their number due to pollution and bycatch has contributed significantly to

Dr Wafaa Benhardouz (on the right) in the laboratory of the Faculty of Sciences in Tetouan, taking measurements of a dead loggerhead turtle (*Caretta caretta*) found at Tahadrat Beach, in preparation for an autopsy to know the cause of death and take samples from the digestive tract and muscles to study the diet and the genetics. Photo by Mustafa Aksissou.

the increase in the number of jellyfish on the northern beaches. Thus, the environmental impact has an economical effect in light of the decrease in the number of tourists coming to the north of the Kingdom, and socially among fishermen due to the poisoning of fish and fishing nets, in addition to devouring the eggs and larvae of fish.

Dr Wafae Benhardouze recommended that scientific research should be encouraged and funded to protect sea turtles and all endangered marine creatures, and to also work to reduce pollution by organising awareness campaigns and training courses, especially in coastal areas. This includes changing the methods and tools in fishing to become environmentally friendly, and organising continuous training courses for fishermen.

Mr Abd al-Salam al-Bakali, a fisherman from the city of M'diq, expressed his happiness of acquiring new knowledge about sea turtles that he did not know before. It was through training sessions by the Association for the Protection of Sea Turtles in Morocco that he and his colleagues benefited. He appreciated the efforts of Professor Mustapha Aksissou and Dr Wafae Benhardouze and the vital role they play in introducing the pioneering role of "Fakroun Alma". Fakroun is turtle in the Moroccan dialect.

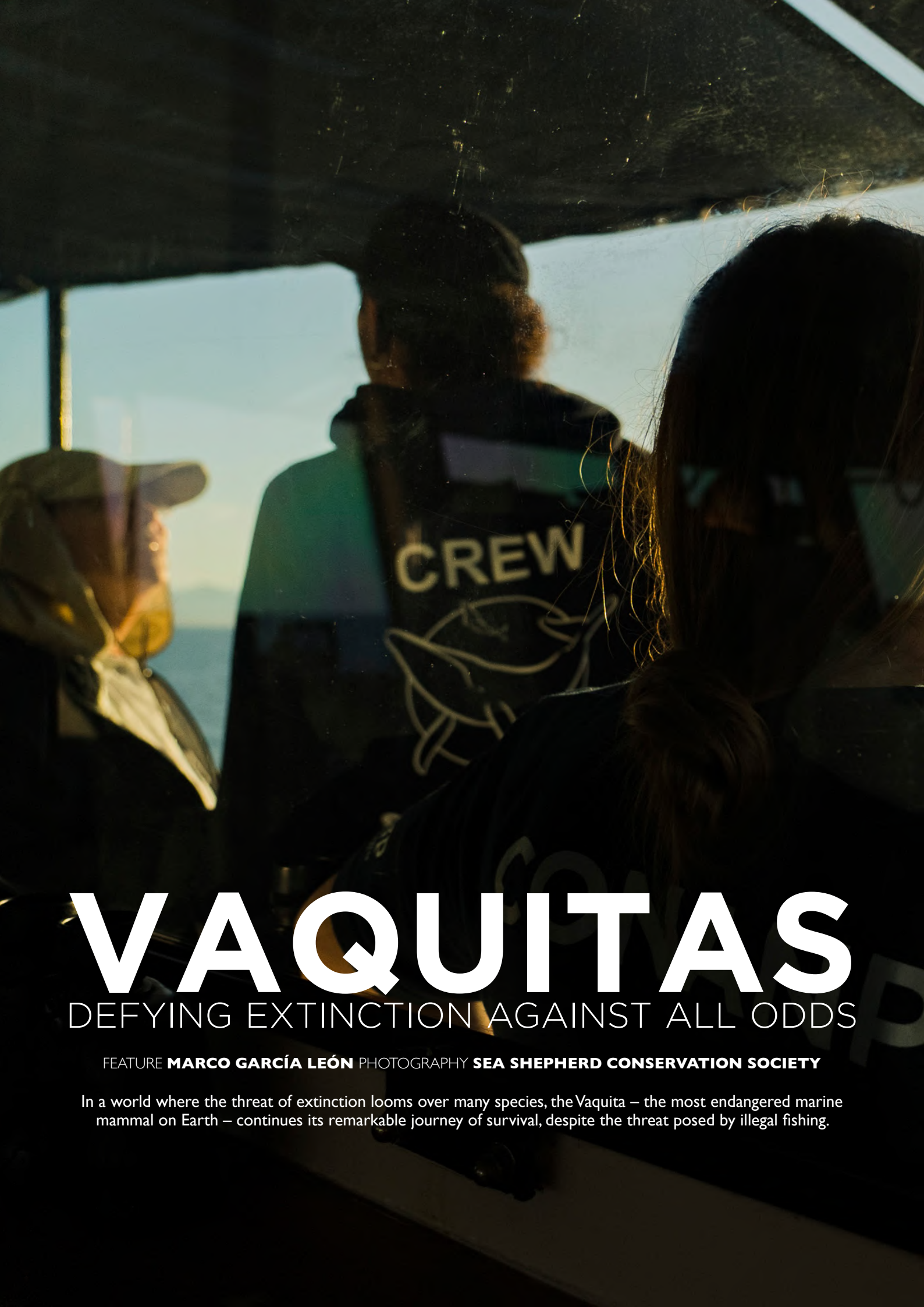
"We have come to respect this marine creature that provides us with a service we did not know about, helping us to combat the damage that is inflicted on us by the proliferation of jellyfish. We have also been trained on having the skills and techniques of removing the "Fakroun" from the nets, without harming them." He added with a sigh, "We are ashamed to know that they have swallowed some plastic waste, but we will receive more lessons in another training course soon, and this time with our children and wives."

Turtle shells that used to be sold in the markets of northern Moroccan cities as parts for musical instruments are no longer found as they once were in past decades. Thanks to the efforts of various activists and sharing continuous awareness, this horrifying phenomenon has ceased.

It is noteworthy that Morocco has become a magnet for the international community interested in preserving sea turtles and their environment. The city of Tetouan recently witnessed the largest conference to promote cooperation, exchange ideas, cross-pollinate perspectives and share the latest knowledge about the biology of sea turtles and their conservation in the Mediterranean. It was organised by Abdelmalek Saadi University, Faculty of Sciences – Tetouan and the Association for the Protection of Sea Turtles in Morocco (ATOMM).

It is also important to mention that the decline of sea turtles in the Mediterranean bank in Morocco requires the activation of various initiatives and recommendations issued by scientists, observers and environmental activists, as well as follow-ups and evaluations from previous strategies, such as the first global strategy established by the Sea Turtle Specialists Group (IUCN) in 1995 in the Mediterranean region, and that carried out by the United Nations Environment Programme, the Sea Turtle Action Plan in 1999.

The protection of sea turtles pose many challenges for scientists, researchers, and the guardianship administration, as turtles use many natural environments throughout their lives, marine and terrestrial, transboundary and international waters. This necessitates international cooperation from various countries on both sides of the Mediterranean, as well as other oceans, as they are migratory species, their paths are affected by sea temperature as well as ocean currents. Females return after decades to specific areas in order to lay their eggs, which requires the protection of nesting and reproduction beaches. It is not enough to preserve certain beaches over others beyond national borders.



VAQUITAS

DEFYING EXTINCTION AGAINST ALL ODDS

FEATURE **MARCO GARCÍA LEÓN** PHOTOGRAPHY **SEA SHEPHERD CONSERVATION SOCIETY**

In a world where the threat of extinction looms over many species, the Vaquita – the most endangered marine mammal on Earth – continues its remarkable journey of survival, despite the threat posed by illegal fishing.

In a world where the threat of extinction looms over many species, the Vaquita – the most endangered marine mammal on Earth – continues its remarkable journey of survival, despite the threat posed by illegal fishing. Although the 2024 Vaquita Survey, released in June by survey leaders, senior Mexican government officials, and the Sea Shepherd Conservation Society, revealed significant challenges, the commitment to protecting this precious species remains stronger than ever.

2024 VAQUITA SURVEY

The 2024 Vaquita Survey, conducted from May 5-26 in Mexico's Upper Gulf of California, showcased exemplary collaboration between Sea Shepherd and the Government of Mexico. Led by Dr Barbara Taylor and Dr Gustavo Cardenas-Hinojosa, a team of fourteen skilled observers utilised acoustic technology and eDNA analysis to enhance their visual search for these elusive porpoises. The Sea Shepherd vessel M/V Seahorse and the private vessel Sirena de la Noche served as key observation platforms, aiding in the estimation of the Vaquita population within the Zero Tolerance Area (ZTA), a crucial stronghold for the remaining vaquitas, and the Extended Area (EA) of the UNESCO's Vaquita Refuge. The logistical support provided by the Mexican Navy underscored the unified effort to safeguard the species.

CHALLENGES AND VICTORIES

Surveying vaquitas is extremely challenging due to unpredictable weather conditions. Their elusive nature requires calm, peaceful waters for effective observation, and even a slight increase in wind can significantly reduce the chances of spotting them. Despite these obstacles, this year's survey brought encouraging news: 6-8 vaquitas were sighted, a sign of their resilience, although this number is lower than the 8-13 observed in 2023. Importantly, half of the sightings were just outside the ZTA, within the EA, suggesting that vaquitas may be expanding their range and finding safe waters beyond their traditional habitats.

Therefore, the recent count should not be interpreted as a decline but rather as a minimum estimate for the surveyed area, considering that vaquitas move freely in and out of the ZTA. Even more promising is the sighting of a healthy juvenile and the lack of scars from boat propellers on all observed vaquitas, suggesting they are thriving in their natural habitat and successfully avoiding threats from human activities. Vaquitas are relentless.

Since 2015, Sea Shepherd's monitoring in the area has led to an impressive 90% reduction in illegal fishing within the ZTA. Yet, the mission doesn't stop there. The ZTA covers only 12% of the Vaquita's historic habitat, and the 2024 survey revealed that these resilient creatures

Photo by Ernesto Vázquez Morquecho

are likely using a broader range within the Vaquita Refuge. This opens new opportunities to protect them wherever they may roam.

WHAT'S NEXT?

In response to the 2024 survey findings, Sea Shepherd is spearheading expanded scientific efforts to deploy additional acoustic detectors throughout the larger Vaquita Refuge. These detectors will help reveal the full range of the Vaquita's movements, providing crucial data to guide targeted protection efforts across their historic habitats. With this information, Sea Shepherd and the Mexican government are prepared to offer protection wherever vaquitas are found, ensuring their safety and survival.

Mexican authorities are extending acoustic research into July and August, concentrating on recently favoured Vaquita habitats. Thirty acoustic detectors have been deployed in areas where vaquitas were detected in 2015, marking a significant advancement in the ongoing effort to secure their future. Results are expected by the end of September 2024.

Additionally, Sea Shepherd plans to add a new long-range vessel to its fleet, enhancing its monitoring activities in the Upper Gulf of Baja California. The Vaquita will never face this battle alone.

EXTINCTION IS FOREVER

Sea Shepherd is a crucial force in the fight against the extinction of whales, dolphins, turtles, and many other species pushed to the brink by humanity's illegal exploitation of the ocean. The organisation's entirely donation-driven efforts extend from the Faroe Islands, north of Scotland, where it leads a global coalition to end the brutal slaughter of Pilot Whales and Bottlenose Dolphins, to the Upper Gulf of California, where the relentless vaquitas continue to teach us valuable lessons of survival.

SEA SHEPHERD

You can join Sea Shepherd's conservation efforts and crew at sea. Learn more at: **https://seashepherd.org/get-involved/crewing-at-sea**
To support Sea Shepherd's work, go to: **https://seashepherd.org/donate**

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TRENDING TROUBLE
MORE LIKES, LESS WHALES

FEATURE AND PHOTOGRAPHY **UZEYR KAMORA**

Whale swimming offers a unique and transformative experience, but it must be conducted responsibly to ensure the well-being of these magnificent creatures and the marine environment.

Swimming with whales is a profound and for most people, once in a lifetime experience. It can also leave an indelible mark on anyone who encounters these majestic creatures up close. As a certified Marine Mammal observer (MMO), I have had the great privilege to swim with whales for many years now. I have witnessed the magic of interactions firsthand in wonderful far-off places like Tonga, Norway and Sri Lanka, to name a few.

However, recent trends, particularly in Mauritius, have raised concerns about the sustainability and ethics of whale swimming, primarily driven by the surge in social media popularity.

Stunning underwater photos and videos of close encounters with whales have flooded platforms like Instagram and TikTok, attracting a wave of tourists eager to recreate these moments. While this surge in interest has boosted local economies, it has also led to a range of negative consequences for the whales. Many people simply view these experiences as a digital tick on their social media bucket list and have no concept of further implications. For Mauritius in particular, this tendency has created a huge problem for local marine wildlife.

3 years ago, when the island was relatively lesser known for this activity, the abundance of whale populations and relative closeness to land, made it a unique and easily traversed destination for both whale watching and swimming. However, in recent years the number of boats designated for such activities has increased from just a few, to over 30 vessels daily dedicated to the booming tourist trade. Everyone wants to swim with the whales – to duplicate the adventures and heavily promoted pictures are touted on Instagram and TikTok.

This April, the number of boats was so numerous, that I experienced firsthand the terrible harassment and chasing of whales by groups of visitors determined to document their "experience". Before this, and having guided at other times of the year, I was quite used to some whale families and individuals being very comfortable with humans – even inquisitive in many cases – and spending several hours with these mammals while they socialised was not at all uncommon.

With the boom in social media however, many whale excursion operators (both local Mauritians, as well as visiting guides) are stacking boats overly full of tourists. As there are no current laws regulating marine wildlife interactions – as in places like Norway – the implications for the whales of Mauritius are extremely troubling as disruptions to their migration, breeding, birthing and feeding can easily have far-reaching effects for their entire population worldwide.

A particularly telling experience occurred earlier to me this year. During a guided and extremely limited boat excursion (there were only 4 individuals – myself, the boat captain and two guests – we came upon a mother and calf resting and nursing. After I assessed that the situation was safe and comfortable for all involved, we enjoyed a wonderful interaction. The little family spent a good 30 minutes with us, the little calf even being social and playing with us every now and again. Unfortunately, seeing this activity, another boat loaded with tourists raced over and dropped 15 swimmers into the water at once. There was a lot of splashing, noise and confusion. One of the free divers went right under the whales and this startled them. The whales panicked and went straight into deep dive mode to leave.

One particularly clueless Instagram post later showed a couple kissing under the very same mother and calf as they struggled to flee! A very disruptive and unfortunate sight indeed.

This viral trend – the insatiable need to gather pictorial experience for social media one- upmanship – particularly in the Asian market – has sparked a widespread outcry to properly regulate this activity in Mauritius. The most recent update is the formation of a committee to address the negative impacts of increased tourism. The panel will be comprised of providers and guides and the salient points to later be addressed by this committee will hopefully be as follows:

1. **Disturbance to Whales:** The increase in boat traffic and swimmers has led to more frequent disturbances of whale pods. Whales are being approached too closely and too often, disrupting their natural behaviours, such as feeding, resting, and socialising. This constant disturbance can cause stress and may lead whales to avoid areas they once frequented, impacting their health and survival. The number of socialisation's closer inland has significantly reduced over the last 3 years and the whales are likely to socialise and rest further away in deeper water where the number of boats is close to none.

2. **Safety Concerns:** The influx of inexperienced swimmers and unregulated tour operators poses significant safety risks. Without proper guidelines and enforcement, both humans and whales are at greater risk of injury. There have been instances where panicked whales, feeling threatened, have inadvertently harmed swimmers. An incident in Norway where a tourist got stuck in the fishing nets caused a huge issue due to the safety and loss of catch for the fishing vessel. Causing a change in regulations in Norway. Boats are not allowed to be within proximity of fishing vessels (the orca steal fish from the nets and there are usually many animals almost always around the fishing nets – attracting swimmers).

3. **Environmental Degradation:** Increased tourism pressure can lead to environmental degradation. Anchors from boats can damage delicate coral reefs, and increased pollution from boats can affect the overall health of the marine ecosystem. Whales are extremely sensitive to underwater noise. It affects everything from them being able to communicate feed and navigate.

4. **Ethical Considerations:** The pursuit of the perfect social media shot often leads to unethical behaviour, such as touching or riding whales, which is highly stressful for the animals and can cause injury. This behaviour undermines the ethical standards that responsible whale swimming should uphold.

FORWARD THINKING

To address these issues, it is crucial to implement and enforce stricter regulations on whale swimming activities.

1. **Stricter Guidelines:** Establish clear and enforceable guidelines for whale swimming, including minimum distances, limits on the number of boats and swimmers, and designated times for interactions to minimise disturbance. If you do happen to go, ensure the provider is approaching the animals correctly and the number of people entering the water is not more than 5. If the animals show signs of stress – leave.

2. **Education and Awareness:** Educate other tourists and operators about the importance of respectful and non-intrusive

interactions with whales by promoting a code of conduct that includes maintaining a safe distance, minimising noise, no physical contact, limiting time spent with whales, observing natural behaviours without interference, and following local and international guidelines. These practices can be reinforced through educational programmes, signage, and pre-trip briefings, fostering a culture of respect and ensuring sustainable whale interactions. As a tourist, be someone that stands for what's right for the animals and promote that.

3. **Certification Programmes:** Implement certification programmes for tour operators to ensure they meet high standards of safety and ethical practices. Certified operators should be incentivised through marketing and partnerships. Do not be shy to ask if the skippers and guides have qualifications for approaching and viewing marine mammals.

4. **Sustainable Tourism Models:** Develop sustainable tourism models that balance economic benefits with conservation efforts. This can include promoting off-peak visits, investing in marine protected areas, and supporting local conservation initiatives.

Whale swimming offers a unique and transformative experience, but it must be conducted responsibly to ensure the well-being of these magnificent creatures and the marine environment. As someone who has had the privilege of swimming with whales in various parts of the world, I urge fellow enthusiasts, operators, and regulators to work together to preserve the magic of whale swimming for future generations. By prioritising the welfare of the whales and the health of our oceans, we can continue to enjoy these incredible encounters without causing harm for generations to come both for humans and the whales.

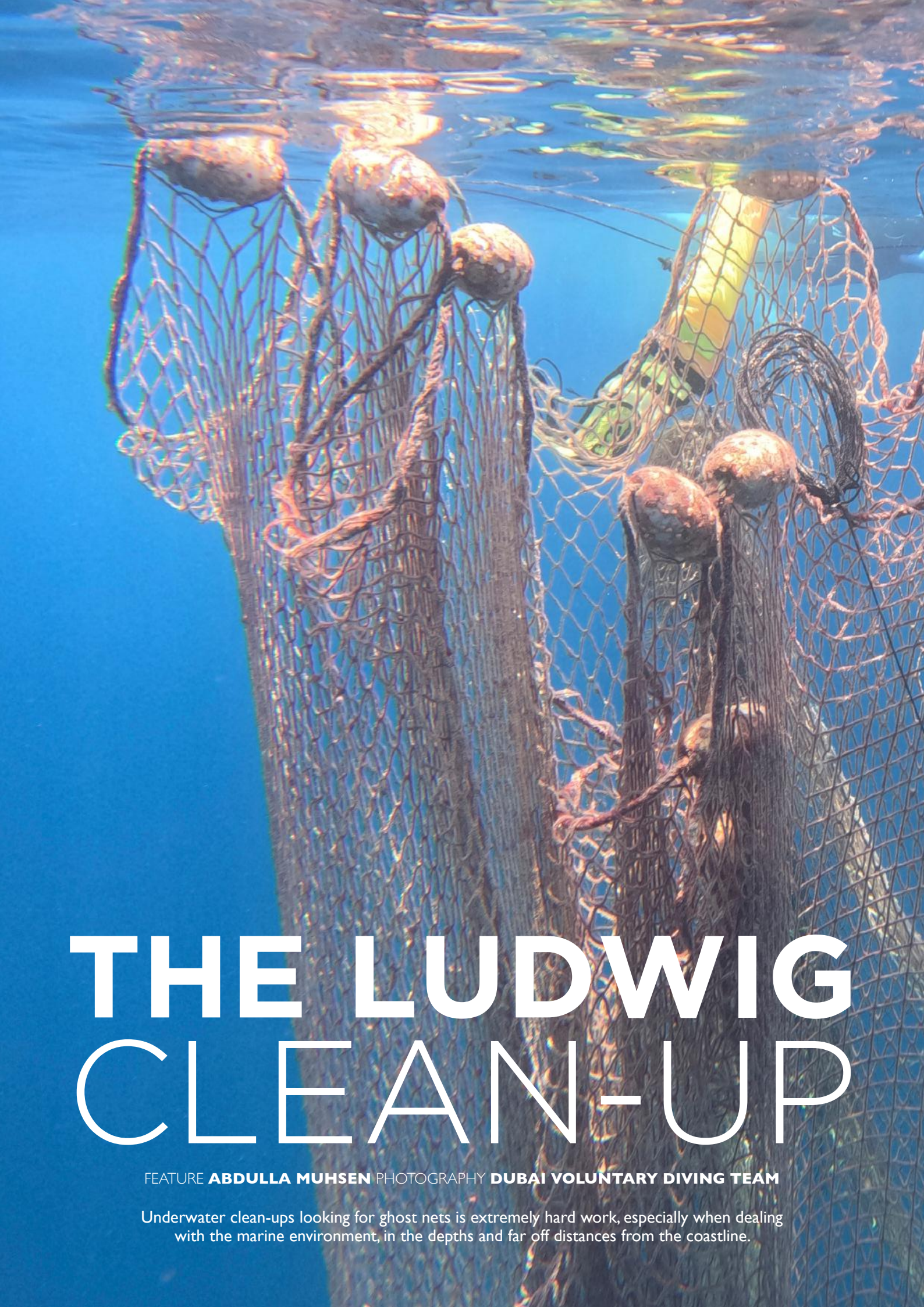
In places like Sri Lanka, Norway, Baja and Mauritius, whale swimming should be conducted with a deep respect for the animals and their natural behaviours. Local regulations and guidelines ensure that interactions are non-intrusive and prioritise the well-being of the whales. And while in most countries – including Mauritius – it is illegal to swim with whales on paper – not all governments have developed a tourism model that balances human curiosity with conservation. The only country where you can legitimately swim with humpback whales is the kingdom of Tonga in the south pacific. Here the regulations are strict, and all the operators follow them or risk penalties. A maximum of 4 people are allowed in the water with one boat within 200 metres of the whales. This has resulted in a beautiful one-of-a-kind place where the whales return year after year and swim with people without any kind of stress. Here, the whale populations have learned from infancy that they can return to their migratory and breeding destination without having a fear of humans.

ABOUT THE AUTHOR

I have dedicated a significant part of my life to the conservation and understanding of marine mammals. As a certified marine mammal observer, a licensed veterinary nurse and a PADI certified Master Scuba Diver, I have had the privilege of working with marine wildlife in various capacities, including my time at the National Aquarium of Abu Dhabi focusing on sea turtle conservation. My journey with whales has taken me across the globe to see these magnificent creatures – each experience offering unique and unforgettable encounters.

My passion for marine wildlife extends beyond just observing; I am committed to educating others about the importance of sustainable and ethical interactions with marine life. Through my work and experiences, I hope to inspire a deeper appreciation for the ocean and its inhabitants, creating a sense of responsibility to protect and preserve these incredible animals.

Ultimately, whale swimming offers a unique and transformative experience, but it must be conducted responsibly to ensure the well-being of these magnificent creatures and the marine environment. As someone who has had the privilege of swimming with whales in various parts of the world, I urge fellow enthusiasts, operators, and regulators to work together to preserve the magic of whale swimming for future generations. By prioritising the welfare of the whales and the health of our oceans, we can continue to enjoy these incredible encounters without causing harm for generations to come, both for humans and the whales alike.



THE LUDWIG CLEAN-UP

FEATURE **ABDULLA MUHSEN** PHOTOGRAPHY **DUBAI VOLUNTARY DIVING TEAM**

Underwater clean-ups looking for ghost nets is extremely hard work, especially when dealing with the marine environment, in the depths and far off distances from the coastline.

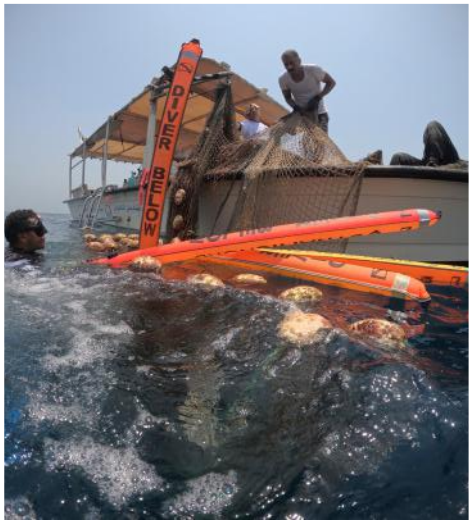
Underwater clean-ups looking for ghost nets is extremely hard work, especially when dealing with the marine environment, in the depths and far off distances from the coastline. Detailed plans are necessary, with follow-ups and extensive field trips run throughout the year, and returning to inspect the sites that had been cleared of waste. But this is not enough. We need to consolidate and multiply our sources of information from seafarers and stakeholders in the maritime field. This is what we do in the Dubai Voluntary Diving Team (DVDT). We preserve and sustain the marine environment, to achieve The Global Goals of sustainable development which is Goal 14: Life Below Water.

We regularly receive our information from divers, fishermen, and practitioners of various marine sports about sites that are harming and destroying the marine environment due to fishing waste. One example of this, is the report we have received from several people regarding the damage to the Ludwig wreck which lies in the sea of the Emirate of Abu Dhabi, at a depth of 26 metres, and 45 miles from the Emirate of Dubai where the DVDT boat is anchored in Port Rashid.

Fishing with nets is prohibited in the Emirate of Abu Dhabi, as well as fishing with cages (Gargoor). It is our duty to inform the authorities of the violations we observe in the Emirate of Abu Dhabi, so we contacted the Environment Agency – Abu Dhabi (EAD). We drew up a plan to clean the nets and debris and requested the logistical support needed. We had to clean the wreck in 3 stages due to the long distances getting to the Ludwig, and the deep depths we had to take into consideration for the safety of our dive team.

STAGE 1

On the 26th of January of this year, we embarked on the first trip with the team on our 38 foot boat, equipped with twin Suzuki 300hp engines, on a 1.5 hour boat journey from Port Rashid. We inspected and cleaned the wreck, but we were surprised at the amount of nets that were stuck in the hull and the marine life that had died in entanglement with the nets. We retrieved 500kg of nets during 3 dives, but due to the limited time, night fell upon us while lifting the nets into the boat with the help of the DVDT crane. The nets were brought back to Port Rashid where P&O Marinas support the Dubai Voluntary



Diving Team, and helped unload and transfer the nets to the waste landfill as part of the required procedure.

STAGE 2

The second trip was made on the 8th of June, on World Oceans Day. This time, the DVDT were accompanied by two boats from EAD and their divers. 700kg of nets were recovered during the 3 dives, and the trip took a total of 12 hours from start to finish.

STAGE 3

This last stage was done on the 22nd of June where the wreck was completely cleaned of its last ghost nets. Approximately 500kg was recovered on the 3 dives under brutal conditions with high temperatures of 50°C and high humidity in the height of summer.

The team had first cleaned the Ludwig wreck on the 21st of May 2021, and had then rid the ship completely of fishing waste, which consisted of fishing nets, cages (Gargoors), ropes, fishing lines, hooks, and plastic bags.

We extend our sincere thanks to the Environment Agency – Abu Dhabi for their support of this mission. They published an awareness video about the clean-up on their social media sites to alert and educate seafarers about the consquences these silent killers have on the marine environment and how they deplete our precious resources. We also thank the entities that support us throughout the year and the volunteers for their tremendous efforts so that we can preserve the marine environment, and we wish them all the best.

SUMMARY OF THE THREE STAGES

Total Distance Travelled: 490km (3 trips) (Dubai – Abu Dhabi – Dubai)
Total Volunteer Hours: 290 hours
Number of Fishing Nets: 2
Net Weight: 1,500kg
Max Depth: 26 metres

فريق دبي للغوص التطوعي
DUBAI VOLUNTARY
DIVING TEAM

THE GHOST NET HOTLINE

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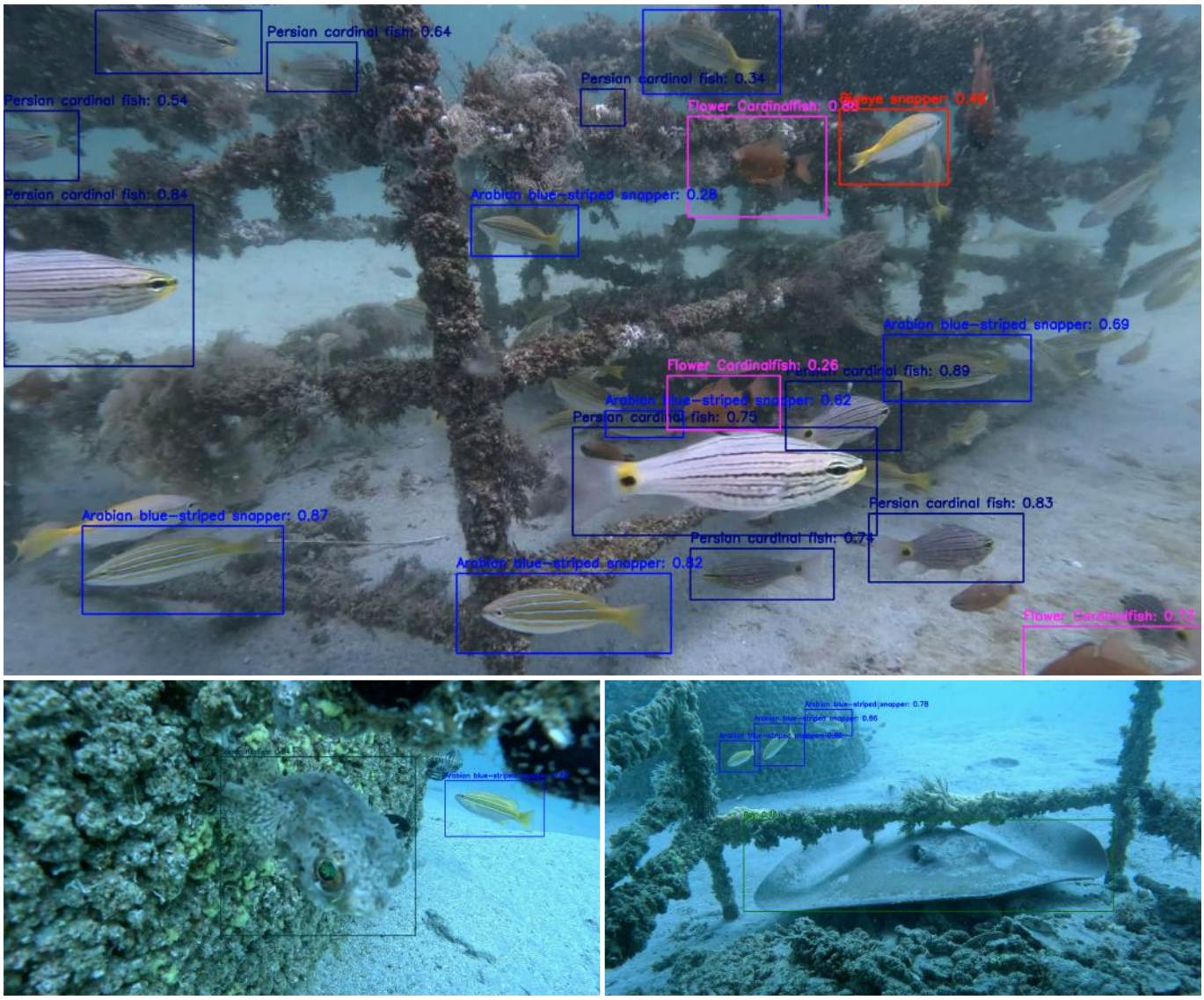
MARINE SPECIES DETECTION
& BIODIVERSITY ASSESSMENT USING AI

FEATURE AND PHOTOGRAPHY **FUJAIRAH RESEARCH CENTRE**

This cutting-edge technology represents a significant leap forward in marine biodiversity assessment and ecological research.



MARINE SPECIES DETECTION WITH AI

The Fujairah Research Centre, (FRC) is thrilled to announce a groundbreaking development in marine science. Our Digital and Artificial Intelligence (AI) Department, in partnership with the Marine Department, has unveiled the first iteration of an advanced deep learning model designed to detect and identify a wide array of marine species. This cutting-edge technology represents a significant leap forward in marine biodiversity assessment and ecological research.

THE CHALLENGES

Marine ecosystems are under pressure from climate change, pollution, overfishing, and habitat loss. Accurate and timely data on aquatic species and biodiversity is crucial for understanding these impacts and for guiding conservation efforts.

Traditional methods, such as manual surveys and underwater photography, were increasingly seen as insufficient in the face of environmental challenges and resources. More over, the manual techniques are often restricted by the scale of data collected and the subjectivity of human observation.

THE RESEARCH

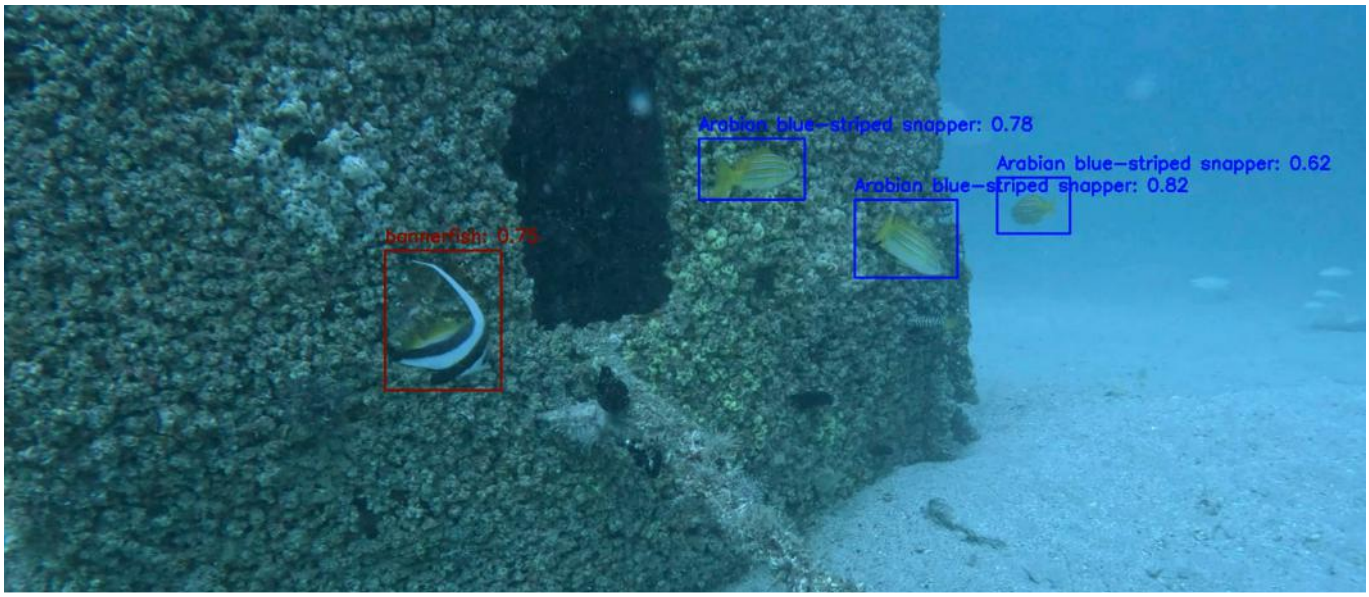
The FRC team came up with a conclusion: AI is needed to overcome the limitations of traditional methods. AI-driven systems can analyse data with unparalleled precision, and adapt to new information, making them indispensable tools for modern marine conservation. AI can process huge amounts of data and identify patterns beyond human capabilities. By developing an AI model that could automatically detect, classify, and analyse marine species in real-time, it will lead to more accurate and comprehensive biodiversity assessments.

THE TEAMWORK

The development of this AI-powered marine species detection system is a collaborative effort between the Marine and AI experts. The Marine researchers provided the biological expertise, defining the species of interest. On the other hand, The AI and Machine Learning specialist brought in the technological expertise, designing and training the deep learning models that power the detection and analysis algorithms. Together, these departments have created a system that enhances our understanding of marine ecosystems and help in management efforts.

Maryam Alhefeiti, FRC's Marine Researcher said, "This AI system is a groundbreaking achievement for our team and for marine conservation as a whole. We've always known that the oceans hold vast amounts of data critical to understanding and preserving marine life. By using the power of artificial intelligence, we've been able to create a tool that not only enhances our ability to monitor marine biodiversity but also allows us to do so with unprecedented accuracy and efficiency. Our team's work is evidence that we have the knowledge and tools necessary to protect our oceans for future generations."

Dr Fouad Lamghari, FRC's Director adds, "We are witnessing a significant scientific breakthrough that will revolutionise conservation science. This success has been possible thanks to a true team effort involving scientists, authorities, and citizens. We could not have achieved these results without the continuous support of the Fujairah Environment Authority and the invaluable contributions of our volunteer divers. They played a pivotal role in gathering the extensive photo and video data needed to train our AI models. This initiative marks a major milestone




The AI team.


The diving volunteers.

in our ongoing efforts to integrate cutting-edge technology with environmental science. Our marine and AI teams have truly pushed the boundaries of what's possible in marine research. Their work with AI-driven species detection and biodiversity assessment is not just innovative – it's transformative."

THE MOTIVATION

The implementation of this technology comes with many challenges. One of the primary difficulties is the need for extensive training data to ensure the AI models are accurate and reliable. Additionally, the underwater environment presents unique challenges – varying light conditions, water clarity, moving fish etc.

It can affect the quality of the visual data and, consequently, the performance of the AI models. Another challenge was to ensure the system's adaptability. Marine ecosystems are dynamic, with species behaviour and environmental conditions constantly changing. The AI models must be continuously updated and retrained to account for these changes, requiring ongoing collaboration between the Marine and AI departments.

Despite these challenges, the potential benefits of AI in marine species detection and biodiversity assessment are immense. This technology promises to revolutionise our approach to marine conservation, providing the tools needed to protect our oceans more effectively and sustainably. The integration of artificial intelligence in marine species detection and biodiversity assessment represents a significant leap forward in marine conservation.

OUR COMMITMENT

It is our commitment to advance marine science through innovative technology, reflecting our dedication to preserving marine ecosystems and understanding their complexities. We are excited about the potential of this AI-driven approach to contribute significantly to marine biodiversity assessment and ecological research.

This innovation addresses the pressing need for more efficient and accurate monitoring of marine ecosystems. While the process presents challenges, the potential impact of this technology on preserving our oceans is profound. As we continue to refine and expand these tools, the future of marine conservation looks brighter than ever.

In summary, the launch of our deep learning model marks a significant milestone in marine species detection and biodiversity assessment. By leveraging artificial intelligence, the Fujairah Research Centre is paving the way for more effective and insightful marine research, ultimately supporting the conservation and understanding of our planet's vital oceanic resources.

Diving volunteer, Eng Ahmed Nabil reflects, "Being part of this groundbreaking project has been an incredible experience for all of us. As volunteers, we're passionate about the ocean and committed to its preservation, so the opportunity to contribute to something as impactful as this AI system was truly rewarding. Knowing that our efforts directly support marine conservation made it all worthwhile. We're proud to have played a part in this project and to see our contributions making a tangible difference. This experience has strengthened our resolve to continue working for the health of our oceans, knowing that our efforts, combined with advanced technology, can lead to real change."

FROM CATALOG TO CAPTIVATING

A PHOTOGRAPHY COURSE WITH KATE JONKER

FEATURE AND PHOTOGRAPHY **HESMA FIVAZ**

In a world where underwater photography can be a solitary pursuit, the workshop fostered a sense of community and collaboration. By creating a space free from competition, Kate allowed participants to learn from one another, explore new perspectives, and unlock hidden depths of artistic expression.

Flying in from six of the seven continents, sixteen underwater photographers met at Utama Villa in Tulamben, Bali, of May this year. Together we dove into a ten-day workshop to improve our macro underwater photography skills with renowned photographer Kate Jonker. Each participant in the workshop brought a diverse set of experiences and proficiencies to the table. Some were more experienced, some wanted to master new cameras and set-ups, whilst others, such as myself, were just eager students, hungry to learn and hone our new craft.

I had previously dived in Tulamben the year before. Once again, I was amazed by the unparalleled opportunities to capture the immense beauty of underwater macro, super macro, and wide-angle photography. For our macro photography course, we ventured away from the wrecks and coral formations, and instead found our subjects on the black volcanic sand. It was here that we encountered the tiniest of creatures, which proved to be incredibly and mind-blowingly diverse.

ACCOMMODATION

Our home away from home for the ten-day workshop was the stunning Villa Utama. It boasted breathtaking panoramic views of the majestic Mount Agung from both the on-site restaurant and the rooftop lounge bar. The convenient location made it easy for us to venture out and explore the well-known macro dive sites in the surrounding area. In addition to the picturesque vistas, we were able to take full advantage of the villa's lovely amenities and facilities. The friendly and attentive staff further enhanced our stay by preparing delectable traditional Indonesian cuisine for us to enjoy.

Utama Villa is undoubtedly a destination of choice for scuba diving photographers. All the villas are equipped with ensuite, easy access outdoor bathrooms, ideal for rinsing off after a dive without having to leave puddles in your air-conditioned room. The Villas also have large tables and chairs with multiple electrical sockets for charging and cleaning camera equipment. There are lovely patios, stunning gardens, and dedicated rinse tanks for all your equipment located just outside the villas.

THE WORKSHOP

The workshop kicked off with introductions and an overview, allowing each of us to set

personal objectives. This personalised approach was a crucial element, as it enabled us to tailor our learning to our unique needs and individual creative styles within the overarching structure of the ten-day programme.

Kate's curriculum, "Dive into Macro Magic" workshop focused on three key techniques: black background, bokeh, and creative underwater photography, with the overall emphasis on capturing clear, sharp, full frame images. On the first day, we simply went diving and took pictures, establishing a baseline for our current capabilities. This was followed by two full days (six to seven dives) dedicated to each technique. At the end of each day, we submitted an unedited photo for the group's image review session – a strategy that proved highly beneficial.

This was where I could immediately see and feel my growth and improvement. It was refreshing to have a space free from competition, where we could present our photos and share the stories we wanted to tell with our photos. It opened my eyes to a wide range of unique perspectives, artistic license, and hidden beauty.

A key lesson I learned early on was that macro photography is all about slowing down. This improved my bottom time significantly and allowed me to focus on practicing the new techniques. I could focus on the subjects surrounding me in the moment. More is not always better, especially in macro photography. The goal is to capture microscopic subjects in images that fill the frame, are clear and well-isolated from their surroundings to make them stand out, and are vibrant in colour. This emphasis on quality over quantity was a transformative insight, one that will continue to shape my approach to underwater photography as I continue my photography journey.

In the competitive world of photography, it can be rare to find an instructor who effortlessly blends technical expertise, creative flair, and an unwavering passion for empowering their students. Yet, it is exactly what I experienced in this underwater photography workshop. As a participant in her 10-day immersive programme, I can attest to Kate's ability to guide photographers of all skill levels on an enlightening journey. Even before the workshop during our one-on-one zoom sessions, Kate's dedication to sharing her craft and imparting her wealth of knowledge was palpable. Her patience and willingness to share her experience was empowering. She actively engaged with each of us, offering tailored tips and tricks that helped us achieve our personal goals.

By allowing participants to work on their own objectives within the broader structure of the workshop, she fostered an environment that celebrated individuality and artistic expression. She incorporated inspiration, coaching, and a deep love of the ocean into a well-organised and enjoyable experience. Her passion for storytelling and sharing the underwater beauty through her own images enabled all of us to learn from her and apply the knowledge she shared. She actively engaged with us throughout, sharing years of experience and empowering us to grow as photographers and mirror the wonders of the ocean through our own lenses.

In a world where underwater photography can be a solitary pursuit, the workshop fostered a sense of community and collaboration. By creating a space free from competition, Kate allowed participants to learn from one another, explore new perspectives, and unlock hidden depths of artistic expression.

As I reflect on the workshop, I am left with a renewed sense of wonder and a toolbox of techniques to elevate my underwater photography. Her passion for this craft is not just a profession, but a true calling – one that she shares generously with those lucky enough to experience her transformative workshop.

Photo by Kate Jonker

DIVE GUIDES/DIVEMASTERS

Most of the dives in Tulamben are shore dives and constituted all our twenty-seven workshop dives. Unlike typical fun dives, our guide-to-diver ratio was 1:2. Having experienced guides allowed me to focus on applying the skills I learned in the theory sessions. Having a buddy and guide also sparked my creativity, as we could try different angles and lighting. This enabled me to concentrate on compositions and develop my own unique style.

The guides at Utama Villa were particularly knowledgeable. Many are brilliant photographers themselves, familiar with cameras, lighting, angles, and locating tiny subjects.

My guide Ari demonstrated remarkable patience. He kept me focused, ensuring I did not get distracted and move between subjects too quickly. His attentive guidance helped me practice my skills and make the most of the practical workshop experience.

Key learning from the workshop for me personally:

- Get a good dive guide/spotter – this will accelerate your learning and improve the quality of your photos.
- Slow down.
- Set up your camera the night before – clean, vacuum seal, and do test shots. This frees you up to focus on your goals for the day and avoid any unexpected leaks.
- Absorb technical knowledge, but don't just copy others. Photograph the same subject in different ways, experiment with techniques, and don't be afraid to break traditional photography rules. Develop your own personal style.
- Challenge yourself with composition – try different angles, strobe positions, and external light sources. Be creative and learn from feedback during image review sessions.
- Harness the power of light – get comfortable with strobes, snoots, and external light sources. Adjust placement and power of strobes to create interesting effects and make colours pop.
- Practice finding the perfect settings and focal distance for your gear and lenses. Repeated practice is key.
- Be aware of your surroundings – there is beauty and a story in the textures, styles, techniques and composition.
- Always prioritise preserving the fragile marine ecosystem when shooting underwater.

Kate's expertise and guidance proved invaluable as she unlocked new dimensions of creativity within us. She taught us new techniques, helping us to train our lenses on the intricacies of macro underwater photography, and the enigmatic marine life that Bali has to offer.

If you consider doing a course or workshop to improve your photography skills, I highly recommend that you do your research beforehand. Make sure they are well established in the industry and their style and the approach resonates with you. This course hit all the marks for me. I returned home with enormous growth and can almost call myself an underwater photographer. I had undergone a remarkable transformation – I no longer take catalog-style photographs, and now I can capture captivating photos instead.

MY GEAR

Camera: Sony RX100 M7
Housing: Nauticam
Strobes: Inon S2000
Focus light: Kraken Sports Hydra 1500 WSR
Instagram: @hesmafivaz

DIVE LOCAL
AND GET TO KNOW THE SPECIES

FEATURE AND PHOTOGRAPHY **AHMED AL-ALI**

Dive in and discover the UAE's marine life in more depth.

THE OTHER CLOWN

Yes. It is the other clownfish. In the UAE, there is a second species that is rarely seen unless you know what to look for: the Sebae Anemonefish (*Amphiprion sebae*).

This species is very similar to the commonly seen Clark's Anemonefish, which we often see on reefs and fall in love with. However, unlike Clark's Anemonefish, the Sebae Anemonefish forms a commensal relationship with Carpet anemones, not Bubble or Purple Tip anemones.

Being commensal means that both the fish and the anemone (the host) benefit from each other in some way, forming a symbiotic relationship. In this case, the sea anemone provides protection for the anemonefish, which are born with thicker skin making them immune to the anemone's stings – the host's only defence mechanism. This allows the anemonefish to hide from predators within the anemone, which uses its stinging cells to defend them. No other fish can withstand the pain from the anemones' stings. In return, the waste from the anemonefish provides nutrients for the anemone to thrive. A recent publication from 2020 showed that anemones hosting anemonefish have almost twice as much algae as those without, making them healthier and more resilient to bleaching, thus better equipped to combat the impacts of global warming. It is indeed a mutually beneficial relationship.

Carpet anemones can only be found on sand, not on reefs, which may explain why this fish is rarely seen, as most divers prefer to dive on reefs. Adult Sebae Anemonefish have a white edge on their dorsal fin, which is absent from the Clark's Anemonefish. This is how you can distinguish between the two species. The next time you encounter a Sebae Anemonefish, keep your distance. They are very territorial and will defend their area regardless of the size of the intruder. Simply admire their beauty and curiosity as they approach you.

THE MASTER CLEANER

The Coral Banded Cleaner Shrimp (*Stenopus hispidus*) is one of the largest cleaner shrimps found in the UAE. Despite its significant size, which can reach up to 7cm (3 inches), it can be difficult to spot as it often prefers dark cavities and hideouts during daylight. It is considered a nocturnal species, meaning it is active at night and rests during the day.

At night, these shrimps come alive. They are like the owls of the sea, becoming active around their hideouts, dancing side to side, and waving their long antennae to advertise their cleaning services. Fish approach them, allowing the shrimp to feed on parasites and fungi attached to them, creating a mutually beneficial relationship.

Next time you find them, note their location and return for a night dive to join the party. Let the disco lights shine!

THE POLKA-DOT NUDI

The Polka-Dot Nudibranch (*Chromodoris annulata*) is one of the most common nudibranch species found in UAE waters, both on the west and east coasts. This large species can grow up to 10cm and is very easy to spot amongst vivid coral reefs due to its bright colours and complementary orange and purple markings. Interestingly, this species is almost exclusively recorded in the Indian Ocean, including the Arabian Gulf, which underscores its uniqueness.

Identifying this nudibranch in the UAE is straightforward. Nearly all individuals have a white base body with orange dots scattered across it, resembling a polka-dot pattern (hence the name). Additionally, there are two purple circles on its body. One circle is located at the front, surrounding the two antenna-like structures known as rhinophores, which allow the nudibranch to sense water currents and detect dissolved chemicals for finding food or companions. The other circle is at the back of its body, encircling the gills.

The name "nudibranch" comes from the Latin words "nudus," meaning naked or exposed, and "branchia," meaning gills used for breathing. The feather or fluff-shaped organ on the back end of a nudibranch's body is its gills, which allow the nudibranch to breathe dissolved oxygen in water. While most marine species have their gills hidden inside their bodies, nudibranch gills are exposed on their back and, in some species, throughout their body.

An interesting fact is that specimens from the Arabian Gulf show a purple line connecting the two circles together, while in other parts of the Indian Ocean, they typically have two separate circles.

DUBAI'S SOFT CORALS: THE SEA PENS

FEATURE AND PHOTOGRAPHY **ARWA MOHAMMED – XPHOTODXB**

For years, divers and marine enthusiasts have explored the waters of the UAE, captivated by the diversity of marine life. Among the many intriguing organisms, sea pens (*Virgularia*) have often caught my eye, sparking curiosity yet often going unrecognised.

For years, divers and marine enthusiasts have explored the waters of the UAE, captivated by the diversity of marine life. Among the many intriguing organisms, sea pens (*Virgularia*) have often caught my eye, sparking curiosity yet often going unrecognised. Recently, it has been revealed that sea pens are not merely another type of marine creature – they are, in fact, a type of soft coral. This discovery has reshaped my understanding of the marine ecosystem and underscored the importance of ongoing exploration, education, and documentation of local marine life in Dubai.

As an underwater filmmaker and photographer, I've noticed a trend within my small circle of local photographers. Many are only interested in capturing the "superstars" of the sea, like nudibranchs, while they overlook the smaller, less conspicuous creatures. Whenever I point out these fascinating tiny beings, there's often little interest in photographing them. Even when I choose to document these unique species, I find that few are eager to identify or learn about them. This has made each dive more intriguing to me – not just for capturing videos of unknown marine life, but for the knowledge and appreciation that comes with identifying these creatures.

This has inspired the launch of my personal project, the Dubai Marine Biodiversity Log: A Comprehensive Photo & Video Archive, which I started a year ago. The primary objective of this initiative is to conduct visual surveys of the marine ecosystems along Jumeirah Beach, documenting and cataloguing the various flora and fauna. By gathering valuable photos and videos, researching them, and identifying the species, this project aims to support conservation efforts and contribute to scientific research. With the help of experts in the field, I have successfully identified over 40 marine creatures, deepening my passion as a marine biology enthusiast.

Sea pens are one of the many corals I once took for granted during my dives. However, upon realising that they are a type of soft coral, my appreciation for them has grown immensely. Named for their feather-like appearance that resembles a quill pen, sea pens are fascinating organisms anchored in the soft substrates of the ocean floor, swaying gently with the currents. In Jumeirah, I've been fortunate to find them in two distinct colourations: pure white, and pink with purple hues intermingled with white.

INTERESTING FACTS ABOUT SEA PENS

- **Coral Relatives:** Sea pens belong to the same class (Anthozoa) as stony corals and sea anemones. They are colonial marine cnidarians, composed of numerous individual polyps working together as a single organism.
- **Bioluminescence:** Many sea pens can produce light through bioluminescence. When disturbed, they emit a soft glow, which can startle predators and attract prey.
- **Anchored Lifestyle:** Unlike many corals that attach to hard surfaces, sea pens anchor themselves in soft sediments using a bulb-like structure called a peduncle.
- **Filter Feeders:** Sea pens extend their polyps to capture plankton and detritus from the water column, filtering nutrients to sustain themselves.
- **Variety of Shapes and Sizes:** Sea pens come in various shapes and sizes, from slender and delicate to large and robust, depending on their environment and species.
- **Colonial Structure:** Each sea pen is a colony of polyps with specialised functions, such as feeding, reproduction, and defence, allowing the colony to thrive as a single entity.
- **Reproduction:** Sea pens reproduce both sexually and asexually. They release sperm and eggs into the water column for fertilisation, while also cloning themselves by budding off new polyps.
- **Symbiotic Relationships:** Some sea pens host symbiotic algae within their tissues, providing them with additional energy through photosynthesis, much like their coral cousins.
- **Indicator Species:** Sea pens are considered indicator species, meaning their presence can provide valuable information about the health of the marine environment.
- **Historical Importance:** Sea pens have been known to humans for centuries, even appearing in ancient texts and art, but their true nature as corals has only recently been recognised by modern science.

The revelation that sea pens are soft corals emphasises the importance of continuous marine research and education. Local initiatives like my Dubai Marine Biodiversity Log aim to document and share knowledge about the diverse marine life of Dubai. By understanding the true nature of these organisms, we can better appreciate their ecological roles and work towards conserving their habitats.

Sea pens are just one example of the many treasures to find in Dubai's waters. As I dive deeper and explore further, who knows what I might uncover next?

THE GREATEST SHOAL ON EARTH

THE SARDINE RUN SOUTH AFRICA

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

One of Mother Nature's most breathtaking natural phenomena, the KwaZulu-Natal Sardine Run sees billions of sardines migrate up South Africa's east coast, bringing a spectacular variety of marine megafauna along with them.

We'll start with a confession: That headline was stolen from the trip's brochures. However, there simply isn't any better way to describe it! A real 'bucket list' experience, this trip had been on our radar for years, ever since we saw the photography of travel writer and underwater photographer, Pier Nirandara, a seasoned veteran of the run.

It was Pier who had first written about the Sardine Run in the March 2020 issue of Divers for the Environment, and following her journeys on her Instagram account over the years finally convinced us to put down the considerable fee and take the plunge!

The KwaZulu-Natal Sardine Run is a natural phenomenon that occurs every year between May and July, when billions of sardines, or more specifically the Southern African pilchard, *Sardinops sagax ocellatus*, spawn in the cool waters of the Agulhas Bank and move northward along the east coast of South Africa.

Known as the "Blue Serengeti," after the vast plains that serve as a migratory route for millions of wildebeest, the Sardine Run was so named because in terms of sheer biomass, researchers estimate the sardine run could in fact rival East Africa's great wildebeest migration. The individual shoals are often more than 7km long, 1.5km wide and 30 metres deep and are clearly visible from spotter planes or from the surface.

A migration of forage fish of such colossal scale could never fail to attract larger predators, and so the Sardine Run brings with it a spectacular parade of marine megafauna comprising various species of seabird, sharks, whales, dolphins and more.

Heading out of the sleepy coastal town of Port St Johns on lightweight, rapid and agile RIBs (rigid inflatable boats), you'll follow these migrations in search of 'action', when a concentration of activity caused by dolphins herding sardines into bait balls creates an underwater show you'll never forget!

ALIWAL SHOAL

However, the Sardine Run experience starts about 200km North of Port St Johns, at the Blue Oceans Dive Resort in eMkhomazi, also known as Umkomaas, just South of Durban. We did the nine-day package, which includes a two-night stay in Umkomaas for a day's diving at the infamous Aliwal Shoal, a series of reefs that are home to a large concentration of spotted ragged-tooth sharks (*Carcharias taurus*).

Upon arrival at Durban airport, you'll be picked up for your transfer to the Blue Oceans Dive Resort, a comfortable dive hostel with a welcoming atmosphere and, most importantly, a lively bar! Here you'll spend your first evening sampling the commendable pizzas from the wood-fired pizza oven and getting to know your friendly dive guides.

The following morning, you'll be up at sunrise to prep your gear before piling into the pickup for the trip down to the beach, where the RIB launches from. This is an adventure in itself, as the boat has to launch off of the beach, and the exact spot depends on the currents and the tides. On our launch, we had to go off the banks of a river that fed into the ocean. Once the boat is in the water, we climbed aboard, pushed our feet under the toe straps, and grabbed on for dear life.

After the word from the skipper, we brace ourselves as the boat launches over the waves coming in from the sea, and for about 20 seconds your only task is to avoid falling out of the boat. Thankfully, we were all successful

Drone shot by Vernon Malyon

in that task, so once out to sea, we headed off to our first dive site.

The sea conditions dictate how many dives you can do, but thankfully we were able to get two dives in at Raggies Cave and the Channel. Visibility was also better than usual, though not superb, ranging from 15 to 20 metres, so we had a reasonably clear view of everything going on around us. Which was good, because the spotted ragged-tooth sharks surrounded us as soon as we descended at Raggies Cave. As a nocturnal species, raggies are thankfully very docile during daylight hours, and if they're not swimming slowly about, they're nestled in the canyons and under overhangs throughout the reef.

Sharks are always growing new teeth, and are therefore constantly shedding the old ones, so keep your eyes peeled for teeth littering the seabed, and you may come away with a few souvenirs!

Other species to look out for include green turtles, and big potato groupers if you're lucky!

After the second dive, we were all feeling a bit chilly, and the surface conditions had worsened, so we called it and headed back to the resort to sort our gear for the next day's transfer, before a little après dive and pizza!

PORT ST JOHNS

After your second night, the third day is taken up by the 5 to 6-hour transfer by minivan South to Port St Johns, a small town of about 6,500 people situated at the mouth of the Umzimvubu River on the Wild Coast in the Eastern Cape province of South Africa.

Our lodging for the duration was The Spotted Grunter Resort, located on the riverbank about a kilometre upriver from the mouth of the Umzimvubu. Named after a fish that populates the river, The Spotted Grunter is a fishing resort for most of the year, but from May to July, hundreds of divers and marine wildlife enthusiasts from across the world descend on the resort for the infamous Sardine Run.

After a first night settling in, and getting to know everyone in the dinner hall, it's off to bed for an early rise the next morning. We were heading off down the river on the RIB with our skipper James and guide Matt at a chilly 7am, before being treated to a gorgeous sunrise as you reach the mouth. Here, once again it's life jackets on and hold on tight as James pilots the RIB through the waves to get us out to sea.

The event that everyone has come to witness is a 'bait ball', which occurs when a pod of common dolphins cooperates to herd a bunch of sardines together, and circle them to keep them in place while each of them take turns zooming through the bait ball to feed.

This also attracts other predators such as dusky sharks, blacktips, and even Bryde's whales (if you're really lucky – we were not), and all the action is punctuated by gannets hitting the water like torpedoes and plunging down to depths of up to 20m. Surprisingly good swimmers, they'll then spend up to a minute hunting the sardines before surfacing.

The first telltale sign of some action is a large flock of gannets circling a patch of water overhead. This will attract the attention of your skipper, who'll take the RIB closer to look out for telltale sign number two – gannets dive-bombing the surface.

As you're scrambling to get your gear on –

hoodie, mask, snorkel, fins – he'll assess the action, and if it looks good, he'll give the order to drop in. The bait balls can range from a few hundred to a few thousand fish, and your group will form a line, staying off of the ball to avoid disturbing it while you watch the dolphins do their thing.

If the bait ball is big and stable enough, the guide may decide it's worth heading back to the boat to gear up for a dive, as the action is, of course, best viewed from under the water!

As is always the case with nature, these bait balls are an unpredictable phenomenon. Some start moving, making it impossible to keep up. Others split up and dispel, and some just disappear entirely once the dolphins have had their fill.

Sometimes, a pod of the less industrious and cooperative bottlenose dolphins will show up and spoil the show completely by careening through the ball and sending the sardines scattering in all directions.

As a result, the whole experience mostly involves sitting on a boat for six to eight hours, jumping in and out of the water to catch whatever action you can. It can be a little exhausting pulling yourself into the boat over and over, so not everyone jumps in the water every time.

Throughout the trip, there will be a LOT of whale and dolphin spotting, which is hugely exciting if you're a first timer like we were. If the humpback whales are in a good position, you can jump in for an encounter, which we were lucky enough to experience a few times. Amazing as this was, it was not the highlight of our trip.

THE MOTHER OF ALL BAIT BALLS…

All the skippers of the Sardine Run boats are in constant contact to share news of promising action. On our first day out, our skipper James got a call from another of The Spotted Grunter boats, so we went to investigate.

We saw a cluster of boats under a big circling flock of gannets, but something else had caught James' eye. Steering towards another circling flock about half a click away, as we approached we saw a riveting sight – hundreds of gannets dive-bombing the surface like a waterfall.

"This is a big one, get ready!" he shouts, and

Blue Shark by Björn Lunter

its go time. We don masks and snorkels, and plunge into water to form up alongside Matt to see the ball.

Except we can't. It's just a giant, throbbing shadow beneath us, rippling and sparkling as the sun catches their scales, parting occasionally as a dusky shark darts up from beneath. A pulsating, amorphous mass, we can't find the edge – it just seems to keep moving beneath us.

After a few minutes, we hear a breathless shout from Matt. "BACK ON THE BOAT, WE'RE GOING TO DIVE IT!"

So, it's a frantic swim back to the boat to don our scuba gear, and get back into the water before we miss everything. We needn't have worried… As we descend, we are treated to something truly magnificent.

It is colossal, what must be a whole shoal of millions of sardines, fifty metres wide at the top, and forming a massive column plunging down to more than 30m in depth. Holding it in place are hundreds of common dolphins, circling it in a massive vortex, whilst others join the dusky sharks and blacktips, plunging in and out to enjoy this gargantuan feast.

And the sharks… we spotted around fifty swimming around us, and that's just what we could see from our side – there must have been hundreds all around it.

While all this is going on, a deep, irregular boom reverberated in our ears, like a bass drum being pounded with no rhythm. At first, we couldn't figure out what it was, until we looked up, and realised the booms coincided with the gannets dive bombing the water, leaving long trails behind them as they plunged into the mass of sardines.

It has to be one of the most primal, majestic and spectacular natural events that a human being can witness on this Earth.

James had radioed the other skippers, so within ten minutes, the others of our group from The Spotted Grunter had joined us. The ball was so large that it was still going strong when we reached our 50-bar limit after 45 mins, having spent a good part of it down at 20m. As we surfaced, and for the rest of the day, it was the topic of discussion throughout

the resort. The seasoned veterans hadn't seen anything like it in a decade. The young pups had NEVER seen a ball like that.

It seems we had been extremely fortunate!

As with any wildlife experience, one should always bear in mind that nothing is ever guaranteed. For some visitors, the action might be limited. On a few rare occasions in the past, the Sardine Run has failed to materialise completely. Just remember that Blue Ocean and your dive resort staff have no control over what happens under the water, but will always make every possible effort to make sure you have a great time regardless.

If things are quiet, but some approaching whales are spotted, the skipper can position the boat ahead of their approach, and drop you in for some spectacular encounters. At one breathtaking instance, we came face-to-face with a humpback whale which passed within two to three metres of us before swimming gracefully off into the gloom. On another occasion a mother and calf swam majestically past. From the boat, we spotted multiple breaching humpback whales, and followed a Southern right whale for a while.

The same also applied to an approaching megapod of dolphins. It's truly wonderful to dive down under the surface to witness hundreds of these beautiful animals swimming around you, with some of the more curious ones approaching to within a couple of feet for a closer look at you!

Species spotted by other groups and friends who took part in the Sardine Run this season include a great white shark, blue sharks, mako sharks and even orcas. As beautiful as they are, orcas are definitely the hooligans of the seas, and there is a risk that too many of them arriving will terrorise the other species away from the area. A friend doing the run separately to us reported seeing an orca killing a humpback calf for sport!

Another activity we opted for on a quiet day was to use one of our tanks to dive the Deep Reef dive site for another spotted ragged-tooth encounter. This was far more extreme than Aliwal Shoal – even in the limited visibility under 10m, there were scores of the sharks casually drifting around, some getting within a foot of you before turning away. We also spotted a potato grouper milling around on the reef, and the group had a field day collecting handfuls of the sharks' teeth littering the reef.

However, this dive was COLD. After 20 minutes of shivering in 17°C at the bottom gulping air, we had to call it. Another thing to bear in mind, is that South Africa is a Southern Hemisphere country, and this migration takes place during their wintertime. Therefore, sea temperatures are chilly, varying between 23°C at the surface to 17°C at the bottom. A 5mm full-body wetsuit is the minimum recommended, but we also went armed with 5mm hoodies, dive socks, and a 2mm neoprene vest to wear under

the wetsuit. We still found it chilly at times, so if you're used to the balmy sea temperatures of the UAE, be warned!

A must-do experience in Port St Johns is a trip up to the airstrip at the top of the mountain right next to the town of Port St Johns. Your resort will most likely arrange this as standard, but just check that they do, because you don't want to miss the experience. It's the strip where the Sardine Run's spotter planes, mostly single engine light aircraft, land and take off from.

Being at the top of the mountain, it offers breathtaking views of the surrounding valleys and mountains, and is the perfect place to catch a spectacular sunset. A fun fact is that this also happens to be the shooting location of the last scene in the Leonardo DiCaprio film Blood Diamond, where the two main characters are fleeing up a mountainside towards the airstrip to be rescued by a plane, but a wounded Leonardo has to be left behind.

If you decide to skip a day on the boats (as some do, especially those on the 15-day package), and you're feeling adventurous, local guides can also be hired to do some hiking on the surrounding hills. Some of the trails can be very overgrown though, so a machete might be a wise thing to take along.

A lot of visitors to the area also stop at the nearby Second Beach, a gorgeous and idyllic natural spot. However, it has a rather unfortunate status, as we discovered whilst researching the area for this article, as the world's most deadly beach for shark attacks! There are warning signs on the beach, so take heed.

Overall, the experience is spectacular. Aside from the Sardine Run itself, South Africa's Eastern Cape is wild and beautiful, with green cliffs towering over the sea, and you'll catch views such as the stunning Waterfall Bluff, one of only two waterfalls in Africa and only 19 worldwide that fall directly into the sea. This waterfall can be hiked to if you have the time.

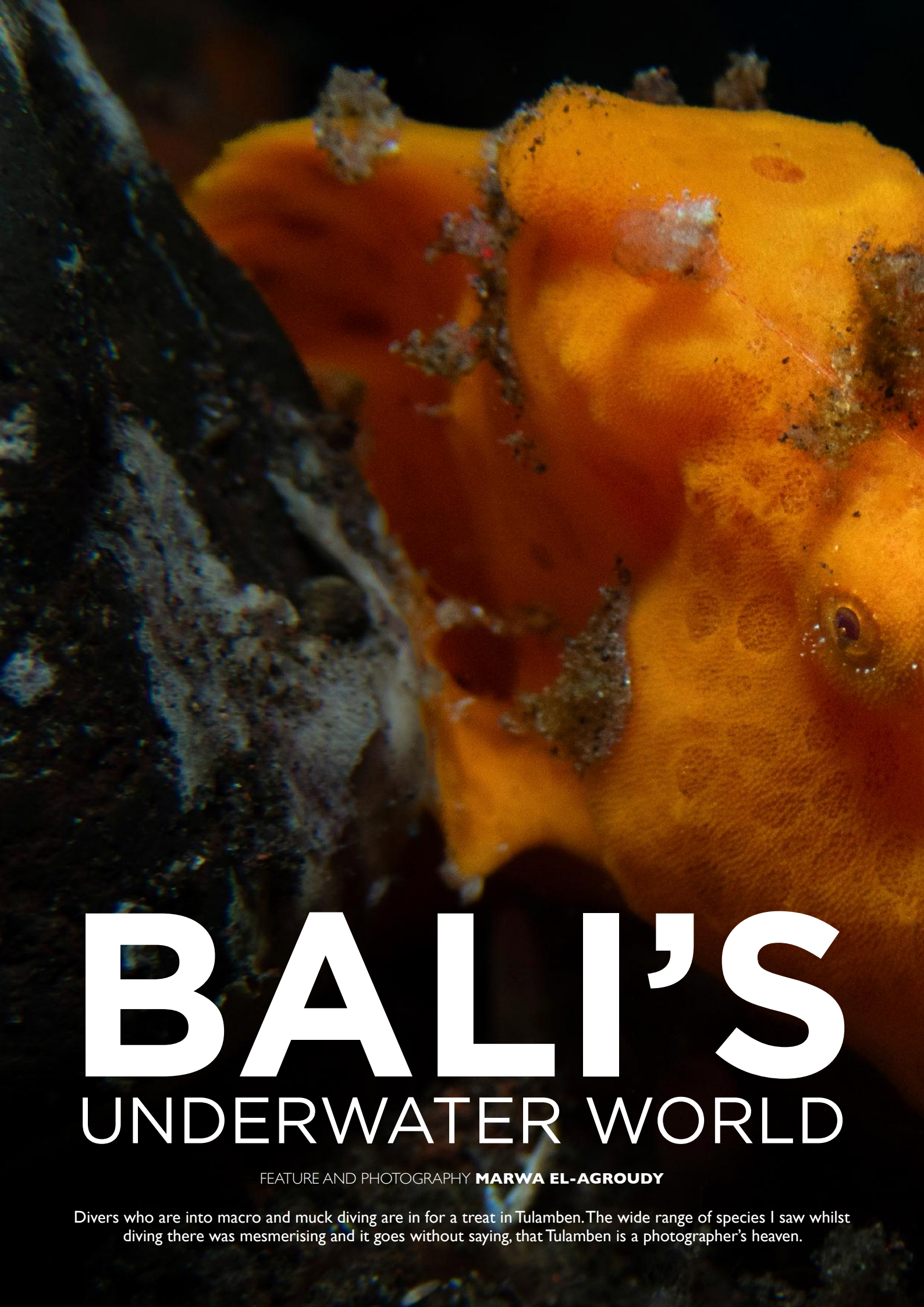
We would say it was a once-in-a-lifetime experience, but there are those, such as Pier Nirandara, who return year after year! For us, there are too many other trips on our Bucket List, and not enough time, so we'll make do with the unforgettable memories of this spectacular experience.

GETTING THERE:

In order to get to the Sardine Run, you fly direct via Emirates to Durban, where you'll spend the first two nights. Then it's a long drive down to Port St John and back, so you should consider this when booking your return flight, as it should definitely be an evening departure.

The experience is full board, so all meals are covered, including drinks, snacks and sandwiches on the boat. You'll only have to cover any after-dinner tipple, but don't overindulge if you're spending six to eight hours on a boat the next day!

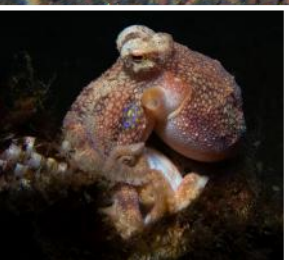
https://blueoceandive.co.za



BALI'S UNDERWATER WORLD

FEATURE AND PHOTOGRAPHY **MARWA EL-AGROUDY**

Divers who are into macro and muck diving are in for a treat in Tulamben. The wide range of species I saw whilst diving there was mesmerising and it goes without saying, that Tulamben is a photographer's heaven.



Before I became a diver, Bali seemed to me about rice terraces, floating breakfasts, swings, volcanos, and waterfalls. I probably would have gone to most of the famous Instagram hotspots had I visited before I learned to dive, but I was always discouraged to visit due to the overtourism of the past few years. I felt that the island was losing its character in order to curate for the influx of tourists and I didn't like that! Being a diver changed my perspective because all I could think of was the underwater world surrounding the island. I wanted to experience that flavour, the one that only divers get to have a taste of. And so, on a whim, I decided to go there on a short dive trip.

I knew I wanted to dive in Tulamben, but I was clueless with regards to anything else, so I went on an online search and asked dive friends for dive centre recommendations. Villa Alba Resort & Dive Centre came highly recommended. The beach property is nestled in a very quiet area in East Bali, close to Mount Agung and a short distance away from one of the most popular dive sites in Bali: the USAT Liberty. It has two swimming pools, a spa, a restaurant, and two types of en suite rooms to choose from – simply everything you could wish for on a dive vacation. On top of that, East Bali is where the sun rises on the island so whenever you are up for an early start, it will come with colourful and serene scenery.

Diving in Tulamben is distinct from other diving locations in South East Asia. The sandy bottom consists of black volcanic sand and the shores are all covered in volcanic stones and pebbles which makes it quite a challenge to get in and out of the water since they are mostly shore dives, so booties come in handy. Don't let that discourage you though as it is so worth the trouble, and besides, the dive guides are always happy to lend you a hand if you need one.

Divers who are into macro and muck diving are in for a treat in Tulamben. The wide range of species I saw whilst diving there was mesmerising and it goes without saying, that Tulamben is a photographer's heaven. From nudibranchs, shrimps, crabs, seahorses, frogfish to octopuses – you name it. I will let the photos accompanying the article speak for themselves about the variety of the marine-life in that area. Don't get disheartened if tiny critters are not your thing, because you can always dive the wreck of the USAT Liberty if you are after big stuff.

The USAT Liberty was a commissioned armed supply ship by the US Navy after the

US got involved in WWII. It was torpedoed by a Japanese submarine on the 11th of January 1942 en route to the Philippines from Australia. It was towed to Tulamben where it has remained after being stripped of its cargo and valuable items, until a volcanic eruption in 1963 made it the famous dive site it is today. By famous, I mean the most crowded dive site I have ever seen, but again totally worth it. The wreck is huge, 120m long, resting at about 40m from the shore with depths ranging from 6-30m. It is bustling with some of the richest diversity in marine life I have ever seen on a wreck. The schools of jackfish and barracuda, the soft and hard corals, the sweetlips, the clownfish on colourful anemones, they all paint an amazing picture of the abundant life down there. At one point, I stopped taking photographs so I could enjoy what I was seeing through my own eyes.

You can also go on day trips to dive in Nusa Penida for a chance to see the Mola-Mola (season dependent), Mantas, and other pelagic fish. Be warned though, the underwater temperature in Nusa Penida is a lot cooler to that of Tulamben's where I was diving in a skin-suit. You'll need a warmer wetsuit if you are planning on going there.

In conclusion, I believe that Tulamben should be on every diver/underwater photographer's list. The diving is spectacular and the sightings are fascinating. I can't recommend Villa Alba enough! The people are so friendly and will do everything they can to ensure you enjoy your stay. The divemasters are excellent spotters, the food is delicious, the rooms are comfortable, and the uninterrupted sea view is a plus.

www.facebook.com/VillaAlbaDiveResort

USEFUL INFORMATION

COUNTRY: Indonesia
DESTINATION: Tulamben, Bali
AIRPORT: Denpasar (DPS)
CURRENCY: Indonesian Rupiah IDR
LOCAL TIME: GMT +8 (there are 3 different time zones in Indonesia)
VISA: On arrival (nationality dependent) or requires an e-visa that costs AED120 and can be obtained via **https://molina.imigrasi.go.id**
TOURIST TAX: There is an obligatory tax of IDR150,000 to be paid online prior to arrival on **https://lovebali.baliprov.go.id**
CUSTOMS DECLARATION: Obligatory but free of charge via **https://ecd.beacukai.go.id**
ADVICE: Mosquito repellant is a must and to be mentally prepared to share your room with some friendly geckos and insects.

EQUALEASY

BUOYANCY AND EQUALISATION

FEATURE **CLAUDIO DI MANAO**

How many times have our ears warned us that we were descending?

It is often the ear, the part of our anatomy most sensitive to increasing pressure, that signals us of an unplanned descent. Not surprisingly, it is also one of the most frequent victims of poor buoyancy control.

A FUNDAMENTAL TECHNIQUE

Buoyancy control is essential for the comfort and the safety of the dive. We will never stop repeating that fact. Poor buoyancy control increases air consumption, but more importantly, it affects the diver's vertical speed control. This begins with weighting: A diver carrying excess weight has to put more air in their buoyancy compensation device (BCD), which amplifies the effect of pressure changes at depth. A drysuit behaves in the same way. A swift change of volume in a drysuit or BCD can lead to fast ascents or unwanted descents.

Divers who are overweighted and fail to compensate this by putting additional gas in their BCDs, display a very typical trim: an upright position with fins down. In order not to sink, these divers are forced to fin continuously, putting the sea bottom at risk and possibly causing loss of visibility if they stir up the sand. On the other hand, divers who are not wearing enough weight or have too much air in their BCD are typically in a head-down trim. An inexperienced diver will find it difficult to reach the dump valve on the lower back of the BCD. In a drysuit, a head-down position causes air to become trapped in the feet, necessitating emergency countermeasures.

A COMMON DIVING ACCIDENT

The most dangerous consequences of poor buoyancy control are a rapid ascent or missed decompression stop. These mistakes can take a diver straight into the hyperbaric chamber. The risk of barotrauma may seem small compared to the risk of decompression sickness (DCS). However, the numbers tell a different story. The most frequent diving injury is barotrauma, not DCS. Lack of proper buoyancy control is a major factor in many cases of barotrauma.

However, a diver doesn't need to plunge into the abyss or shoot to the surface to get hurt. Repetitive, sudden depth changes can easily damage the ears. Instructors taking students up and down during the course, often assisting them with both hands and not focusing on their own buoyancy, are an example. Instructors sometimes fail to equalise with the right frequency, which can result in barotrauma. Unfortunately, many are unfamiliar with the hands-free equalisation technique, which is described in the EqualEasy course. No matter what the cause may be, any uncontrolled descent stresses our ears.

HOW TO SAVE THE EARS

Let's go back to our lessons from open water training: While holding a normal breath and with an empty BCD (and a near-empty cylinder), a diver in a recreational configuration should float at eye level. It's a method that works with reasonable reliability. Beware the old saying, "better a kilo more than a kilo less." Being too generous with the extra kilos carries its own hazards.

Once underwater, divers should rely primarily on their BCD, then on regulating their lung volume during the breathing cycle to maintain proper buoyancy. In contrast, a frantic and sole use of the BCD would soon turn a diver into a yo-yo. As for dealing with equalisation, it is better to be proactive rather than reactive: if we know we are going to ascend, we should be ready to deflate the BCD. If we know we have to descend, we should avoid releasing too much gas, especially if we are already at depth. In addition, during the dive, it's good to check the position of our legs and head – their position not only shows us what is happening with our trim, but also with our buoyancy.

ABOUT THE AUTHOR

Claudio Di Manao is a PADI and IANTD diving instructor. He's the author of a series of books and novels about diving, including Shamandura Generation, an exhilarating portrait of Sharm el Sheikh's diving community. He collaborates with magazines, radio and newspapers, talking and writing about diving safety, marine life, and travel.

THE MIRAGE OF MOUNT STUPID:
DIVING AND THE DUNNING-KRUGER EFFECT

BY **TIM BLÖMEKE**

Unskilled and unaware of it – references to the Dunning-Kruger effect are popular in the diving community. However, the findings of the original research are commonly misunderstood or misrepresented. On top of that, the effect itself may not even be real. A (somewhat) serious deep dive by Tim Blömeke.

Florida Man. The Darwin Awards. Some nitwit watched a video on rocketry and blew his garage to smithereens in an attempt to reach escape velocity. Or tried to make his own whisky, with identical results. The stories are interchangeable, but the moral is always the same: You don't know what you don't know, and a little knowledge is a dangerous thing. Ka-boom.

The world of diving has its own trove of stories of this type, many of them revolving around bad things happening in caves to divers who were only trained to dive in the ocean. Some are embellished, fictional accounts, but there is no shortage of true ones. Accident reports from the early days of cave exploration, or nonfiction books like Robert Kurson's Shadow Divers, make for some educational (and gruesome) reading.

In 1999, a pair of researchers named David Dunning and Justin Kruger published a paper[1] that provided these anecdotes with a scientific backdrop. The researchers conducted tests in which they asked participants of various ability levels to predict their performance in a series of academic exams. In a nutshell, Dunning and Kruger concluded that people of low ability systematically overestimate their performance, while those of higher ability tend to predict it more accurately and even slightly underestimate it.

The Internet picked up on their study and processed it into memes, going so far as to give names to specific terrain features in a fancifully shaped curve purporting to show the rise, fall, and rise-again of one's self-confidence along the course of one's learning journey: Mount Stupid, the Valley of Despair, the Slope of Enlightenment, the Plateau of Sustainability.

Fig. 1: You have probably seen something like this. It's not an accurate representation of what Dunning and Kruger said.

The memes were so successful that they even found their way into corporate consulting and management training programmes. As a result, there are quite a few people with expensive educations who accept them as an accurate illustration of a real-world phenomenon. Many of us will have seen similar memes in the context of diving, at one point or another.

Memes spread not because they are true, but because they are appealing, and the one above does a great job of that by reminding us of the juicy anecdotes we all like to hear. Everybody has a story of "that guy" (and let's face it, it's mostly males who wind up as the protagonists in tales of grand stupidity). However, a little bit of applied scepticism quickly reveals why we absolutely shouldn't trust in personal experience when it comes to evaluating empirical claims.

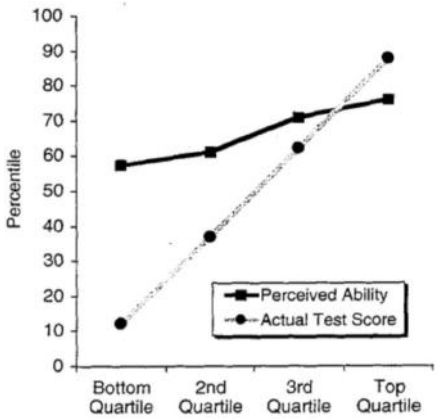


Fig. 2: This graph shows Dunning and Kruger's original findings. Mount Stupid is notably absent.

One big problem with relying on experience is that our information input is skewed. Overconfidence can produce spectacularly memorable outcomes, while lack of confidence rarely generates attention of any kind. Everybody's heard of Bob, the open water diver who entered a cave with a converted fire extinguisher for a scuba tank. He made international headlines when

his body was found. Nobody ever heard of his classmate Alice, who underestimated her abilities to the point of (sadly) never diving again. The Bobs of this world become part of what we call our experience, while the Alices are quickly forgotten.

As someone who has harboured these thoughts for a while, I was excited to learn that not only the vulgar understanding of Dunning-Kruger but also their core claim has come under considerable fire within the scientific community[2], culminating in a March 2022 cover feature in The Psychologist, with a rebuttal by David Dunning in the following issue. Criticisms centre around the thesis that the effect Dunning and Kruger found is not a feature of human psychology, but instead a statistical artefact inadvertently created by the way the researchers set up their experiment and evaluated their data.

A relatively accessible (and elegant) version of this critique was published by Canadian economist Blair Fix in a blog post titled "The Dunning-Kruger Effect is Autocorrelation" (April 2022).

"The Dunning-Kruger effect also emerges from data in which it shouldn't. For instance, if you carefully craft random data so that it does not contain a Dunning-Kruger effect, you will still find the effect. The reason turns out to be embarrassingly simple: the Dunning-Kruger effect has nothing to do with human psychology. It is a statistical artefact – a stunning example of autocorrelation.

[…] The line labelled 'actual test score' plots the average percentile of each quartile's test score (a mouthful, I know). Things seem fine, until we realise that Dunning and Kruger are essentially plotting test score (x) against itself."

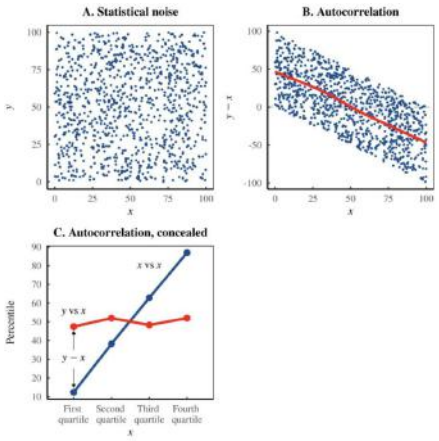


Fig. 3: A cloud of random data, and the same data after applying autocorrelation. Source: "The Dunning-Kruger Effect is Autocorrelation"

My initial excitement was promptly followed by a sobering realisation: I understand enough mathematics to find the argument compelling, but not enough to verify it. The fact that Fix's and others' criticisms confirmed something that I wanted to believe anyway didn't help: It could be just the same kind of cognitive trap that leads people into accepting the distorted, meme-ified version of Dunning-Kruger's claims. What if, by becoming more confident that the Dunning-Kruger effect isn't a real thing, I was propelling my ignorant self right onto the summit of Mount Stupid?

I reached out for help to an expert, Dr Stephan Boes, a senior official at the Statistical Office of North Rhine-Westphalia in Germany[3], who validated Fix's critique: "The autocorrelation is definitely there. I can't say exactly how much of the effect it explains without reviewing the data, but it looks pronounced to me. However, there is another problem further up the line: Participants in the experiment weren't really asked how competent they think they are. They were asked to predict how well they would do in comparison to other participants. There are two issues with this: One is that in order to make this prediction, participants would need to know the ability level of others in the test. Another is that a competitive ranking isn't very suitable for describing the distribution of outcomes for most real-world tasks, where you typically have a few people who consistently do badly, a few people who consistently excel, and a majority with middling outcomes who might do better than their peers in one test and worse in another. The way Dunning and Kruger present their data doesn't take this into account at all."

This connects to another criticism of the Dunning-Kruger effect: In a study published in 2020, authors Gilles E. Gignac and Marcin Zajenkowski found that the above-average syndrome (also known as illusory superiority) provides a better explanation for the discrepancies between predicted and actual performance relative to others that Dunning and Kruger found. Illusory superiority describes the observation that a majority of people consider themselves smarter, more competent, better drivers etc. than the average person (which is impossible; 50% are below average by definition).

In light of this information, the idea of applying Dunning-Kruger in the context of diving seems questionable. For starters, describing the ability of divers in terms of a competitive ranking is unhelpful. It doesn't matter if you were in the top or bottom quartile of your Advanced Open Water class. What matters is that your skills are adequate for the dives that you do – absolute ability, not relative. And even if we were to ignore all that and take Dunning-Kruger at face value, there are other human factors that come into play: In a PADI seminar on risk management I once attended, the lecturer emphasised that the majority of dive accidents during training don't happen under fresh-off-the-boat instructors who think they know everything. Accidents are more frequent with experienced instructors who become complacent.

Having absorbed all this, what are we to do when our instructor or buddy casually drops a reference to Dunning-Kruger or Mount Stupid in the classroom or over a beer? We could jump to our feet and launch into a maniacal rant about how the Dunning-Kruger effect isn't what they think it is, and how we read in Alert Diver that the effect maybe doesn't even exist, and even if it did, how it probably wouldn't apply to diving.

However, unless you're determined to spend the rest of the evening debating the methodology of quantitative psychological studies, regression to the mean, and statistical artefacts created by graphing x versus (x-y) when x and y have the same bounded value range, a better alternative would be to interpret mentions of Dunning-Kruger not literally but figuratively: as a cultural code, the short-hand version of a cautionary tale to warn us of underestimating the difficulty of a task we are about to attempt. Even if the Dunning-Kruger effect isn't real, overconfidence certainly is, in diving and elsewhere, and it's usually more dangerous than its opposite. We should always keep that in mind.

May the slopes of your learning curve be smooth and filled with joy.

FOOTNOTES:

[1] Kruger, J., & Dunning, D. (1999). Unskilled and unaware of it: How difficulties in recognising one's own incompetence lead to inflated self-assessments. Journal of Personality and Social Psychology, 77(6), 1121–1134. https://doi.org/10.1037/0022-3514.77.6.1121

[2] Nuhfer, Edward, Christopher Cogan, Steven Fleisher, Eric Gaze, and Karl Wirth. "Random Number Simulations Reveal How Random Noise Affects the Measurements and Graphical Portrayals of Self-Assessed Competency." Numeracy 9, Iss. 1 (2016): Article 4. DOI: http://dx.doi.org/10.5038/1936-4660.9.1.4

Gilles E. Gignac, Marcin Zajenkowski, "The Dunning-Kruger effect is (mostly) a statistical artefact: Valid approaches to testing the hypothesis with individual differences data." Intelligence, Volume 80, 2020, 101449, ISSN 0160-2896, https://doi.org/10.1016/j.intell.2020.101449.

Robert D. McIntosh and Sergio Della Sala, "The persistent irony of the Dunning-Kruger Effect." The Psychologist, Journal of the British Psychological Society, vol. 35, March 2020, www.bps.org.uk/volume-35/march-2022/persistent-irony-dunning-kruger-effect

David Dunning, "The Dunning-Kruger effect and its discontents." The Psychologist, Journal of the British Psychological Society, vol. 35, March 2020, www.bps.org.uk/psychologist/dunning-kruger-effect-and-its-discontents

[3] Views expressed here are personal and do not represent the opinion of Dr Boes' employer.

ABOUT THE AUTHOR

Tim Blömeke teaches technical and recreational diving in Taiwan and the Philippines. He is also a freelance writer and translator, as well as a member of the editorial team of Alert Diver. For questions, comments, and inquiries, you can contact him via his Instagram account or his blog page:

www.instagram.com/timblmk
https://timblmk.com

UPCOMING EVENTS

UNDERWATER CLEANUP ARABIA 2024 EVENT – PART 1

DIVE CLEAN-UP | PORT DE LA MER MARINA

Saturday 2nd November 2024 | 8am | EDA Members & Partners Only

As part of Cleanup Arabia's main event this year, members will be able to register to the underwater dive clean-up, happening at Port De La Mer Marina.

This beautiful World-class boutique marina is Mediterranean-inspired, offering an unparalleled island retreat within the city. With panoramic views of the open ocean and the stunning Dubai skyline, the marina provides a haven for yacht enthusiasts seeking a vibrant yet laid back-seaside life.

Lunch will be provided to the participants courtesy of D-Marin. Spaces are limited.

AN EDA MOVIE SCREENING

FIGHTING FOR FLORIDA

Thursday 7th November 2024 | 6:30pm | 97 mins | Deep Dive Dubai

Fighting for Florida is an eye-opening, environmental film that celebrates the natural beauty of Florida while promoting shark conservation and exposing the abuse of Florida's natural habitats and precious resources.

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

McCourtney illuminates the need for conservation and illustrates small changes that every Floridian family can make in order to keep Florida beautiful with thriving ecosystems that act as safe havens for the breathtaking wildlife.

CLEANUP ARABIA MAIN ANNUAL EVENT 2024 – PART 2

ISLAND CLEAN-UP | NAKHEEL ISLAND, DUBAI

Saturday 9th November 2024 | 8am | EDA Members & Partners Only

This year's Cleanup Arabia main event is being held in Dubai on Nakheel Island. Members will promptly arrive at Port Rashid to receive the event briefing, and then travel to the island by designated boats from the P&O Marina. The dive clean-up at the island is reserved to a group of experienced technical and commercial divers due to the deep depths. The rest of us will concentrate on working to collect as much of the waste on the island that we can in our designated zone (only weight will be counted) to protect the resident marine birds and marine life as we work together to stop more rubbish from entering the marine environment. This clean-up will hold the record for the most rubbish collected during an EDA clean-up. Inspiring change to make a difference together!

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ONLY ONE – THE ACTION PLATFORM FOR THE PLANET

Only One is on a mission to restore ocean health and tackle the climate crisis in this generation. 1) We mobilise millions to win global campaigns. 2) We fund the world's best ocean and climate solutions. 3) We tell stories that spark change for people and planet.

THERE IS ONLY ONE WAY TO SAVE OUR PLANET. TOGETHER.

Our strength comes from our network of partners and supporters. We connect with scientists, community leaders, innovators, and activists from around the globe. Together, we take a collaborative, research-driven approach to identify targeted, nature-based solutions that can sustain wide-reaching impact.

https://only.one

EDA
جمعية الإمارات للغوص
Emirates Diving Association

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MISSION STATEMENT

Our mission is to conserve, protect and restore the UAE's marine resources by emphasising and promoting the underwater environment and environmental diving.

LEGISLATION

EDA is a non-profit NGO registered with the Ministry of Community Development as per the Ministerial Decree No. 149.

The Decree stipulates the following responsibilities for EDA:
- Ensure environmentally respectful diving practices in all EDA members.
- Support the diving industry within the UAE by coordinating the efforts of the diving community.
- Promote safety in the commercial and recreational diving fields through standardisation of practices.
- Preserve historical aspects of diving within the gulf region and enhance environmental education to diving and non-diving communities through EDA projects and events.

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INSPIRING CHANGE TO MAKE A DIFFERENCE TOGETHER

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CLEANUP ARABIA

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REGISTER TO THIS YEAR'S CLEANUP ARABIA EVENT ON NAKHEEL ISLAND, DUBAI

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