



GLOBAL EDITION  
March 2024  
Number 124



Egypt  
**Red Sea Safari**

Caribbean  
**Bonaire**

Mediterranean  
**Malta**

Cave Diving  
**Longest Swim**

Wrecks  
**Xlendi**

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ARGENTINA

# **Southern Right Whales**

COVER PHOTO BY DON SILCOCK



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**COVER PHOTO:** "El Blanco," a rare white southern right whale calf, Peninsula Valdés, Argentina  
 Photo by Don Silcock

Fireworm, Malta. Photo by Michael Salvarezza and Christopher P. Weaver



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## We miss you, Jacques-Yves Cousteau

Or rather, we miss someone of a similar calibre who inspired an entire generation to dream of diving, a figure whose documentaries would clear the streets, captivating viewers in front of their tellies around the world. Those of us who were children back when the moon landings were the pinnacle of wonder, fellow old-timers, will know precisely what I mean. (Crikey, that does rather date me, doesn't it?)

Once upon a time, being a scuba diver was as cool as being an astronaut—and an equally far-off dream for most. It was an entirely different era, where scuba divers were akin to a select cadre of the “right stuff,” not unlike the special forces. To the average person, diving was an elusive spectacle, something to marvel at from afar, as we watched the pioneers explore the deep blue on our television screens.

Now, fast-forward several decades, and you will find that even middle-aged Aunt Agatha has been certified on a package holiday to Thailand. But is this democratisation of the

ocean's depths a positive or negative development?

I would argue it is a boon. Making the marine world accessible, allowing people to experience and understand our shared underwater heritage, is instrumental in the preservation of our aquatic environments and ecosystems upon which we all, ultimately, rely.

On the other hand, it is disheartening to see diving lose its lustre, relegated to just another activity ticked off a holiday bucket list or an entertaining diversion at a seaside resort.

Diving has seemingly shifted from being a part of one's identity to merely an activity one participates in. It is this loss—the erosion of diving as an integral part of one's being—that I mourn deeply.

Fashions and trends in how we spend our leisure

time are ever-changing, but diving is more than just a pastime. It connects us to a primal affinity with water and the sea. Who among us has not delighted

in water as a child, or cherished days spent at the beach? Who has not been curious about what mysterious life forms dwell beneath the waves, or what secrets or treasures lie sunken and waiting to be discovered? The desire to explore is innate—if only we have the means, which divers do.

And yet, the diving community is ageing and the dive industry in many places is struggling or shrinking. It is a worrying trend.

The apparent indifference of younger generations to the splendour of our planet's aquatic realms baffles me. We may not be able to travel to other planets, but we can immerse ourselves in an alien world right here on Earth, and we can all be explorers just by donning dive equipment.

Rekindling the allure and prestige of diving is a challenge without an obvious solution. But I believe that a figure with the influence and passion of Jacques-Yves Cousteau could, once again, ignite the collective imagination.

— Peter Symes, Publisher  
and Editor-in-Chief





# NEWS

from the deep

Edited by  
G. Symes

## Coral resilience under climate stress: Insights from Hawaiian reefs

In Kāne'ōhe Bay, Hawaii, a profound study unfolds, delving into the resilience of coral reefs facing climate change. Led by Katie Barott from the University of Pennsylvania, researchers embarked on a decade-long journey to understand how corals cope with rising ocean temperatures.

In 2015, amidst a marine heatwave, Barott's team tagged numerous coral colonies, initiating a study on coral adaptability. Their focus: rice coral (*Montipora capitata*) and finger coral (*Porites compressa*), two dominant species in the region. Over the years, multiple heatwaves provided a unique opportunity to observe coral responses, revealing both resilience and vulnerability.

### Acclimatization

Corals, colonial marine inverte-

brates, rely on a symbiotic relationship with algae for survival. However, disturbances like temperature shifts can disrupt this delicate balance, leading to coral bleaching—a critical threat to reef ecosystems. The researchers meticulously tracked over 40 coral colonies, discovering variations in resilience. While some corals displayed persistent pigmentation, indicating thermal tolerance, others exhibited signs of acclimatization, adapting to successive heatwaves.

### Environmental memory

The study unveiled the concept of "environmental memory," where corals retain resilience from prior stress events. This phenomenon parallels human adaptation to exercise, suggesting corals can acclimate to recurring stressors. However, resilience varied between species, with rice coral showing prolonged recovery periods.

Despite signs of resilience, challenges persist. The ongoing

El Niño cycle threatens warmer ocean temperatures, emphasizing the urgency of coral conservation. Future research aims to unravel genetic and physiological factors driving resilience, crucial for predicting coral survival in a changing climate.

### Global significance

These findings hold global significance, guiding conservation efforts and informing policymakers. Protecting resilient coral species is paramount for preserving marine biodiversity and the vital services coral reefs provide. However, achieving zero carbon emissions remains imperative for the long-term survival of coral ecosystems.

As Barott stressed, preserving coral reefs is essential for cultural heritage and ecosystem health. Urgent action is needed to address losses and safeguard these invaluable marine ecosystems for future generations.

"Getting to zero carbon emissions is absolutely essential for the survival of coral reefs into the future," said Barott.



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Rice coral (*Montipora capitata*), Kāne'ōhe Bay, O'ahu, Hawaii

"So, even though we have signs of resilience, if the only species left is *Porites compressa*, we're not going to have the amount of biodiversity and services from these ecosystems

that a lot of people rely on, both for their cultural value as well [as] for nutrition. Corals can take years to reach sexual maturity, and some reefs can take thousands of years to

fully form, so addressing these losses is urgent and pressing if we want to maintain coral reef ecosystems as we know them." ■ SOURCE: PENN TODAY, UNIVERSITY OF PENNSYLVANIA



# Wildfires can affect aquatic ecosystems

**In recent years, climate warming has exacerbated destructive wildfires worldwide, with projections indicating escalating environmental and economic damage in the future. While existing studies have primarily focused on the impacts of wildfires on land ecosystems, fresh research from the University of California San Diego and collaborating institutions reveals significant changes occurring in aquatic ecosystems due to wildfires.**

Led by the laboratory of Professor Jonathan Shurin at the School of Biological Sciences, the research examines how aquatic systems respond to burnt plant matter, including its effects on food webs. Published in the journal *Global Change Biology*, two studies by the researchers highlight several key findings. They demonstrate that wildfires chemically alter plant debris, fundamentally shifting the role of aquatic ecosystems in the carbon cycle. Additionally, the research underscores the importance of these ecosystems as carbon sinks, storing carbon in their sediments.

Postdoctoral scholar Chris Wall, the lead author of one of the studies,

emphasized the broader impact of wildfires on water resources and ecosystem health. "The effects of wildfires are not limited to terrestrial systems," he said. "When we think about wildfires increasing, especially in the West, it's important to remember that burned materials flow directly into waterways that are vital for people and wildlife. We're now recognizing that wildfires can greatly influence ecosystem health, with

implications for water resources, like aquifers and recreational fishing." The research, conducted primarily at UC San Diego, carries significant implications for regions like the Sierra Nevada mountains, where wildfires are prevalent.

**Carbon storage capacity**  
The study challenges conventional wisdom regarding carbon dioxide emissions in aquatic systems. While

lakes and ponds typically emit more carbon dioxide than they absorb, the research suggests that this balance can be altered by the influx of burnt materials from wildfires. Ponds receiving burnt materials showed reduced carbon dioxide emissions, indicating a shift towards greater carbon storage.

However, the study also reveals potential limits to this carbon storage capacity. As the quantity of burnt material increased, the ponds' ability to store carbon diminished, with the most heavily impacted ponds exhibiting higher carbon dioxide emissions.

**Insect breeding grounds**  
Moreover, the research highlights changes in the composition of aquatic communities in response to wildfires. Ponds with heavy loads of burnt material saw a transformation in their inhabitants, becoming breeding grounds for insects like mosquitoes, in contrast to the typical aquatic species found in unburned ponds.

The study, conducted over a 90-day period, employed various experiments to track the movement of nutrients through the ecosystem. By using nitrogen tracers, the researchers observed a reduction in the trans-

fer of nutrients to higher organisms in response to burning.

**Feedback loops**  
The research underscores the need for integrated models to forecast the impact of climate change on both terrestrial and aquatic ecosystems. By understanding the feedback loops between these systems, we can better comprehend the changes occurring in the global carbon cycle.

"We've seen the impact that these huge fires have had on watersheds, so we're working in these natural systems to understand how different components of climate change are altering the ecosystems," said Shurin, Department of Ecology, Behavior and Evolution faculty member. ■

SOURCE: GLOBAL CHANGE BIOLOGY, UNIVERSITY OF CALIFORNIA SAN DIEGO



Recent research reveals that wildfires can impact aquatic ecosystems.

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# Soft corals are source of sought-after “anti-cancer” compound

Scientists have discovered that common soft corals are the producers of a natural chemical with potential anti-cancer properties, after a 25-year search by drug hunters.

Researchers at the University of Utah Health led by Eric Schmidt, along with collaborators, suc-

cessfully identified the DNA responsible for synthesizing the compound, eleutherobin, marking a significant step towards producing it in the laboratory for further testing and potential use in cancer treatment.

Meanwhile, a second group of researchers led by Bradley Moore of Scripps Institution of Oceanography at the University of California San Diego, showed

in a separate study that corals make related molecules.

### Ingestible

The breakthrough, published in *Nature Chemical Biology*, offers a ray of hope in the quest for new cancer therapies. Soft corals, abundant in drug-like compounds, hold promise not only as anti-cancer agents but also as sources of anti-inflammatory and antibiotic substances. Unlike venomous chemicals found in other creatures, soft coral compounds are ingestible, making them easier to develop into oral medications.

### Diving and discovery

The journey to this discovery was marked by perseverance and scientific ingenuity. Paul Scesa, the lead author of the study, stumbled upon the sought-after compound in a common species of soft coral near Florida, contradicting the belief that it was synthesized by symbiotic organisms within the corals. With a background in organic chemistry and a passion for marine exploration, Scesa was well-equipped to tackle this challenge.

### Eleutherobin

Soft corals use eleutherobin, a diterpene glycoside, as a defense against predators. It disrupts the cytoskeleton, a key scaffold in cells, and hence is a potent inhibitor of cancer cell growth. “Diterpenes are major defensive small molecules that enable soft corals to survive without a tough exterior skeleton, and, until now, their biosynthetic origin has remained intractable,” the researchers wrote.

Utilizing advancements in DNA technology, the researchers decoded the genetic instructions for producing the compound, paving the way for its laboratory synthesis. By programming bacteria to follow these instructions, they successfully replicated the initial steps of the compound’s synthesis, confirming soft corals as its source.

“My hope is to one day hand these to a doctor,” says Scesa. “I think of it as going from the bottom of the ocean to bedside.” ■

SOURCES: UNIVERSITY OF UTAH, NATURE CHEMICAL BIOLOGY



Encrusting gorgonian, *Erythropodium caribaeorum*, produces eleutherobin, a diterpene glycoside with potential anti-cancer properties (above and left).

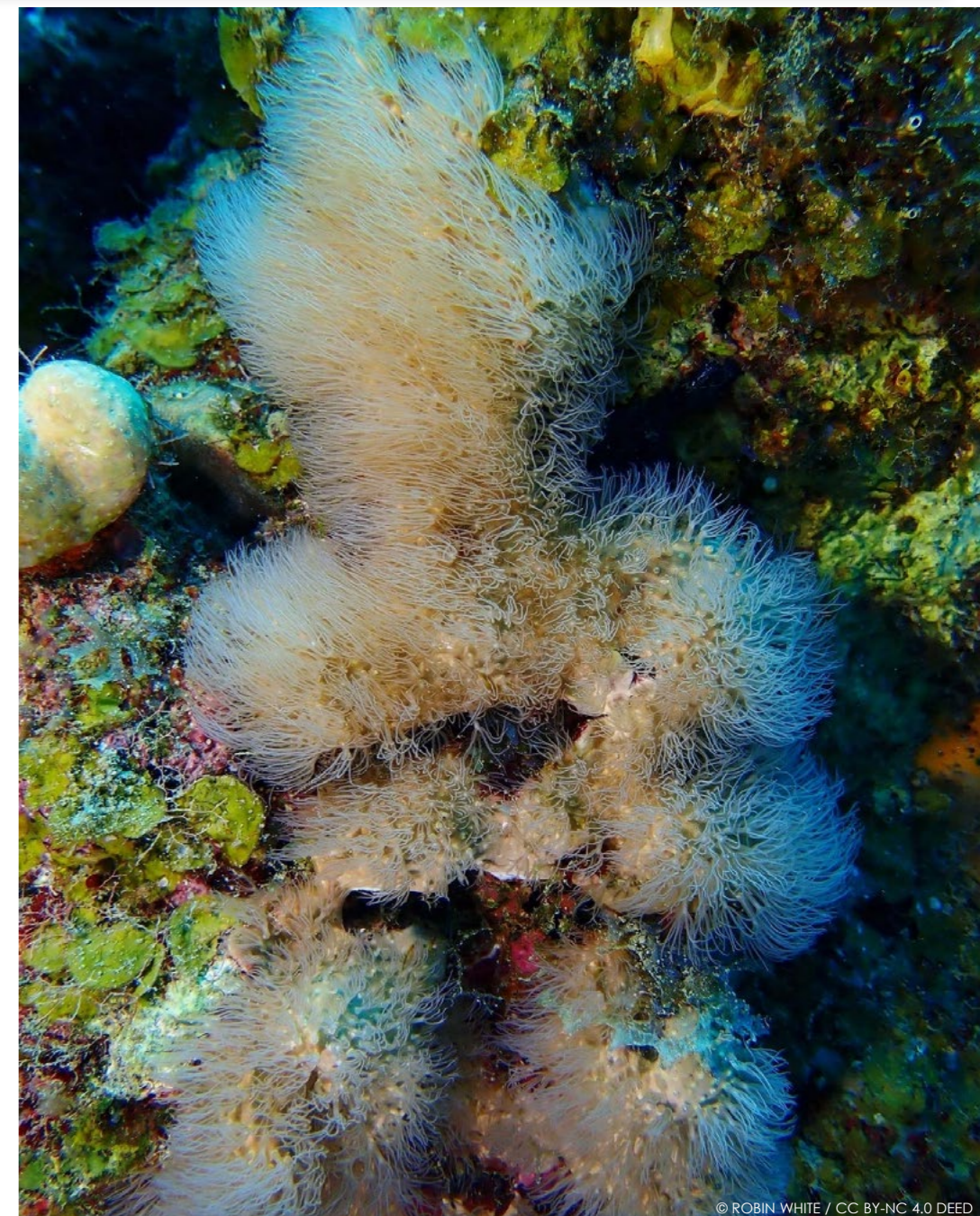
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The common clownfish, *Amphiprion ocellaris*



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## Can clownfish count?

**To discern friend from foe, clownfish count stripes. A recent study found that common clownfish displayed aggressive behavior predominantly towards members of their own species with three white bands, engaging in confrontations lasting several seconds. In contrast, intruders of other species faced milder aggression.**

Clownfish, also known as anemonefish, are feisty critters that vigorously defend their anemone homes from intruders, particularly those of their own species, displaying aggressive behavior. Anemonefish species living in the same areas exhibit a variety of stripe patterns, ranging from three vertical bars to none, as observed by Kina Hayashi from the Okinawa

Institute of Science and Technology, Japan. Hayashi and colleagues published their groundbreaking discovery in the *Journal of Experimental Biology*, revealing that common clownfish (*Amphiprion ocellaris*) possess the ability to count. They conducted experiments, raising young common clownfish from eggs in isolation to ensure they had no exposure to other anemonefish species. The researchers then filmed the fish's reactions to various anemonefish species, including intruders of their own species, to determine their response.

### Stripe patterns

To understand how the clownfish distinguished between species, the researchers isolated small groups of young common clownfish and filmed their reactions to models with different stripe patterns. The results showed that the clownfish paid little attention

to plain orange models or models with one stripe, but exhibited increased aggression towards models with three stripes, similar to their response to intruders in the previous experiment. Hayashi suggests that the aversion to fish with two stripes could be related to their developmental stage, as common clownfish initially develop two white stripes before gaining a third.

The study showed that the young common clownfish possess the ability to differentiate between species based on the number of white bars on their sides. This allows them to defend their anemone homes from individuals that may attempt to evict them, while showing less concern towards species that pose little threat to their abode. ■

SOURCES: JOURNAL OF EXPERIMENTAL BIOLOGY, OKINAWA INSTITUTE OF SCIENCE AND TECHNOLOGY

## Stingrays and cichlids can count

**Researchers at the University of Bonn have made a surprising discovery: Stingrays and cichlids possess the ability to perform simple addition and subtraction within the number range of one to five.**

This finding, published in *Scientific Reports*, reveals a previously unknown mathematical capability in these aquatic animals. Led by Dr Vera Schluessel from the Institute of Zoology, the study sheds light on the cognitive abilities of fish, challenging assumptions about their intelligence.

### Method

The study involved training stingrays and cichlids to perform basic arithmetic operations, such as increasing or decreasing an initial value by one. Using a method similar to that used with bees in previous

research, the researchers presented the fish with collections of geometric shapes colored either blue or yellow to indicate "add one" or "subtract one," respectively. The fish learned to associate the colors with the corresponding mathematical operations and demonstrated their understanding by consistently choosing the correct answers in subsequent tests.

### Cognitive flexibility

Remarkably, the fish were able to apply this knowledge to new tasks, even when the calculations became more complex. They successfully solved problems involving different shapes and colors, indicating a level of cognitive flexibility previously unrecognized in these species. The researchers were particularly surprised by the fish's ability to infer the calculation rule from the color cues and apply it to various scenarios.

### No neocortex

This achievement challenges conventional beliefs about fish intelligence, especially considering that neither cichlids nor stingrays possess a neocortex, the brain region typically associated with complex cognitive functions in mammals. Furthermore, the study highlights the importance of recognizing and respecting the cognitive abilities of non-mammalian species, which are often underestimated or overlooked.

The study suggests that fish possess more sophisticated mental capacities than previously thought, which has implications for our perception of fish intelligence and raises important questions about their welfare and conservation in the face of commercial fishing practices. ■

SOURCES: SCIENTIFIC REPORTS, UNIVERSITY OF BONN



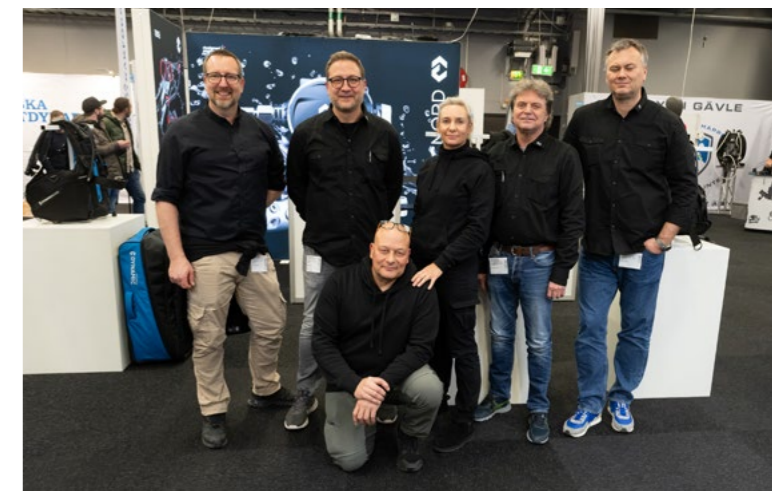
Stingrays (left) and cichlids (right) can do simple addition and subtraction of numbers up to five.

© PHOTO: PROF. DR. VERA SCHLÜSSEL / UNIVERSITY OF BONN / CC BY



Text & photos  
by Peter Symes

The good folks  
from Waterproof  
cheer a produc-  
tive dive show  
(right).



## Scandinavian Dive Show 2024 report

**Reinvention and relocation are key to success and mark the beginning of a new era for the Scandinavian Dive Show.**

It was a relief to see the crowds entering the Scandinavian Dive Show on the morning of Saturday, 10 February. Tommy Jarnbrink, the founder and principal organiser, alongside the X-Ray Mag team, worked tirelessly to organise and promote the expo to both local and international networks, aiming to attract new attendees.

Following the 2023 edition, it became apparent that a new format was essential for the show's future. The Dive Show, or "Dykmässan" in Swedish, faced challenges as a standalone event, particularly in achieving economies of scale

in a niche industry—a challenge which dive events in countries even larger than Sweden also face. The previous edition's low attendance highlighted the need for significant changes.

### Successful new format

Tommy Jarnbrink engaged with the organisers of the long-standing Boat Show in Gothenburg, who quickly saw the potential of combining the expos into a larger, unified water sports event. In May 2023, an agreement was reached to host the Dive Show alongside the Boat Show. X-Ray Mag also stepped up as a co-organiser, promoting the revamped expo to its international network and co-branding it as the Scandinavian Dive Show.

The new format proved successful, with booth space selling out and the

venue reporting 15,815 visitors over the weekend, a satisfactory turnout.

### Gothenburg, a strategic location in Scandinavia

Scandinavia, known for its affluent economies and love for water sports, presents a lucrative market for the dive industry. The strategic location of Gothenburg, accessible from major Scandinavian population centres, enhances the expo's appeal.

While Gothenburg has its own airport, for international visitors, flying to Copenhagen, which is Scandinavia's biggest hub, and taking a train straight to Gothenburg centre may offer a quicker and more convenient travel option, with trains running hourly from the station right under the terminal.

CENTRE COLUMN: Chairman of the Danish Sportdiver Federation, Jesper Risløv (top); Jonas Axelsson, CEO of SITech (above)

RIGHT COLUMN, TOP TO BOTTOM: Desiree Pullens of Magic Resorts; The Dynamic Nord team; Paolo Enrione of Tiaré; Principal show organiser, Tommy Jarnbrink (on the left), and Swedish X-Ray Mag editor Lelle Malmström (on the right) get off their feet at the end of the show, relieved that the expo went so well.



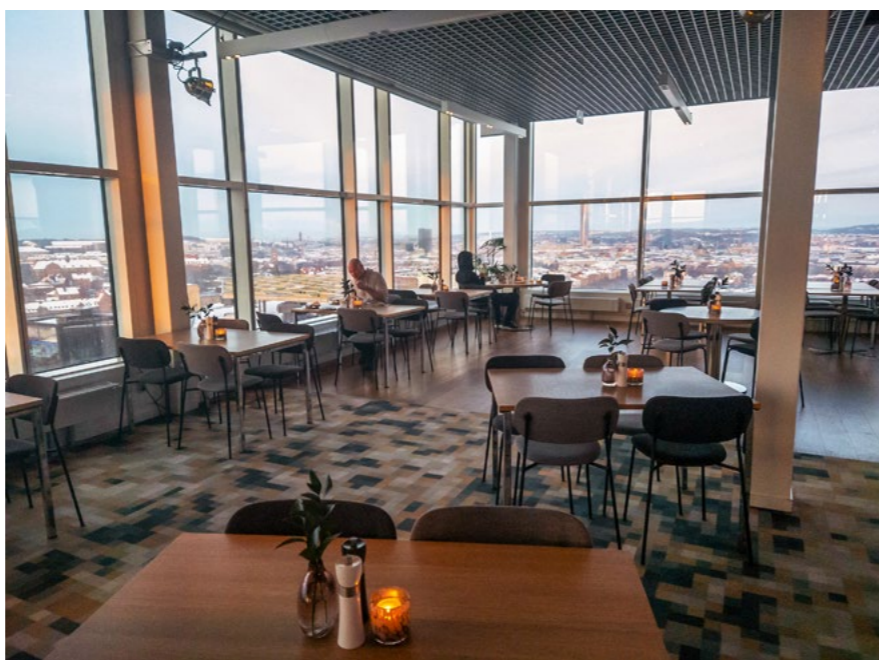


Fun character on stilts at the show (right); Pim van Schendel of Murex Resorts (far right); Scenic view over Gothenburg from the restaurant of the Gothia Towers hotel (bottom right)



**Next year will be even bigger**

The 2025 show, scheduled for 7-9 February, will move to a larger hall within the expo complex, with most exhibitors from this year already signed up. The expo complex, featuring several halls, is directly connected to the Gothia Towers hotel—the largest hotel in the Nordic countries—offering exhibitors easy access to the expo from the hotel's reception area. The larger hall designated for next year's dive show, situated a level above and offering a panoramic view of the main floor through its windows, promises a spectacular setting. Access is facilitated by a wide escalator leading from the boat show's centre to the dive show level.



Plans for further improvements and entertainment for the next edition are underway, promising to evolve the show into Scandinavia's premier dive industry networking event. Already, all Nordic Sportsdiver Federations have met and held a conference at the expo, with more training agencies expected next year. ■

See **videos** from this year's show.

To register for 2025, email principal show organiser, Tommy Jarnbrink at: [dykmassan@gmail.com](mailto:dykmassan@gmail.com)

For more information in English, see our webpage: **Showcase Your Brand at the Scandinavian Dive Show!**

Or go to the **Scandinavian Dive Show** homepage.

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Edited by G. Symes



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Scenes from last year's Malaysia International Dive Expo at the Malaysia International Trade and Exhibition Centre in Kuala Lumpur



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# Malaysia International Dive Expo returns to Kuala Lumpur in June

The 18th iteration of the Malaysia International Dive Expo (MIDE) in 2024 is set to captivate divers, businesses and water sports enthusiasts from around the world. Taking place 7-9 June 2024 at the Malaysia International Trade & Exhibition Centre (MITEC) in Kuala Lumpur, this year's theme, "Embracing the Ocean's Majesty," underscores the event's significance.

Since its inception in 2006, MIDE has remained a cornerstone annual gathering, pivotal in fostering and fortifying the global dive community and associated businesses. Garnering international recognition as an important event, MIDE has drawn over 250,000 attendees in its 17-year history, cementing its status as a premier fixture in the diving industry.

Functioning as a comprehensive nexus for all facets of the aquatic realm, MIDE covers equipment, courses, travel, conservation, education, boating, sailing and other water sports. Consequently, MIDE

2024 offers a prime opportunity not only to engage with industry leaders but also to stay abreast of the latest trends, products and innovations in the underwater domain.

Attendees can explore a diverse array of local and international brands, while exhibitors stand to benefit from enhanced brand exposure and sales prospects. The event is truly a one-stop platform for the exploration, education and enjoyment of myriad aspects of the underwater world.

Exciting dive talks, panel discussions and activities focusing on

cave diving, women divers, underwater photography, freediving, water sports, and youth involvement in conservation and diving are set to be announced soon.

### Register today

For registration and tickets, go to: [mide.com.my](http://mide.com.my). Those interested in sponsorship and branding opportunities can get for further details at: [info@mide.com.my](mailto:info@mide.com.my). Get regular updates at [mide.com.my](http://mide.com.my) or follow on Facebook, X, Instagram, Flickr and YouTube @MIDEEXPO. ■

SOURCE: MIDE

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## SDI introduces new scuba instructor certification

Scuba Diving International (SDI) has unveiled the SDI Elite Scuba Instructor recognition certification, addressing the demand for a rating positioned between SDI Open Water Scuba Instructor and Course Director.

This certification aims to recognise dedicated SDI Instructors and provide new professionals with a clear milestone to strive for. One key objective is to acknowledge the accomplishments of SDI Instructors while encouraging the growth of the next generation of diving professionals. This rating celebrates their achievements and is designed for active SDI instructors committed to producing skilled divers.

### Crossover path

For individuals transitioning to SDI from other diving agencies, SDI has introduced a crossover path for the Elite Scuba Instructor rating. This facilitates the recogni-

tion of equivalent certifications obtained from other agencies.

The application process for this recognition is straightforward. Eligible candidates must meet specific prerequisites, gather all the required supporting documentation, including certification counts, and submit their applications.

### Free registration

Notably, for the initial six months following the certification's launch (until June 15th, 2024), registration for the Elite Scuba Instructor is free for qualifying individuals.

To take advantage of this offer, applicants should complete the PDF version of the SDI Upgrade form and specify "Elite Scuba Instructor" in the "other" space. All necessary supporting documentation must accompany the application, which should be emailed to [training@tdisdi.com](mailto:training@tdisdi.com) or the respective regional office.

The prerequisites for application are as follows:

- Applicants must hold the title of SDI Open Water Scuba Diver Instructor (Note: SDI Assistant Instructors are not eligible).
- A minimum of seven SDI specialty instructor certifications are required (First Response Instructor certifications can also be counted).
- Applicants must have issued at least 50 SDI diver certifications.
- A minimum of four SDI Dive-master or SDI Assistant Instructor certifications must have been issued.

Please note that the SDI Elite Scuba Instructor certification is specific to SDI and does not encompass certifications from TDI, ERDI, or PFI.

Stay updated as we report on further developments in the diving community. For more information or inquiries, please reach out to the SDI official channels. ■

SOURCE: SDI NEWSLETTER

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Edited by  
G. Symes

Cargo on the ancient Phoenician wreck included amphorae from various parts of the central Mediterranean region (right); Due to its deep depth at 110m, the wreck site off Xlendi Bay at Gozo Island required innovative methods to be developed for deep-water archaeology (bottom right); Very little light reached the wreck site, so powerful lamps had to be used to illuminate the area for the excavation (bottom left).

## Rare Phoenician Wreck Site in Malta

*Oldest known shipwreck in central Mediterranean*

During an underwater cultural heritage mapping survey in Malta in 2007, researchers noticed an unusual feature in the sonar data. This anomaly stood out due to its size, shape, and the possibility of human-made objects. Further investigation confirmed the presence of an ancient 2,700-year-old shipwreck.

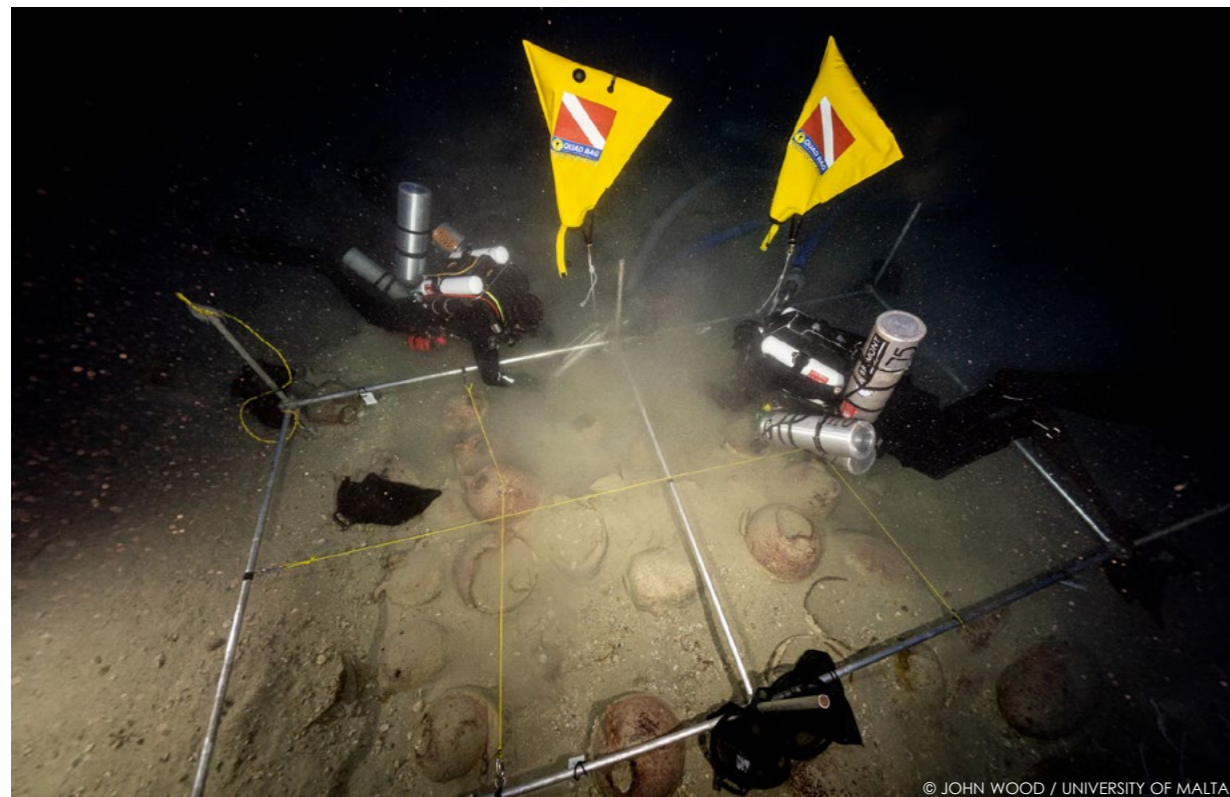
Since then, the University of Malta, in collaboration with local and international partners, has been studying what is now recognized as the oldest known shipwreck in the central Mediterranean and one of only seven known Phoenician shipwreck sites worldwide.

### Intact cargo

This Phoenician shipwreck, located 110m beneath the waters near Xlendi



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Bay in Gozo, holds a well-preserved cargo from the 7th century BC. The cargo, a mix of stone and ceramic artifacts, offers insights into central Mediterranean trade networks and economic history during the Archaic period. Additionally, the site poses challenges and opportunities for the development of deep-water archaeological research methods, including access and communications.

An exposed cargo layer on the seabed, confirmed by a visual survey, included amphorae from various regions of the Central Mediterranean and a variety of urns, found in the middle of the ship, some of which are typically associated with a funerary context. Seven types of ceramic containers were identified, including a small jug.



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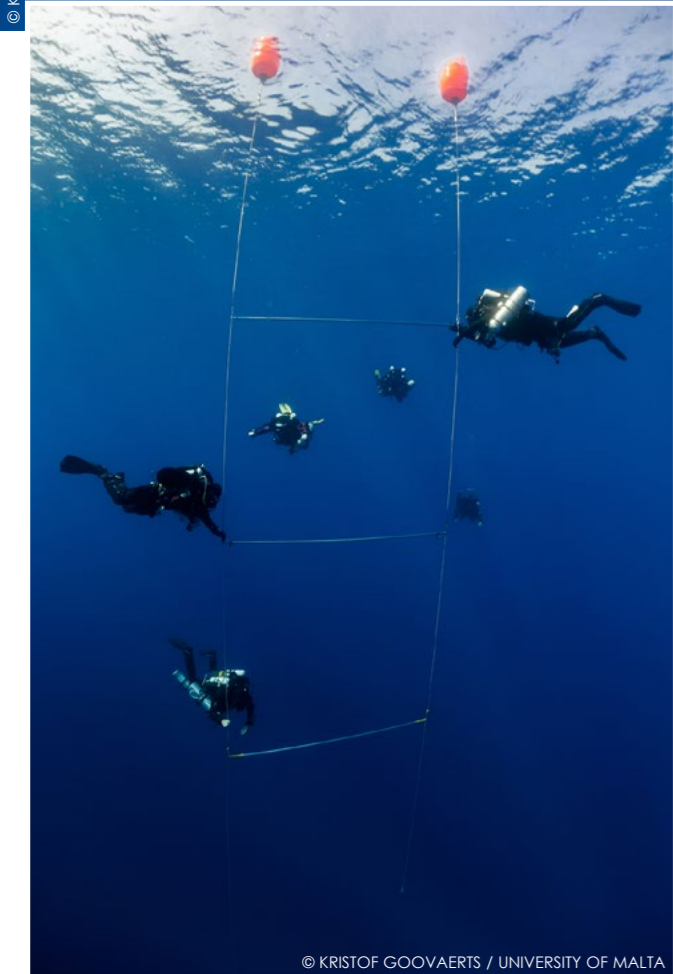




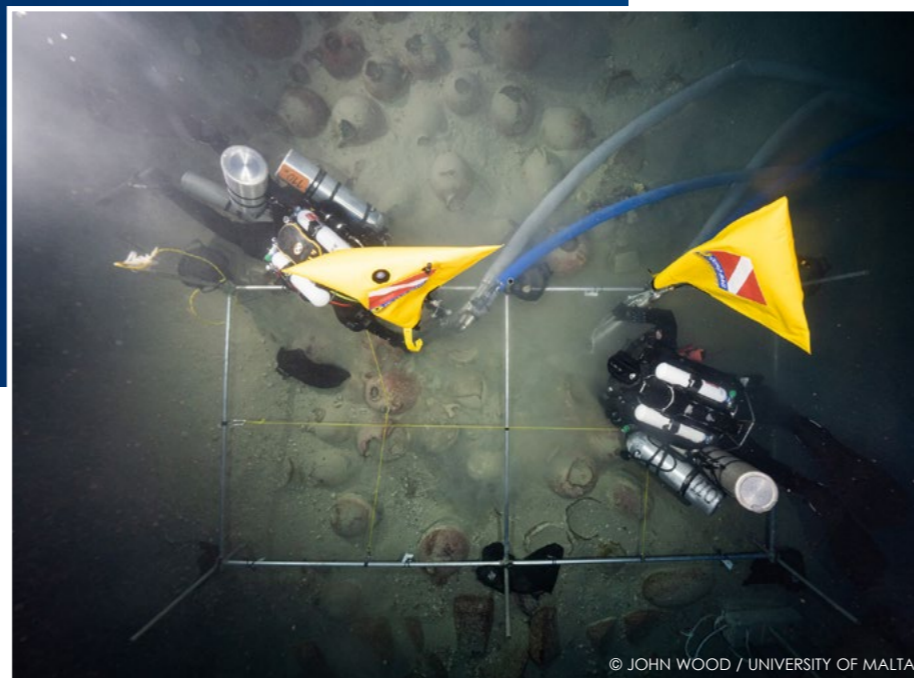
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Research divers brought specialized camera equipment to document the wreck site (left); Photos taken of the wreck site were compiled into a 3D model for archaeological research (above); A grid system assisted the survey and documentation of the wreck site (center and below)

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Research divers hang onto a decompression trapeze with buoys during a deco stop (left)



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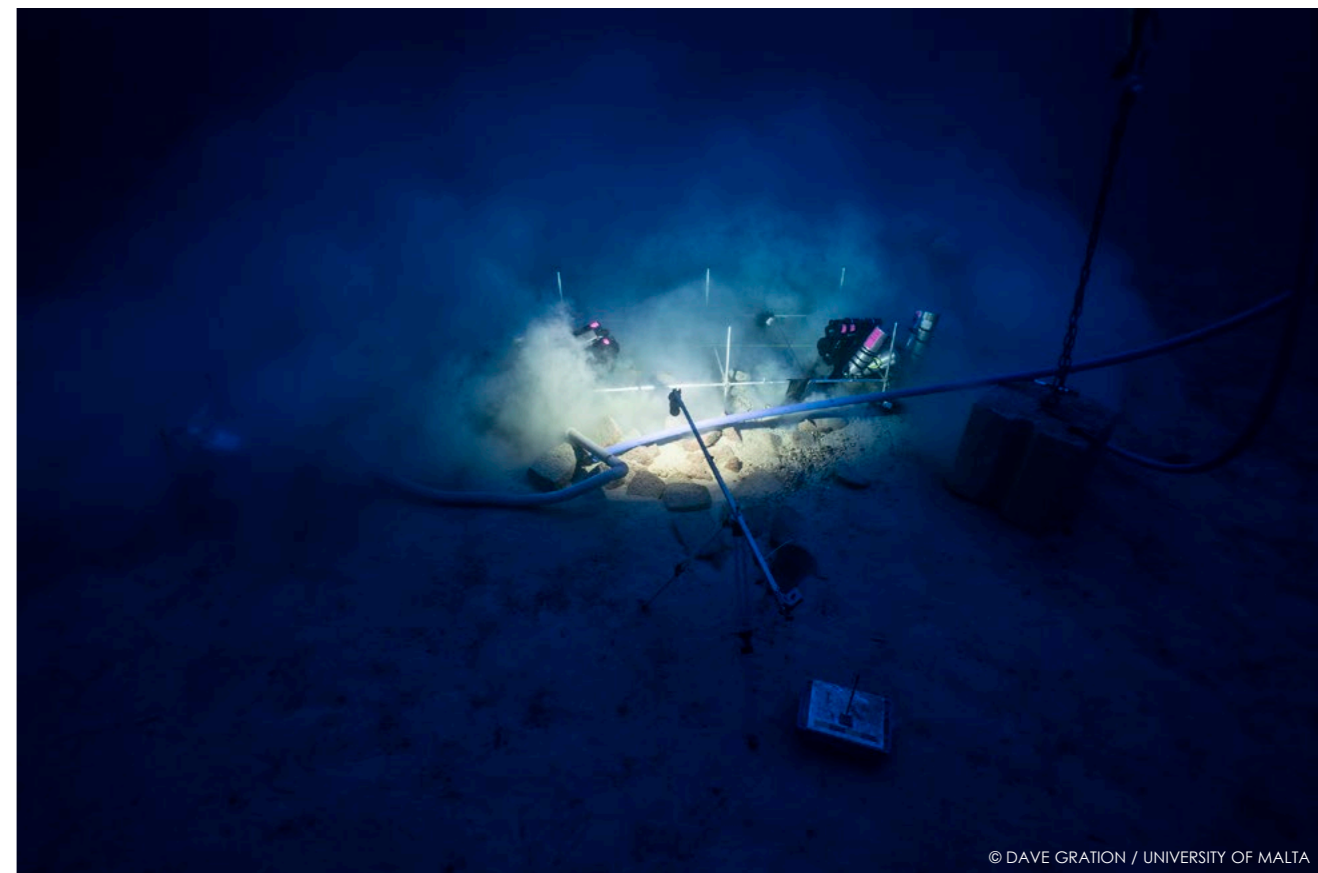
Both ends of the ship contained grinding stones called saddle querns, used for food preparation, which were remarkably well-preserved and probably newly quarried. Tests revealed that they were made from basaltic rock traced to the island of Pantelleria, a known source of grinding stones in the ancient Mediterranean.

### Underwater investigation

Due to the shipwreck's age and diverse contents, it has become a valuable archaeological resource that warranted comprehensive exploration. An expert diving team

conducted underwater investigations from 2016 to 2017, recovering 12 objects, including some which were previously unknown in the archaeological record.

Excavation efforts from 2018 to 2021 marked the first deep-water excavation by divers beyond 100m of depth. The primary objectives were to further explore the cargo, ballast, and possible timber remains of the ship's hull. Developing methodologies for deep-water archaeological excavation was crucial, with a rigid grid system aiding systematic recording. Improved safety and efficiency in



© DAVE GRATION / UNIVERSITY OF MALTA

2019 built upon lessons learned in the previous year, with daily planning and ROV-assisted excavation.

### Innovative methods

The 2020 season successfully recovered a significant cargo, complete amphorae, and wooden fragments, including evidence of an early shipbuilding technique. Innovative methods like a hydraulic-powered

submersible pump and 3D photogrammetric recording expedited the excavation process. Findings included a mortise and tenon joint, which provided early evidence of this shipbuilding technique in the region.

Because of the deep depths, divers spent limited time on site (no more than 14 minutes), necessitating the use of specialized equipment to capture thousands of images daily, with mirror-

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Artifacts on display in an exhibition about the Phoenician wreck in Malta (above and left)

found at the site. It is now undergoing carbon dating and DNA analysis.

In 2021, after four years of underwater excavation, the project broke new ground in deep-water

archaeology beyond 100m. Techniques developed during this period are expected to have a lasting impact on the field.

At the end of the season, the shipwreck site was carefully protected with geotextile, sandbags and spoil material to ensure the preservation of timber remains.

Periodic checks by University of Malta and Heritage Malta divers will help maintain the site's integrity for future generations.

### First deep-sea archaeological park

In August 2023, the wreck site off Xlendi in Gozo was inaugurated as the world's first Deepwater Archaeological Park, which will enable researchers and technical divers from all over the globe to explore the history of Malta from an entirely different perspective, according to Owen Bonnici, Minister for the National Heritage, the Arts and Local Government.

For a virtual exploration of this unique site and the project, you can visit [underwatermalta.org](http://underwatermalta.org) and [phoenicianshipwreck.org](http://phoenicianshipwreck.org). ■

SOURCE: HERITAGE MALTA







# Southern Right Whales

*of Peninsula Valdés in Argentina*

Text and photos by Don Silcock





View of Peninsula Valdés in Argentina (above); A rare white southern right whale calf, nicknamed “El Blanco” (top right); Breaching southern right whale at sunset (bottom right); Curious southern right whale calf, with its mother below (previous page)

**To be in the water with a southern right whale is a life-changing experience. Don Silcock shares his adventure in Argentina to photograph these majestic marine mammals, where he was lucky enough to see a rare white calf.**

The key lies in how you enter the water... Slip over the side ever so gently and swim quietly toward them—always approach from the front, so that the mother can see you coming and assess the level of threat.

Ever vigilant of potential orca attacks and protective of her young calf, she will prioritise caution and cut short the encounter if she senses

danger. However, she is weary from the constant stress of shielding and nourishing her hungry calf and yearns for a moment of rest. Get it right, and there is a good chance she will remain stationary, permitting you to draw closer.

If you are fortunate, she might even allow her curious calf to investigate you, the unfamiliar visitor, granting you the delightful experience of playful interaction with a boisterous calf measuring about five metres in length and weighing nearly eight tons!

And if luck truly smiles upon you, that calf might just be “El Blanco”—an exceptionally rare white calf, among the marvels of Argentina’s Peninsula Valdés, which serves as the winter sanctuary for the southern right whales of the South Atlantic Ocean.

To truly appreciate the significance of such a moment, a glimpse into the history of the whaling industry and its impact on these magnificent creatures is necessary.

**The right whale to kill**

It is said that in the early 1700s, the hardy men of that era gave these majestic creatures their common name for a rather straightforward reason—they were simply the “right” whales to kill!

Distinguished by their considerable size, relatively leisurely pace, and the rich source of whale oil they offered, these whales often swam close to shore to protect their vulnerable calves, making them easy to spot. Their generally placid temperament, and the unwavering commitment of







Breaching southern right whale (left) and mother and calf (above). There are three genetically distinct species of right whales. The southern right whale (*Eubalaena australis*), predominantly found in the southern hemisphere, inhabits three main populations in the southern Atlantic, Indian and Pacific Oceans. The northern counterparts include the North Atlantic right whale (*Eubalaena glacialis*) and the North Pacific right whale (*Eubalaena japonica*). There is no known evidence of these two northern species intermingling with the southern right whales.

mothers to their slower-moving offspring, made them prime targets for whale boats hastily launched from the shore.

Even after being hunted and brought down, the density of their blubber ensured that the carcass remained buoyant, making it easy towing to shore for the horrendous process of flensing and extraction of highly sought-after whale oil.

However, as the demand for this oil surged, so did the number of whalers. By the mid-1700s, the once-plentiful North Atlantic right whale popula-

tion was in sharp decline, and shore-based whaling was inadequate to meet the escalating demand.

Much like recent years, the need for whale oil drove some major technological advancements and “Yankee” whaling ships emerged that could pursue whales far out to sea and process them on board—basically, the self-contained factory vessels of their time.

While the new whaling methods proved immensely profitable for their owners and investors in places like Nantucket and Long Island, the

impact on the whale population was catastrophic. So severe was the decline that Yankee whalers were compelled to venture into the waters of South America, Indian Ocean, and as far as Australia and New Zealand, in their relentless quest for new whaling grounds!

### Southern right whales

Much like their northern counterparts, southern right whales were prime targets for the voracious whaling fleets. By the mid-1800s, this industry had burgeoned into a multimillion-

dollar behemoth, featuring hundreds of ships, many of them powered by steam and armed with lethal gun-loaded harpoons.

Just as the northern whale populations had plummeted under this initial onslaught, so too did the southern whales' numbers dwindle to the brink of extinction by the mid-1800s, rendering them no longer commercially viable targets.

It was not until 1936 that protective measures were finally enacted, but by then, the global population of southern right whales had dwindled

to an estimated 1,000 individuals. Ironically, it was the post-World War II surge in the oil and fossil fuel industries that played a significant role in curbing the massacre of these majestic creatures, with those new industries able to meet the escalating demand for lighting, as well as petroleum-based fuels and lubricants.

### Recovery

Nature possesses a remarkable capacity for self-restoration when we humans step aside, as evidenced by the gradual yet steady recovery of





Southern right whale at the surface

the southern right whale. This resurgence has been so significant that they are now classified as “Least Concern” (LC) on the IUCN Red List.

However, the northern right whales have faced a far grimmer fate. The North Pacific right whale, with an estimated population of just 500 individuals, is currently classified as “Endangered.” In the case of the North Atlantic right whale, the situation is even more dire, with a “Critically Endangered” status and a population of around 350, including fewer than 100 breeding females.

The key distinction lies in our actions in the northern hemisphere, where we have failed to step aside. Collisions with

vessels in bustling shipping lanes and entanglement in commercial fishing gear have been the leading causes of fatalities.

**Safe havens**

The age of a deceased right whale is often determined by analysing its ear wax, revealing an average lifespan of approximately 70 years. As a species, they are known for their slow reproductive rates, with females reaching sexual maturity between eight to ten years of age and giving birth to a single calf after a year-long gestation period.

In the past, intervals between pregnancies were typically three to five years. However, recent research on northern

right whales has unveiled a concerning trend. Females are now calving every six to ten years, and there are clear indications that their lifespans have been reduced to around 45 years. This decline can be attributed to the stress induced by vessel strikes and entanglement, further exacerbating their already precarious “Endangered” status.

Safe havens have played a pivotal role in the remarkable recovery of the southern right whale. Among these sanctuaries, none have been more vital than the sheltered gulfs of Peninsula Valdés in the southern Atlantic Ocean.

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Hector Casin, designated wildlife ranger

Analysis of whaling ship logs suggests that the likely population of southern right whales before the onset of commercial whaling stood at approximately 120,000. However, due to inadequate records, the corresponding population figures for the two northern hemisphere variants remain unknown, though various estimates indicate numbers significantly lower than those of their southern counterparts.

of Patagonia, Peninsula Valdés stands as one of Argentina's most significant protected areas, encompassing a vast expanse of approximately 360,000 hectares. The peninsula is characterised by two expansive gulfs: the San José Gulf to the north and the Gulf Nuevo to the south, with a narrow strip of land connecting Peninsula Valdés to the mainland. It is a sparsely populated region, with limited infrastructure, and virtually no industrial development.

Peninsula Valdés is a dynamic landscape with shifting coastal lagoons, extensive

mudflats, sandy and pebble beaches, active sand dunes and small islands. The varied terrain offers critical nesting and resting sites for numerous migratory birds, besides hosting several endemic species of camelids and rodents.

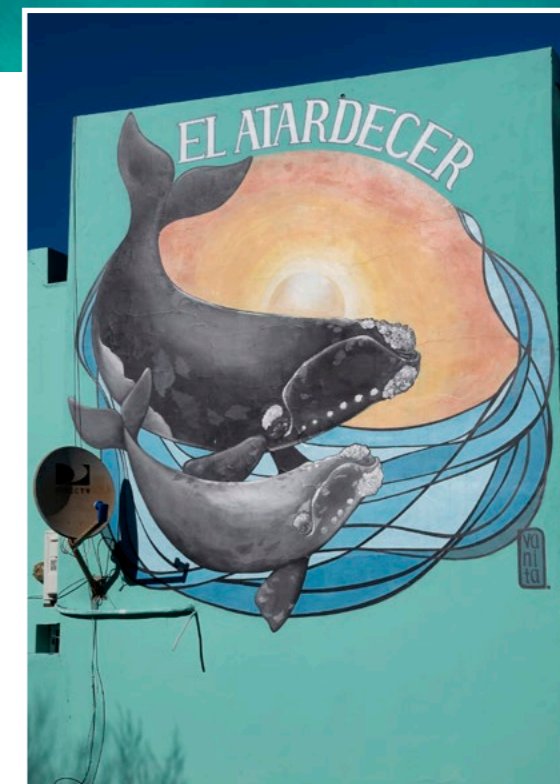
Yet, what truly sets Peninsula Valdés apart is the presence of its large gulfs, which provide a sheltered haven from the wild waters of the South Atlantic. And the unique environment serves as an almost perfect setting for the mating, birthing and nurturing of the next generation of whales, effectively contributing to the preserva-

tion of the species. With an annual visitation of more than 1,500 whales, Peninsula Valdés holds immense significance as a vital breeding ground for the southern right whale.

**Enlightened conservation**

There is much to appreciate about Peninsula Valdés, particularly in the way it is thoughtfully managed. While a single week in the area may not suffice to form a definitive opinion, it offers ample time to grasp the dynamics and determine if you are drawn to return for more—a true litmus test for being in the right place.

The journey toward recognising its unique status and how best to manage it commenced in the 1960s with the establishment of the first nature reserves. In 1974, San José Gulf was designated as a marine park, and this commitment deepened in 1983 with the creation of a comprehensive nature reserve covering the entire peninsula. Central to the overall endeavour was a special emphasis on fortifying the protection of the southern right whale, and in 1995, these marine reserves were extended five nautical miles out to sea, creating a genuine safe haven.



Street art in Puerto Piramides







"El Blanco" (The White One), a rare white southern right whale calf

Implementing enlightened conservation practices is often easier said than done, but the practical execution at Peninsula Valdés is truly commendable, with the large numbers of southern right whales serving as its primary allure. Whale watching forms the linchpin of the economy in Puerto Pirámides, the quaint town serving as the peninsula's ecotourism hub. During the season, hundreds of tourists embark daily at Gulf Nuevo to witness the mothers and their calves.

For those seeking an even more immersive experience, it is possible to enter the waters with the whales through a special permit granted by the

Argentine Ministry of Tourism and Protected Areas, while under the vigilant supervision of designated wildlife rangers. The emphasis remains on maintaining a respectful distance from the whales, ensuring minimal disruption to their natural behaviour, and safeguarding the well-being of individuals sharing the waters with these magnificent but massive creatures.

**El Blanco—the White One**

Sharing the water with large creatures is an inherently special experience, and the degree of specialness usually depends on the animal's disposition towards your pres-

ence. Some creatures may want nothing to do with you, while others seem to relish the company.

In my experience, whales tend to be quite accommodating and spatially aware. They possess an uncanny sense of your location and adjust their movements accordingly—a reassuring trait considering the potential damage their massive flukes and tails could inflict!

The southern right whales of Peninsula Valdés exhibited a similar demeanour, provided one approached them with care. Being in such close proximity to these unusually shaped giants had the potential to be



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“El Blanco,” the white right whale calf at the surface (top left); Southern right whale mother and calf (left); Curious calf (above) with mother below. Recent estimates of current populations indicate that there are approximately 500 North Pacific right whales, a mere 350 North Atlantic right whales, and a comparatively more optimistic count of 15,000 southern right whales.

life changing.

Over the course of five days spent in the water with them, encounters steadily improved as fellow divers and I gained confidence. However, it was on the final day that everything truly fell into place.

We had a premonition that something extraordinary was on the horizon when our boat crew collectively whispered, “El Blanco.” This meant that the rare white calf we had briefly glimpsed earlier in the trip had returned. White calves are exceptionally rare, accounting for just one percent of each year’s newborn whales in the area.

What made this encounter even more exceptional was that “El Blanco” was in a curious and playful mood, evidently taking cues from its mother that it was safe to investigate us. For stretches of up to 15 minutes, the calf engaged with us by approaching closely and then playfully veering away, akin to the spirited antics of a puppy.

We took every possible precaution to avoid physical contact, but even when the calf came so close that we could practically reach out and touch it, it seemed to possess an innate awareness of our presence, turning away at the

last moment.

Throughout this incredible interaction, “El Blanco” kept its tail passive, ensuring our safety. For our part, we were utterly in awe and profoundly inspired by the spectacle before us, and fear was conspicuously absent from the equation.

### In summary

In the past, both the northern and southern right whales teetered on the precipice of extinction, with their populations decimated by the relentless, industrial-scale pursuit of commercial whaling. Today, the northern variants still teeter on that precipice, their





Southern right whale adult (above). Recent estimates of current populations indicate that there are approximately 500 North Pacific right whales, a mere 350 North Atlantic right whales, and a comparatively more optimistic count of 15,000 southern right whales.

long-term prospects appearing bleak unless significant changes occur. However, the southern whales tell a different story—a tale of resilience and remarkable recovery. While there is still work to be done, the signs are undeniably positive.

The safe havens of Peninsula Valdés have played an instrumental role in bolstering the southern Atlantic Ocean population. Witnessing first-hand how these whales utilise these havens was a profound privilege. ■

Don Silcock is an Australian underwater photographer

based in Bali, Indonesia. See extensive location guides, articles and images on some of the best diving locations in the Indo-Pacific region and “big animal” experiences globally on his website at: [indopacificimages.com](http://indopacificimages.com).

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# Bonaire

*A Diver's Paradise*

Text and photos by Matthew Meier





Bonaire



Glassfish with large colony of purple tube sponges and sea rods (above); Diver and school of blue runners with large elkhorn coral formation in shallow reef (top right); Polarized school of creole wrasse fish on house reef at Buddy Dive Resort (right); License plate from Bonaire, with the official slogan, "Diver's Paradise" (below); French angelfish hovers under a large sea rod (previous page).

**A Caribbean island nestled in the Leeward Antilles, warm and sunny Bonaire is a diver's paradise with lots of shore diving and easy-to-reach fringing reefs, attracting divers at all levels who wish to explore and enjoy its beautiful reefs and marine life. Matthew Meier shares his adventure there.**

As synonymous as the slogan "Lone Star State" is to Texas, the "Great Lakes State" is to Michigan, or the "Sunshine State" is to Florida, the phrase "Diver's

Paradise" is so ubiquitous to Bonaire that it is printed on the license plates. One of the many factors that combine to make Bonaire such a paradise for divers is the island's equally iconic status as the shore-diving capital of the



world. Twenty-four hours a day, seven days a week, divers have the ultimate freedom to blow bubbles at their leisure, whenever and wherever they wish, choosing from over 60 shore dive sites, the vast majority of which are situated on the calm and sheltered leeward side of the island.

My wife and I were fortunate to visit Bonaire this past summer and experience a bit of the diver's paradise for ourselves. The civic pride the locals feel for their home country was evident as soon as we arrived. On our flight, there was a team of enthusiastic 7- to 8-year-

old baseball players who, along with their coaches and numerous family members, had traveled to St. Louis, Missouri, and finished second in a multi-national tournament. Upon our landing at Flamingo International Airport, eight

hours later than scheduled due to various delays in Miami, several hundred passionately cheering fans were there, waving banners, carrying balloons and crowding the exit, as a Caribbean steel-drum band played to honor the





Bonaire



View of cactus-filled valley from atop Seru Bentana lighthouse in Washington Slagbaai National Park (above); Flamingos forage for food in shallow waters at the edge of the mangroves (top right); Young wild donkey nursing from its mother (right); Green iguana resting in grass under the shade of a tree (far right)

players' accomplishments and welcome them home. It was incredible to witness and a wonderful start to our week in paradise.

### About the island

Located just 50 miles (80 km) north of Venezuela, Bonaire is a Caribbean island that is part of the Leeward Antilles and considered to belong geologically to the South American continent. A component of the ABC islands, along with Aruba and Curaçao, all three islands were formerly

members of the Netherland Antilles until its dissolution in 2010. Bonaire now exists as a special municipality of the Netherlands, of which nearly 80 percent of its 24,090 permanent residents are Dutch nationals. With an average air temperature of 82°F (28°C), only 22 inches (56cm) of annual rainfall and a near constant easterly trade wind, the dry tropical climate and lack of rain runoff makes for beautiful days, cool nights and clear visibility underwater, which averages 100ft (30m).



The island has a total land area of 111 sq mi (288 sq km) and stretches 24 miles (38.6km) south to north and between 3 to 5 miles (5 to 8km) east to west. Klein Bonaire, at 2.3 sq mi (6 sq km), is situated a mere 0.5 mi (800m) west of

the capital city of Kralendijk. This uninhabited islet is surrounded by a fringing coral reef, providing an additional 26 idyllic dive sites, and its sandy shoreline serves as the perfect nesting grounds for several species of sea turtles.

Juvenile green iguana among orange flowers of a flamboyant tree







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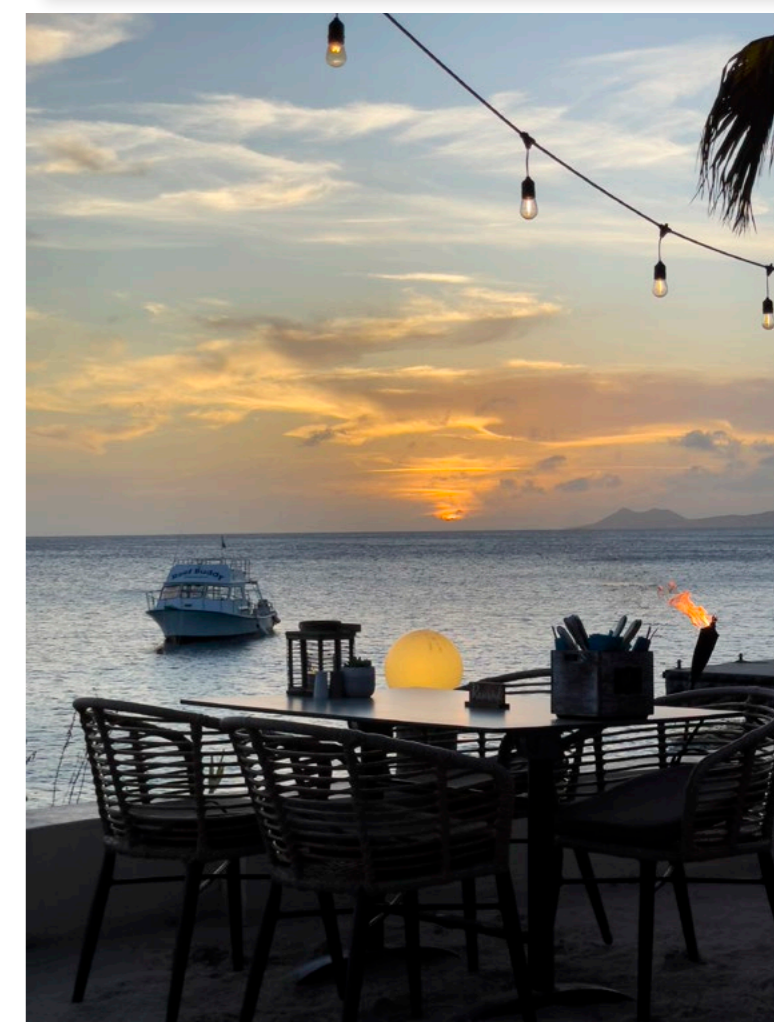
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Buddy Dive Resort viewed from the water in late afternoon light (above); Bonaire weather sign (right); View of the Caribbean through the arched opening of a balcony at the resort (center); Beautiful sunset view from the resort's dining tables at the water's edge (bottom right)



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## The resort

Our home away from home for the week was a well-appointed and very comfortable one-bedroom apartment, conveniently located near the dive shop and both on-site restaurants, with a lovely balcony overlooking the Caribbean Sea for morning coffee and spectacular sunsets. All of the resort's accommodations are air conditioned and include a kitchen, so guests have the option of preparing meals for themselves or dining out at a restaurant. We did a bit of both and definitely had fun at the local grocery

store trying to decipher product labels in Dutch, as many items were not printed in English.

Both restaurants on the property overlook the water. So, guests can sit with their feet in the sand near the pool bar for afternoon cocktails, sharing the last warmth of the sun with the numerous large iguanas that roam the grounds.

## Diving

The morning after our arrival, upon completion of a mandatory dive briefing and filling out the usual paperwork, each diver was given

a padlock for a locker in which to store gear for the duration of their stay. At which point, guests were left to their own devices to decide when and where to dive and how to spend their time. The freedom was refreshing and so much more relaxing than having to follow a rigid dive schedule while on vacation.

Diving Klein Bonaire is primarily done off a boat with many operators offering a two-tank morning dive, returning to the dock in time for lunch, followed by an optional single-tank, afternoon dive, typically to a dive site on the main island. To access the plethora of shore dive sites, a rental car can be included





Pair of honeycomb cowfish circle each other in an apparent mating display (above); Diver and large colony of purple tube sponges and sea rods (top right); Pristine common sea fan with sea rods and star coral on healthy shallow reef (right); Large purple tube sponges and orange elephant ear sponges on shallow reef (left)

as part of the booking package.

Our ride for the week was a shiny, new, manual-transmission, mini pick-up truck with an extended cab for storing our dry effects and cushioning my underwater camera housing. Our host, Buddy Dive Resort, had a unique drive-through service setup for rinsing sandy dive gear and swapping out empty for full tanks of air or nitrox, allowing for uninterrupted diving all day long, with minimal effort. For the utmost convenience, divers can suit up on the dock, adjacent to their lockers, and walk down a short flight of stairs, or giant stride into the fabulous house reef in front of the resort.

### House Reef

The sandy bottom gives way to a sloping coral reef structure, which levels out to more sand past 60ft (18m). The reef has colorful hard and soft corals, elaborate purple rope and tube sponge colonies, pristine sea fans, flowing sea rods and bright orange elephant ear sponges. We passed schools of snappers and grunts, as well as a pair of honeycomb cowfish circling each other in what I assume was a mating display. In the depths past the reef, we even found a southern stargazer buried in the sand, waiting in ambush for an unsuspecting meal to swim past too closely.





Southern stingray resting on the bottom, near the Salt Pier (below)



Caribbean basket star opens up its branches at night to collect food (above).



Dive boats moored under starlight as a diver's torch lights up the water from below on a night dive.

## Night dives

If you are a fan of night dives, the house reef offers a special experience. As always, a different set of critters emerge after dark, and it is possible to see octopus, unfurled basket stars and other nocturnal life that may have been hiding during the day.

However, the real stars of the show are the stealthy, 4 to 6ft (1 to 2m) long tarpon fish that have learned to use the divers' lights to locate food in the dark. The tarpon will swim above or alongside a diver, undetected (more often than not), and then explode out in front of the diver to grab an unsuspecting fish that had the bad fortune of being illuminated by the diver's torch. Even if you know they are there, the speed of the assault and the instant flash of silver reflecting off the enormous tarpon startles most divers into involuntary screams and gasps. On our dive, I could easily have tracked my

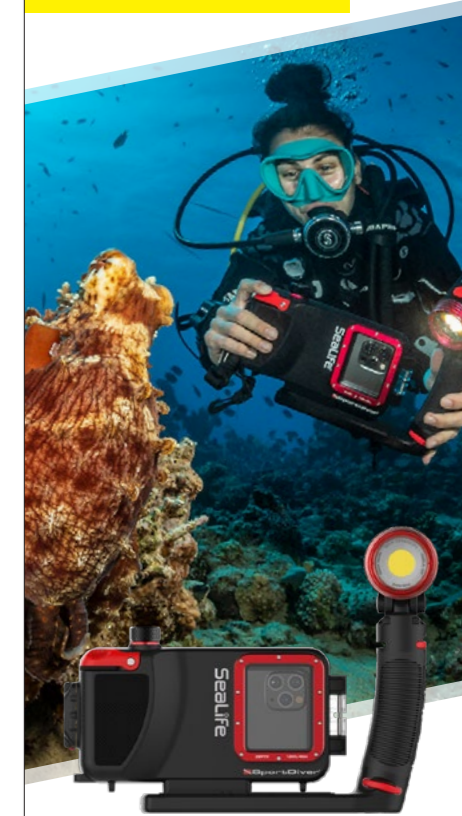
wife with my eyes closed, just by following her squeals every time a tarpon made a surprise appearance.

The flexibility to choose from boat dives, shore dives or a house reef in warm, clear waters with limited to no current makes Bonaire an attractive destination for every level of diver. There is even a thriving technical diving community for those that have the training or want to learn how to extend their bottom times or go to deeper depths.

## The wild side

For the adventurous, it is also possible to dive the eastern side of the island, known as the wild side, due to it being unprotected from the wind and waves. There are a few shore-dive sites available, but it is more advisable to venture out with an experienced operator for a boat dive. During the months of September and October, the eastern trade winds subside, making the wild

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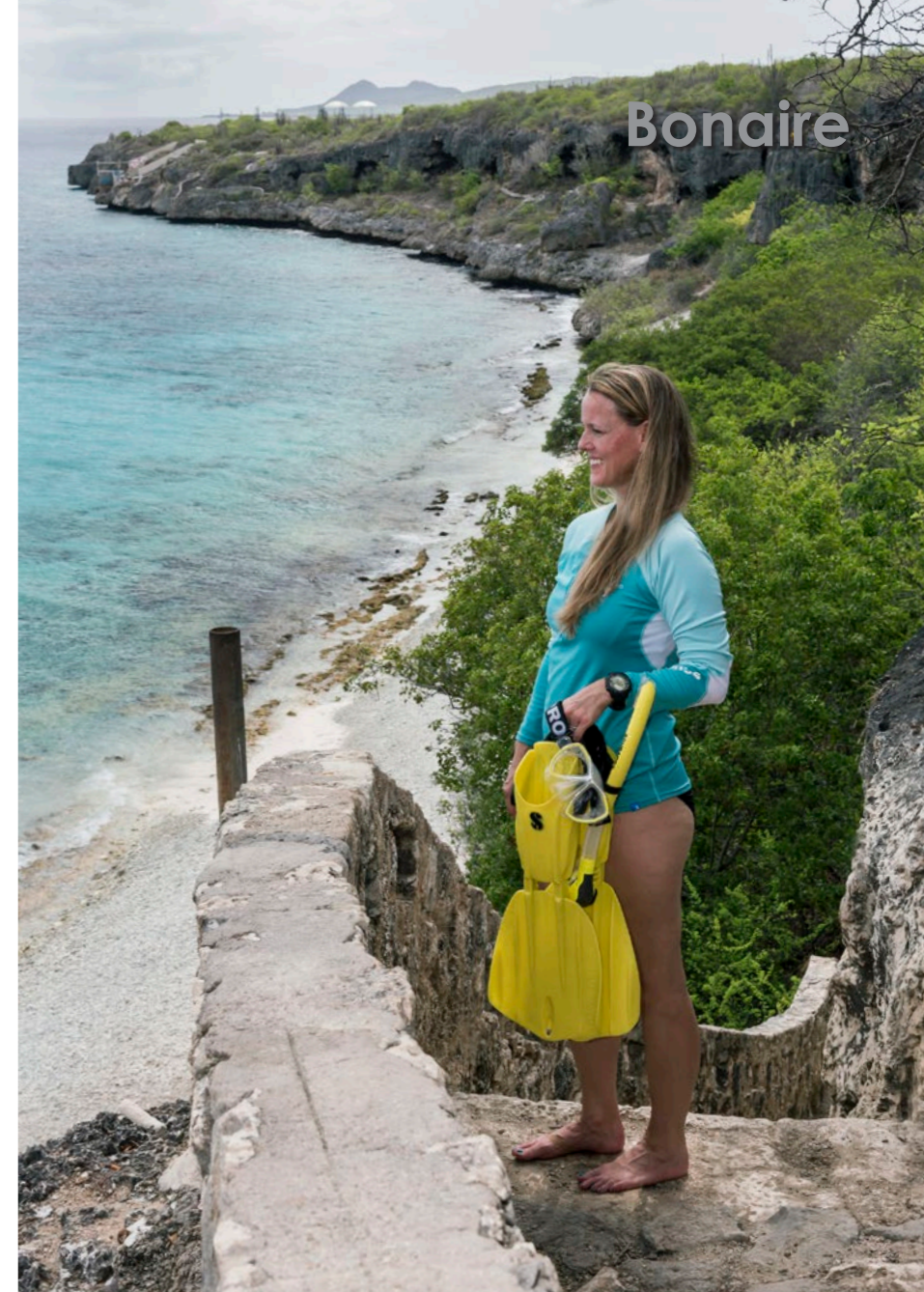
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Diver with venus sea fan on shallow reef (above)

side much easier to dive and temperatures much warmer on the island. The locals say that the fish are bigger, there are lots of sea turtles and there is a better chance to see pelagic critters, such as sharks and eagle rays, on that side of the island.

**Shore dives**

A simple, yellow, hand-painted rock, with the name of the individual shore dive, is used to designate the parking and/or entry location for each dive site, as you navigate the coastal road running along the western edge of Bonaire. There are countless resources providing specific details on what you can expect to see at each site, along with advice on the easiest places and ways to get in and out of the water.

Some entries or exits are less challenging to navigate at high or low tide, some sites have substantial stairs to negotiate to get to and from the water (i.e., “1000 Steps”—technically, only 68), while others are easy



Orange convoluted barrel sponges and sea rods (top left); Small green sea turtle descending after a few breaths of air (above); Looking out from top of stone stairway leading down to the water at 1000 Steps (top right), marked by a yellow stone (right); Goldentail moray eel (left)







Orange convoluted barrel sponges (top left) and branching vase sponges (above) growing on the pilings under the Salt Pier

**The Salt Pier.** The Salt Pier is one of the many iconic shore dives I would highly recommend during a visit to Bonaire. Topside views of the pier itself, the surrounding salt flats, multicolored evaporating pools, foraging pink flamingos and the huge piles of salt

can let you know when the pier is expected to be occupied, so you can plan accordingly. There is ample parking north or south of the pier and a rocky step down into the water, giving way to a gradually sloping sandy bottom before you can submerge.

We discovered a large school of bonefish hovering over the sand almost as soon as we got underwater, along with a pair of Caribbean reef squid, as we swam beneath the pier itself. The vertical pilings are covered with various species of colorful sponges and encrusting corals, and if you dive in the afternoon, there is a chance of piercing sun rays. We had heard tales of Caribbean reef sharks swimming amongst the pilings



Blue runners and bonefish in the shallow sandy area near the Salt Pier (above); Diver with Caribbean reef squid (left) and colorful sponges on the pilings under the Salt Pier (top right)

all the way around. Plus, with so many locations available, divers can opt to drive past a crowded parking lot and often have the next dive site all to themselves, just a little farther down the coast.

are worth the drive by themselves. Located toward the southern end of the island, the pier is still actively used to load salt onto cargo ships and is off-limits when a vessel is docked. Happily, the locals





CLOCKWISE: Threespot damselfish swimming amongst a large colony of purple tube sponges and sea rods; School of lane snappers and smallmouth grunts swimming above colonies of star corals; Numerous venus sea fans extending from the shallow coral reef; Diver inspects azure vase sponge; Spotted porcupine fish peers into the camera.

and, on this dive, personally witnessed southern stingrays and scorpionfish hiding in the sand, along with a green sea turtle munching on sponges towards the end of our dive.

**Hilma Hooker.** A half dozen dive sites farther north of the Salt Pier is the *Hilma Hooker*, Bonaire's lone shipwreck of any substantial size. This 240ft (73m) former cargo freighter had a checkered past and was purposely sunk for divers by the local authorities in 1984. The wreck now sits on its starboard side with its bow in roughly 100ft (30m) of water, situated between the double-reef system that exists at the southern end of the island. The bridge and holds are open to explore, and the propeller is still intact, all of which are decorated with colorful sponges.

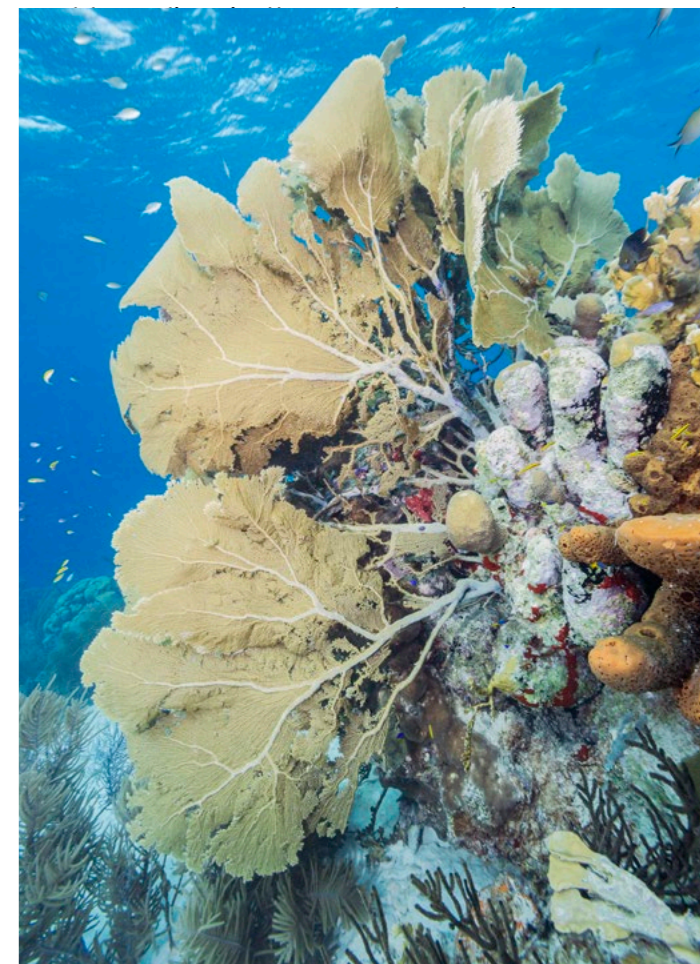
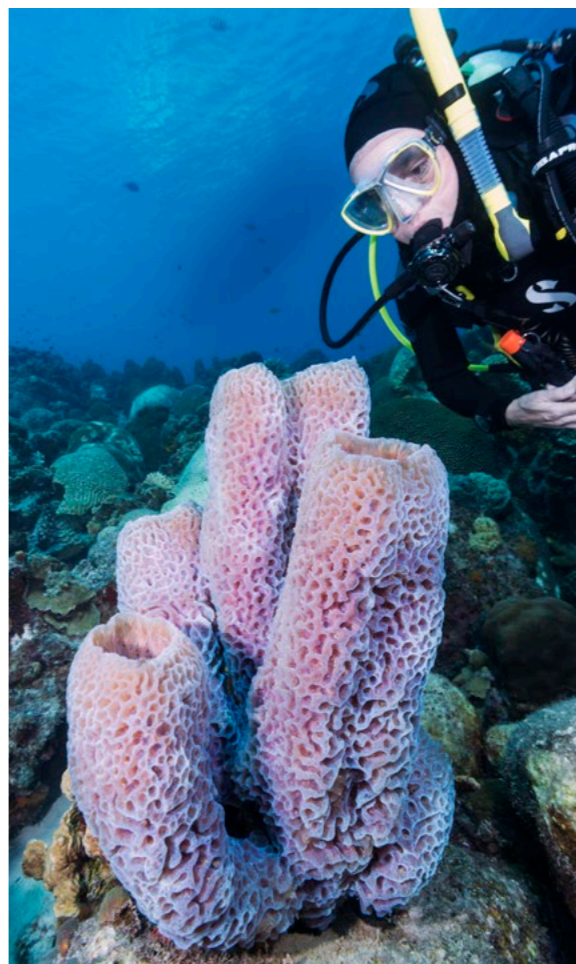
If exploring the wreck from shore, divers can make a staggered ascent and visit the inner portion of the double reef while gradually making their

way back to the beach. The *Hilma Hooker* has multiple mooring buoys and may be easier to dive from a boat, as dropping down the line without the need for a surface swim would allow for more breathing gas at depth.

**Marine park**

The locals have adopted tourism dollars as a major portion of Bonaire's economy and are fully committed to taking care of the environment that attracts its visitors. As such, the reefs, seagrass and mangroves on both Bonaire and Klein Bonaire are protected as part of the Bonaire National Marine Park, which is managed by the *Stichting Nationale Parken Bonaire* (STI-NAPA) national park foundation. The marine park was founded in 1979 and fully encircles Bonaire and Klein Bonaire, stretching from the high-water mark down to 200ft (60m), incorporating an area of 10.4 sq mi (27 sq km).

Anyone wishing to use the park



system must first purchase an annual pass, which is valid through the end of the calendar year, and agree to abide by regulations put in place to safeguard Bonaire's natural resources. For divers, those include performing a mandatory checkout dive for proper weighting and buoyancy, using a surface marker buoy, wearing reef-safe sunscreen, not wearing gloves, not using muck sticks, not touching the reef,





Pair of flamingo tongues on a purple sea rod (above); Orange longlure frogfish is camouflaged atop an orange elephant ear sponge (top center); Pair of orange Christmas tree worms growing out of a colony of star corals (right); Feathery tube worms extend out of their burrows in a grooved brain coral (far right).

lowed us to swim alongside it. We also had a nice encounter with a large school of blue runners, and one overly inquisitive spotted porcupine fish, which seemed fascinated with its reflection in my dome port. Large French angelfish were prevalent at many of the dive sites, along with schools of reef fish, such as brown chromis and creole wrasse.

**Macro life**

While wide-angle vistas are nearly everywhere, Bonaire is also well known for its diverse and abundant macro subjects. In keeping with the island's theme, brightly colored flamingo tongue sea snails (a member of the cowry family) were prevalent on sea rods and sea fans. Christmas tree worms as well as tube

worms were found burrowed into hard corals, and there was a large variety of gobies and blennies hiding on the reef. Shy and elusive seahorses could be found by a trained eye, though you might need to ask a resident expert to point them out. We even spotted

several frogfish of varying colors to match their host sponges tucked into the reef. In the shallow sandy bottom near the shore, before you even reach the reef, look for small holes that may be home to the yellowhead jawfish. The males of the species mouth-

brood their eggs, and with a lot of patience, you may get to see a mouthful of little eyes looking back at you. **Coral propagation** To further assist in the natural recovery of the island's coral reefs and expand their genetic

variety, Reef Renewal Foundation Bonaire ([reefnewalbonaire.org](http://reefnewalbonaire.org)) has been propagating and outplanting corals through active restoration since 2012. Starting with a few corals and only two small nurseries, the project has grown to include nearly a dozen partner





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Diver and large colony of propagated staghorn corals at the Jeff Davis Memorial dive site, showcasing one of the success stories of the Reef Renewal program (above); Staghorn coral trees, used to grow coral fragments until they are large enough to replant on the reef, are part of the Reef Renewal program (right); Elkhorn coral formations at Carl's Hill dive site were transplanted as part of the Reef Renewal program (far right).



dive shops, 11 species of propagating coral, extensive education and outreach programs, international research collaborators, countless volunteers, hundreds of coral nursery trees (with an 86 percent survival rate for replanted corals at six months), and over 55,000 outplanted corals repopulating Bonaire's reefs.

I photographed several of the coral nurseries on the house reef, as Buddy Dive Resort was one of the first to partner with Reef Renewal Foundation Bonaire and now offers its guests

educational programs and volunteer opportunities to get hands-on experience with the process. We also had the pleasure of visiting two of the coral outplanting dive sites, Jeff Davis Memorial and Carl's Hill, where we explored impressive expanses of trans-

planted staghorn and elkhorn corals, respectively. The Jeff Davis Memorial staghorn colony began with roughly 2,000 coral fragments, and over the past 10 years, has expanded to cover an impressive 11,000 sq ft (1,000 sq m).

**Stony coral tissue loss disease**  
Over that past decade, the reefs on many islands in the Caribbean have been experiencing an outbreak of stony coral tissue loss disease (SCTLD) since its discovery off the coast of Florida in 2014. The disease spreads rap-

idly and affects over 20 coral species, causing tissue loss, a white-bleaching effect and ultimately death for the corals. This past year, SCTLD finally made its way down to Bonaire, and so far, is affecting nine of the local coral species, primarily star, maze and brain corals.





In an effort to slow the spread of the disease and help protect the island's coral reefs, STINAPA has developed procedures for decontaminating dive gear, as well as an extensive monitoring system to keep track of each dive site's degree of infection. Divers are asked to disinfect their gear between dives and follow a stoplight system by visiting green dive sites, with less evidence of SCTLD, before exploring orange or red sites, showing greater concentrations, on any given day. The status of every dive site is updated daily and posted at each resort, as well as on the STINAPA website, along with the latest best-practice guidelines to safeguard the reefs.

We were very impressed with all of the policies in place to help reduce the risk of spreading this disease, and honestly, the little bit of extra effort in caring for our gear or planning



Sea rods, purple row pore rope sponges and orange elephant ear sponge (above); Coral nursery of elkhorn corals, small brain coral domes and sea rod colonies on shallow reef (top left); Brown and blue chromis, damselfishes, wrasses, fairy basslets, parrotfishes and grouper with star corals and sea rods (top and bottom right)





View of the cactus-filled valley from atop the Seru Bentana lighthouse in Washington Slagbaai National Park (above); Blowhole sprays water with each crashing wave along the eastern coastline of the park (left).

# Bonaire

Juvenile crested caracara bird scavenges for food on the road in the park (below); A flock of flamingos, known as a flamboyance, forages for food in the shallow waters at the edge of the mangroves (bottom).



our dive day was well worth the reward of diving Bonaire's incredible coral reefs. We would go back tomorrow without thinking twice about it, because as you can see from the photos, the reefs are full of countless healthy corals, tons of cool critters, schools of fish, fantastic sponges and vibrant colors.

### Conservation

The preservation and conservation of nature in the Netherlands Antilles began many decades ago with the creation of the STINAPA N.A. foundation in 1962, and one of its first objectives was to protect the breeding grounds of the Caribbean

flamingos on Bonaire. The Netherlands Antilles' first sanctuary, Washington Park, was also created on Bonaire in 1969, and over the next 10 years, funds were raised to purchase the neighboring Slagbaai plantation, further expanding the park in 1979 to its present form, now named the Washington Slagbaai National Park. A year later, the foundations were localized to each island and STINAPA Bonaire was born.

### Topside activities

Topside activities abound on Bonaire, making this a fantastic destination for both the divers and non-divers in the family.

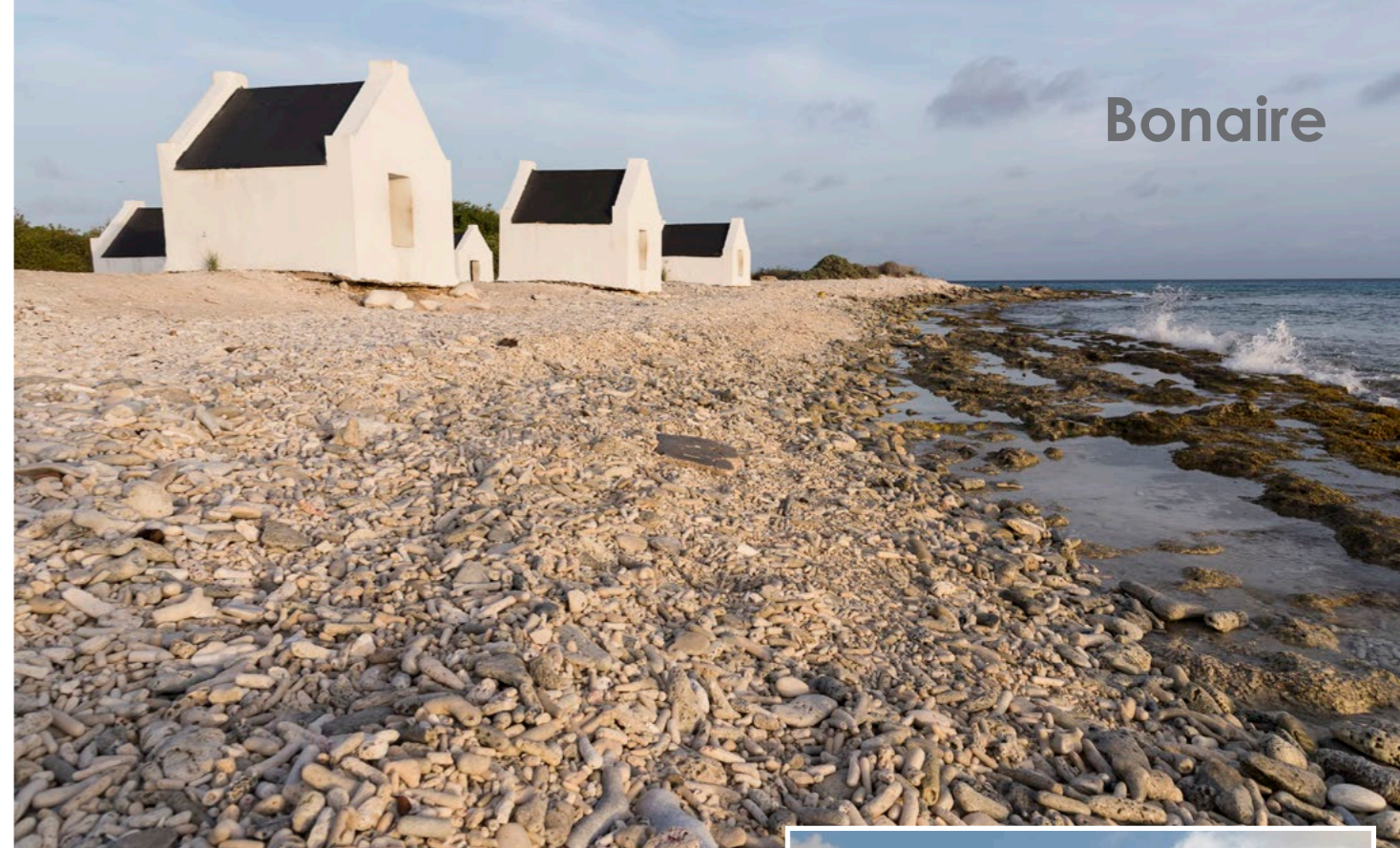
### Washington Slagbaai National Park.

At the northern end of the island, the aforementioned Washington Slagbaai National Park is a great place to get outdoors and spend the day. Take a slow drive along its dirt roads past vast expanses of cactus and brush, rolling hills, and inland lakes playing host to pink flamingos. Wild goats and donkeys roam the wilderness (and are often found on the roads), along with lizards, iguanas and several species of birds, including the crested caracara and endemic brown-throated parakeet.

**Lighthouse and salt flats.** At the far southern end of the island







Large piles of white sea salt at the Cargill Salt Bonaire production facility (above); Slave huts, constructed in 1850, were used as sleeping quarters for slaves working at the salt ponds (right).

is the Willemstoren lighthouse and the Cargill solar salt flats, which support a sanctuary for an even larger concentration of flamingos. Multiple sets of slave huts still stand here, illustrating the living quarters for the former workers, who once toiled to produce one of Bonaire's major exports—sea salt.

**Lac Bay.** Lac Bay offers windsurfing and kitesurfing, along with mangrove kayak tours; nearby is the expansive, and not to be missed, wild donkey sanctuary. There are miles of hiking and mountain-biking trails, caves to be explored, beautiful white sandy beaches and stunning reefs for snorkeling. The island has a fantastic collection of food trucks that make for a perfect snack stop between shore dives, numerous fine dining and casual restaurants, delicious ice cream shops and plenty of shopping, all wrapped up in a warm, inviting atmosphere.

We spent our last morning kayaking and snorkeling the mangroves at the edge of Lac Bay, and upon

arrival, were treated to a flamboyance of pink flamingos wading in the shallows while foraging for food in the beautiful morning sunlight. In a compound behind the Mangrove Info Center, dozens of orphaned or lost juvenile flamingos were cared for by the Bonaire Wild Bird Rehab Center. Once strong enough, the fuzzy, grey fledglings were released back into their natural habitat to rejoin the flock.

The two-hour snorkel tour was relaxing and informative, and the mangroves were fascinating to see up close. Their crisscrossing root system beneath the water's surface acts as a tightly packed maze that protects the juveniles of numerous fish species from larger predators, which are unable to fit in-between the gaps. It was a fabulous experience and a great way to start our dry day before packing to fly home.

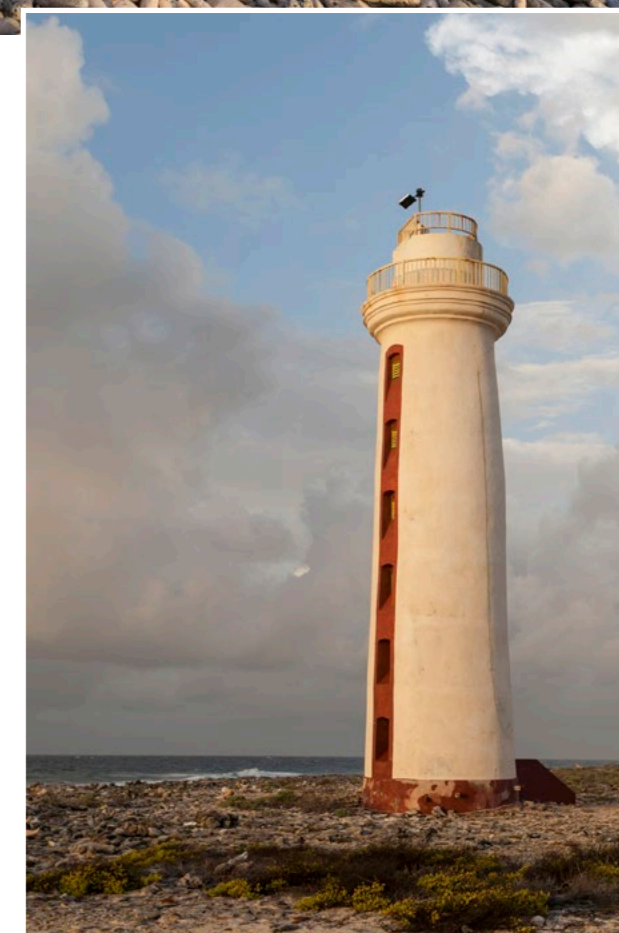
**Final thoughts**

As always, our week came to an end far too soon, and as my wife laments on every trip, "I just want one

more day!" Frankly, I would have loved to have stayed another week or longer, but sadly, that was not to be. We packed a lot of adventures into our short time on Bonaire, and I am already looking forward to a return trip. The island offers a little something for everyone, and for divers, there is no easier place to get underwater. If you have not been to Bonaire yet, I highly recommend a visit, and for those that know of what I speak, it is time for a return trip to the "Diver's Paradise." ■

*Special thanks go to Buddy Dive Resort ([buddydive.com](http://buddydive.com)) for hosting this adventure and to Tourism Corporation Bonaire ([bonaireisland.com](http://bonaireisland.com)) for their assistance with logistics and flights. The author also thanks Scubapro ([scubapro.com](http://scubapro.com)) and Blue Abyss Photo for their assistance with underwater dive and photo gear.*

*Matthew Meier is a professional underwater photographer and travel writer based in San Diego, California, USA. To see more of his work*



and to order photo prints, please visit: [matthewmeierphoto.com](http://matthewmeierphoto.com).

REFERENCES: REEF RENEWAL FOUNDATION, STICHTING NATIONALE PARKEN BONAIRE, WIKIPEDIA



# Malta

## *Protecting an Underwater Heritage*

Text and photos by Michael Salvarezza  
and Christopher P. Weaver







Octopus peers out from its lair (above); Elegant feather duster worm (top left)



Diver at the smokestack of the *El-Faroud* wreck (above); Diver at the bow of the *Rozi* wreck (previous page)

**In the waters of Malta, an island nation that sits in the middle of the Mediterranean Sea, there are deep historical shipwrecks dating back to ancient times, to the First and Second World Wars, and up to the present day. Michael Salvarezza and Christopher P. Weaver share their exploration of some of Malta's wrecks and reefs.**

The archipelago of Malta, which includes the main island of Malta and her smaller cousins Comino and Gozo, is centrally located in the Mediterranean, about an hour

by fast boat south of Sicily. First inhabited around 5900 BC, the islands have been fought over for centuries as various empires and ambitious nations lusted over their strategic importance. The Phoenicians, Romans, Byzantines, Normans and Ottomans were among the empires that had ruled these islands at one time or another, along with the Spanish, French, and most recently, the British.

During the Second World War, Italian and German forces mercilessly bombed these islands in an effort to break the will of the Maltese and force a surrender. Throughout the siege, the Maltese held firm and, indeed, Britain's King George VI awarded the George

Cross to the people of Malta in 1942 for their bravery in the face of relentless attacks. In fact, Malta includes a representation of the George Cross in the upper left corner of its national flag.

Today, Malta is an independent republic, one that finds itself seeking to preserve and protect its rich history, both above and below the water, while confronting the environmental problems of the modern world.

#### **Diving Malta's wrecks**

On an early September morning, we found ourselves descending to the wreck of the *Um El-Faroud*, an abandoned 10,000-ton Libyan tanker that was intentionally





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Divers work at the site of a Phoenician-era wreck where artifacts are carefully catalogued before removal (above); The remains of a B24 Liberators on the sea floor (top right); Engines of a downed B24 Liberators fighter plane (right)

scuttled in 1998 following an explosion while in dry dock three years earlier; the explosion killed nine ship workers. Today, the wreck sits in 120ft (36m) of seawater southwest of Wied iz-Zurrieq, near Qrendi. The wreck split into two during a bad storm in 2005. Exploring the *Um El-Faroud* got us thinking about Malta's sunken history and its program to protect it.

According to Julia Zerafa, an archeologist with the **Underwater Cultural Heritage Unit (UCHU)**, a working group within **Heritage Malta**, the mission of UCHU is to locate, protect, preserve, and eventually make accessible, deep-water historical remains in the waters of Malta. These are wrecks that

lie deeper than 150ft (50m).

The Malta Cultural Heritage Act designates any wreck older than 50 years as historical, and therefore subject to protection. Currently, there are at least 22 identified wrecks, including a 2,700-year-old Phoenician-era wreck and 67,000 square meters of Punic archaeological deposit, off Gozo Island. The latter has been made available to the public as the Xlendi Underwater Archaeological Park. Other wrecks include dozens of aircraft crash sites, submarines and battleships from the First and Second World Wars.

"Once a wreck is identified as archeologically important," Zerafa

said, "a buffer zone is implemented around the site. Fishing and anchoring are prohibited."

Heritage Malta divers are tasked with documenting the wreck site, and while the sites are strictly protected, some artifacts are occasionally removed for study and are eventually displayed in museums. Making the shipwrecks accessible goes much further than just displaying a handful of artifacts. Heritage Malta is committed to a program of using virtual reality headsets and other tools to provide access to schools and the general public, to connect people to the submerged history of the country. The deep-water wrecks are also made

available to the general public by means of a "virtual museum," which is accessible at: [underwatermalta.org](http://underwatermalta.org).

"Taking people to sites they cannot see for themselves is like taking them to a new world," said Zerafa.

Recreational and technical divers are permitted to explore these wrecks as long as they arrange their dives through one of the dive centers on Malta that are specifically approved to visit these sites. To become certified





Diver hovers at the stern of the P29, a patrol boat that was intentionally sunk (above)

to visit these wrecks, the dive center must commit to certain protocols and be educated on the parameters set forth by Heritage Malta.

**Historical heritage**

Travelling anywhere in Malta will expose the visitor to the fascinating history of these islands. This history extends under the clear waters of the Mediterranean, and the work that is involved to protect that history is emblematic of the pride that Malta takes in its own heritage. But it is more than that.

“In the case of World War II, for example, the immediate relatives of people lost on these ships and planes are still alive today. They are not only historical wrecks

but also war graves. Our work is about more than pride; it's a moral obligation,” said Zerafa.

**Ċirkewwa**

Our next dives took us to Ċirkewwa, a popular shore-diving spot for recreational divers. Here, there are a number of accessible dive sites, including two small purposely sunk vessels—the P29 patrol boat and the Rozi tugboat. We were here to explore the reefs along this area, which feature walls of tumbling boulders, small tunnels and swim-throughs, and a beautiful natural underwater archway.

Despite the fascinating geological formations, we were interested in the marine life. All along these

reefs are dense beds of seagrass, an important part of the local ecosystem. Flitting around the seagrass were several species of bream, the colorful ornate wrasse and the European parrotfish, which appeared dullish brown until the flash from our strobes revealed a brilliant red coloration.

Looking towards the sandy bottom, red mullet could be seen foraging for food and stirring up clouds of silt. In the rocky crevices, hordes of small cardinalfish hung still in the water and an occasional Mediterranean moray could be seen.

What we did not see were large schools of fish, nor did we spot anything big. An occasional jack would fly by, but other



TOP TO BOTTOM: Two sponges in an embrace; Colorful Mediterranean parrotfish; Common two-banded seabream

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Dense beds of Neptune grass are often described as the “lungs of the sea” in Malta (left); Snails can often be found in the sea-grass beds (bottom left); *Cratena peregrina* nudibranch (below); Sponges are an essential part of healthy ecosystems (right); Scorpionfish lies in wait for prey (center right); Brilliant red sea star on rocky reef (bottom right);



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than that, the largest fish we came across were the dusky groupers. We wanted to investigate further and learn more about Malta's marine environmental protection efforts.

**Environmental protection**

The **Environment and Resources Authority** (ERA) states that their mission is “to safeguard the environment for a sustainable quality of life.” This mission extends to the waters around the archipelago. With a rapid push towards development and the growth of the tourism industry in Malta, this mission is a challenge.

According to Bart Romanczuk from the ERA, Malta has the larg-

est amount of Marine Protected Areas (MPA) relative to the size of the country, with about 35 percent of the waters protected. “We have excellent cross government participation in this program, including from the Army, Navy, Heritage Malta, the Police and others,” reported Romanczuk.

The ERA has built an extensive permit system. Yasmin Clark, also from the ERA, said that “permits are required for virtually any activity within an MPA, ranging from development activities to beach cleanups.” Permits are designed to control the impact on activities in these areas.

**Protecting threatened species**

Despite all of these measures, there are significant challenges facing the ERA. Several species of marine fauna are threatened or endangered, including loggerhead sea turtles, which often come ashore in Gozo to lay eggs.

Some areas within the MPA zones were specifically created to protect beds of seagrass known as Neptune grass, which are important habitats for coastal biodiversity. The seagrass is often referred to as the “lungs of the sea,” and it is critically important as both a carbon sink and a gen-

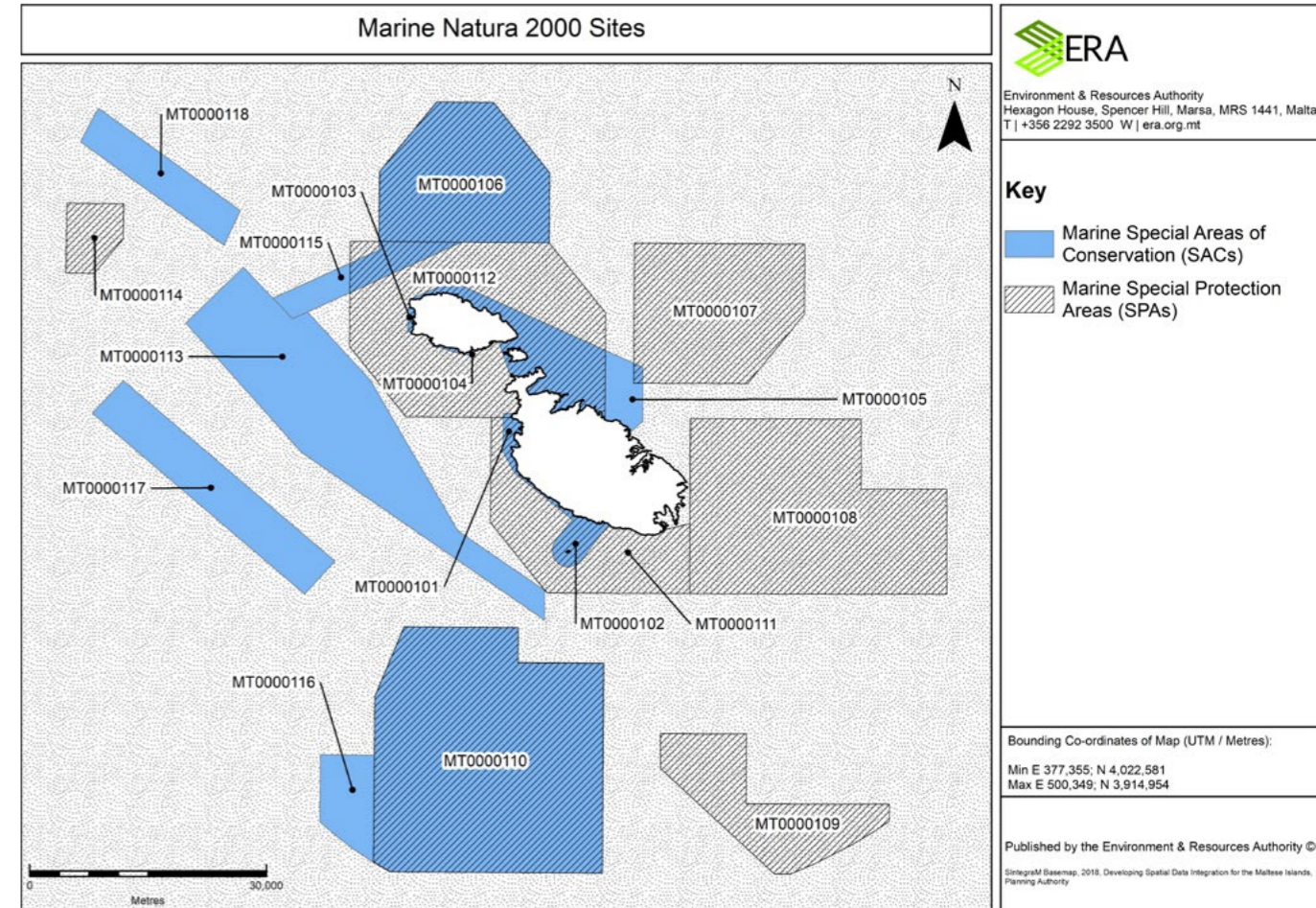
erator of oxygen in the water. The Maltese top-shell, a protected gastropod endemic to these waters, is found in these beds of seagrass.

In addition, sites have been included that are important to the loggerhead sea turtles, bottlenose dolphins and three species of seabirds—the Scopoli’s shearwater, Yelkouan shearwater and European storm petrel. The populations of these seabirds found in Malta





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are significant. Fully 10 percent of the global population of Yelkouan shearwaters find their way to Malta, as do three percent of the world's population of Scopoli's shearwaters. The European storm petrel breeds extensively in Malta, with 50 percent of the Mediterranean population found on the archipelago. Malta's approach to MPAs protects both the cliffs that the birds nest in and the waters they forage in.

Indeed, the MPAs are designed to cover a diversity of habitats, ranging from the seagrass beds to reefs, caves and sand banks. Because Malta is a member of the European Union, the MPA approach in Malta is designed to fit with the larger

directives from the EU. The Marine Strategy Framework Directive (MSFD) aims to protect more effectively the marine environment across Europe, including the Mediterranean. The MSFD was adopted on 17 June 2008, and each member state is required to develop a strategy for its marine waters. Malta's efforts align with these objectives.

Still, the ERA's ability to enforce regulations and protections is limited. They are actively looking to engage divers and citizen scientists to help monitor and measure the health of the various marine environments.

**Invasive species**

One of the most worrisome threats

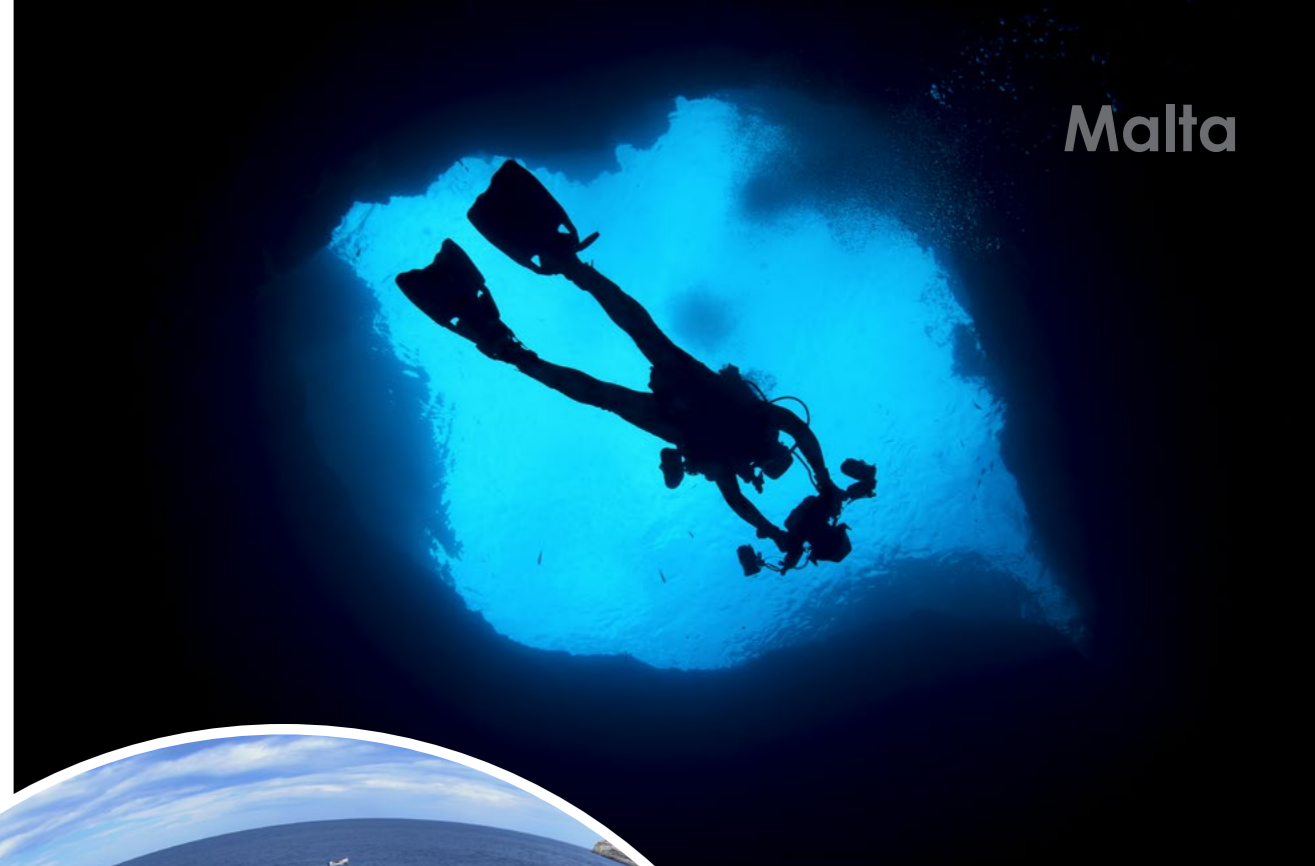
to the health of Malta's waters is the rising migration of invasive species arriving from the eastern Mediterranean Sea. Fish, jellyfish, prawns and other marine species are moving in, their movements fueled by warming waters and human activities. In fact, more than 1,000 non-indigenous species have been identified in the Mediterranean and the Black Sea. As in the Caribbean Sea, one inter-loper is the lionfish, a voracious predator that has migrated from the Red Sea and has the ability to decimate local fish populations.

Another group of organisms that are finding their way into Malta's waters more frequently are various species of jellyfish. As the waters

The purple mauve jellyfish is an invasive species that packs a potent sting (top left); Inside one of the ancient temples, dating back to 5000 BC, protected by Malta's government (top center); Historical fortification wall around the city of Valletta (top right); Map of Malta's marine protected areas (above); Wreck site of a Phoenician-era ship (center)

COURTESY OF MALTA ENVIRONMENT AND RESOURCES AUTHORITY





Diver (above) descends into the Blue Hole of Gozo (left); The dramatic cliffs of Malta (far left)

of the Mediterranean warm, jellyfish are migrating west into the central parts of the sea. Of these, the mauve stinger is of more concern, as it packs a nasty sting and can be dangerous. Larger populations of other species, such as the fried egg jellyfish, have been spotted; however, the fried egg jellyfish is beautiful and does not sting.

As with much of the world's marine environments, waters are warming, and marine ecosystems are changing as a result. Malta is no exception.

### Blue Hole

Our final dives were on Gozo, at a place known as the Blue Hole. Here, we descended into a vertical tunnel, with the divers above us silhouetted against the brilliant blue surface waters. Inside this unique site, we mar-

veled at the geology of this place. Outside the structure along an open wall of rocky boulders, we swam over the geogenic reefs and searched for marine life. Ironically, here among the large outcroppings of rock and stone, we spotted some of Malta's smallest jewels—the nudibranchs.

These flamboyantly colored relatives of snails stand out from an otherwise drab background. Underwater photographers travel the world to find them, and they are so beguiling that one of the local dive centers, Dive-Wise, has an instructor who is developing an entire PADI Specialty Certification course on nudibranchs.

We watched as a brilliantly blue *Paraflabellina ischitana* nudibranch struggled to creep forward in the moving water, its frilly appendages waving

furiously in the swell. The determination of the small sea slug seemed an apt metaphor for Malta itself.

### Facing challenges

Unconquerable through the ages, Malta has always risen to meet the challenges it has faced. Today, the country simultaneously seeks to modernize and rapidly develop, endeavoring to grow into a modern, cultural center of the Mediterranean, while preserving, protecting and honoring its past history.

Sometimes, these objectives are at odds with each other. The efforts to protect historical shipwrecks for

future generations are laudable and a model for other countries with similar sunken legacies in their waters. But balancing the needs for protec-

tion and access can be a challenge. The inherent difficulty in protecting marine environments from the significant threats brought by human activity, climate change and the loss of biodiversity can be daunting. Malta will need to be as determined and resilient as it has been in the past when facing threats to its islands while fighting these issues.

For us divers, Malta's waters have a magical quality. We are confident that Malta is poised to do all it can to preserve its marine resources. ■

*Michael Salvarezza and Christopher P. Weaver are underwater photographers based in New York. For more information, visit: [ecophotoexplorers.com](http://ecophotoexplorers.com).*





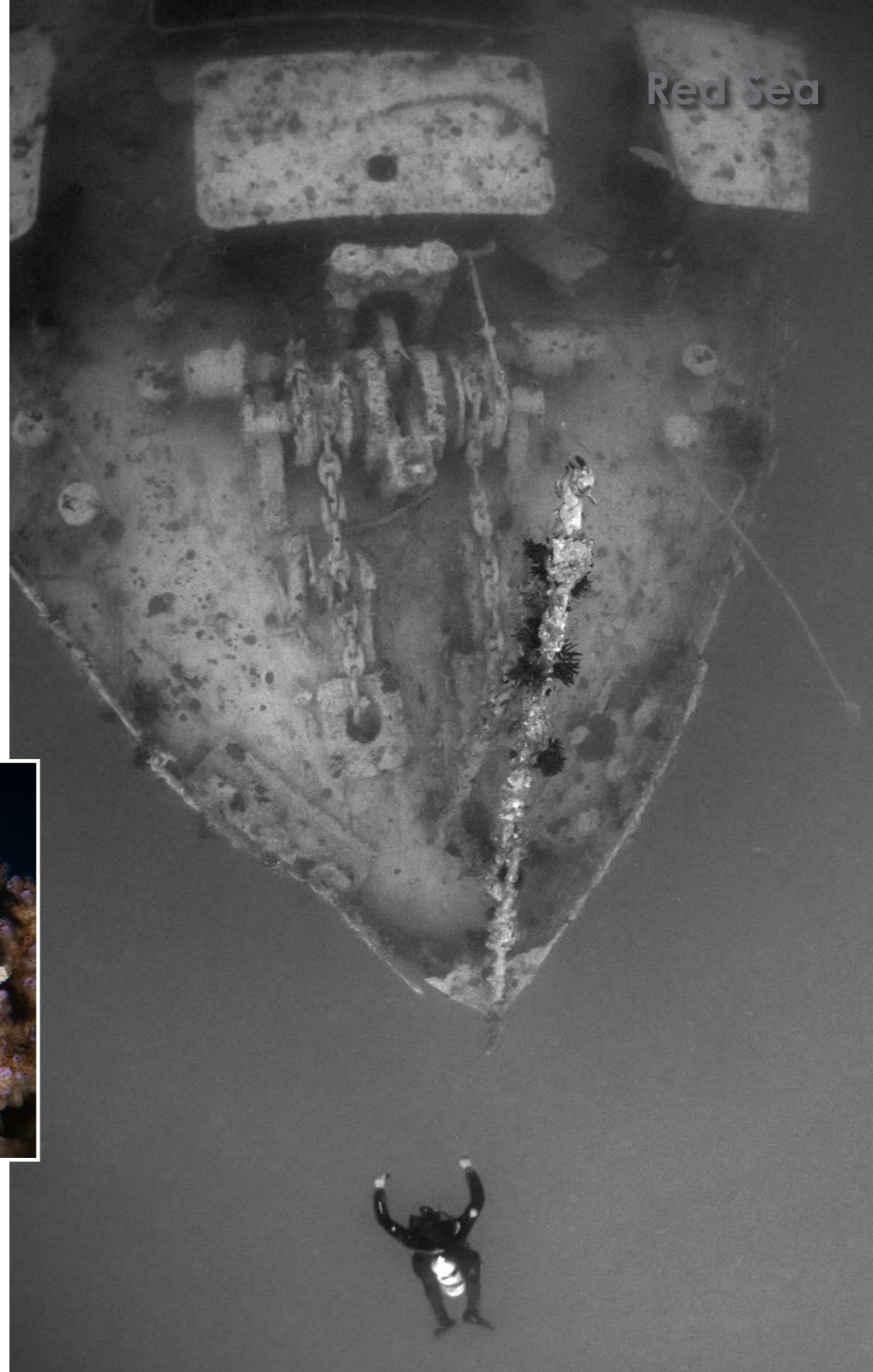
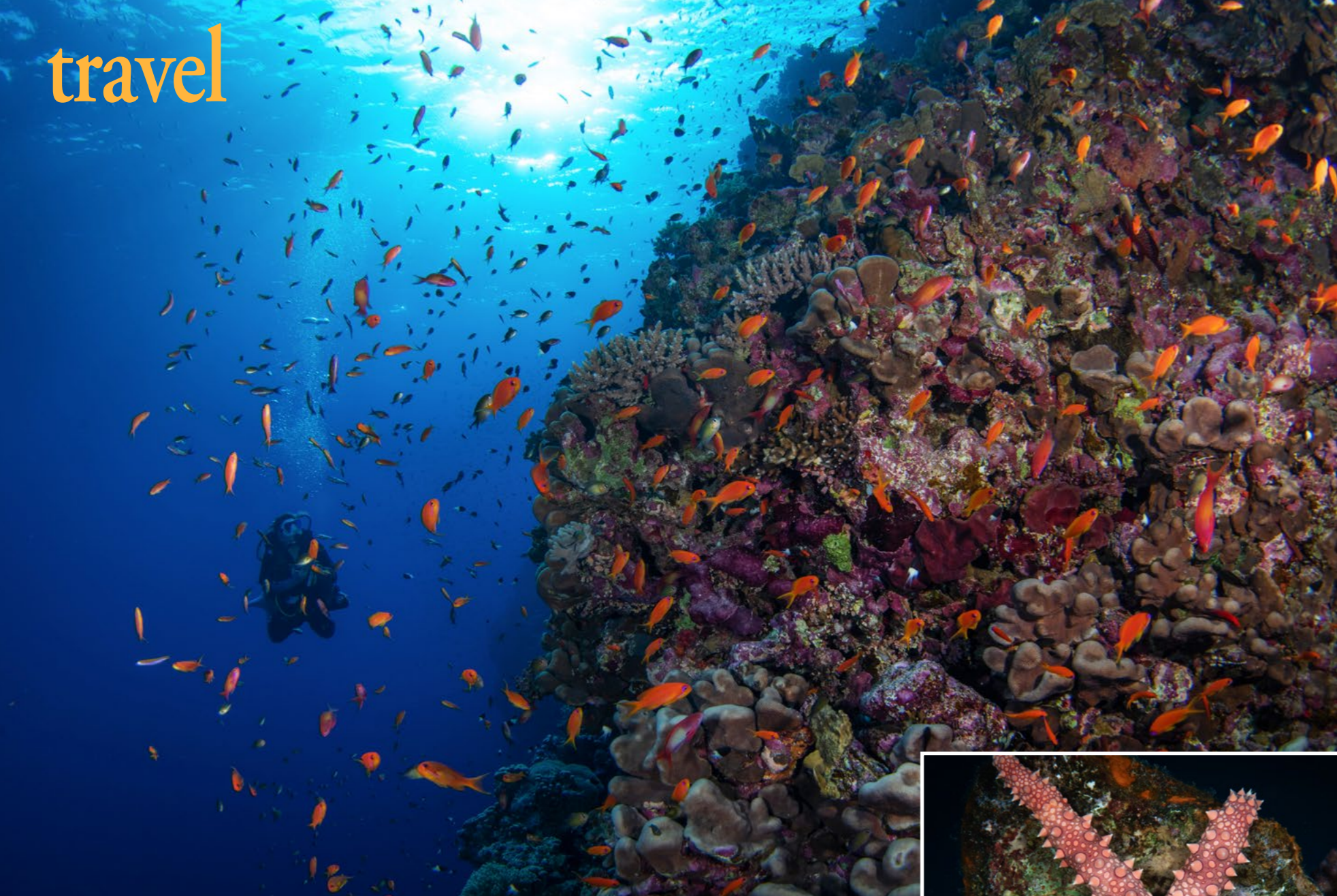
# Red Sea Safari

*Wrecks, Sharks & Luxury*

Text and photos by Brandi Mueller







Red Sea



Diver on wall with anthias and chromis (above); Oceanic whitetip shark (previous page)

**The Egyptian Red Sea offers divers beautiful reefs with plentiful marine life as well as wrecks to explore and photograph. Brandi Mueller takes us on a liveaboard safari that starts in Hurghada.**

Like on most liveaboards, my tank had been refilled and was standing at my designated spot on the dive deck. I retrieved my mask and fins from my bin below my spot on the bench and had them ready for the dive. My wetsuit had been hung above my station during the surface interval, but now

that it was dive-time, the hard-working crew had removed it from the hanger, reversed it back so it was no longer inside-out and laid it over my gear. After climbing into the wetsuit, I unbungeed my tank and put my arms through my BCD straps, with the assistance of a crew member (who had been standing by, waiting to help). I buckled it and started my pre-dive mental checklist.

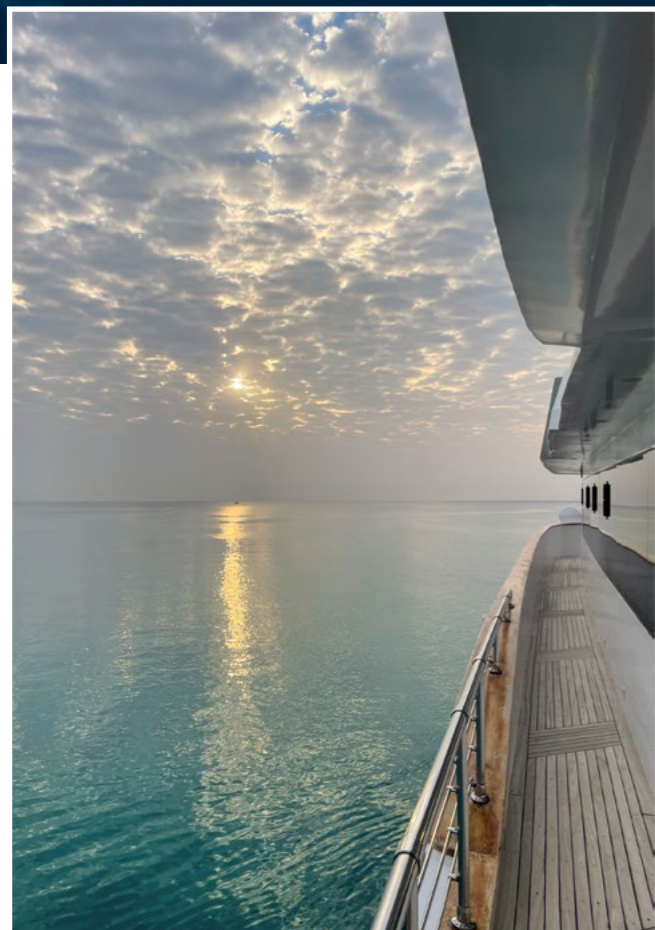
Dive computer was on my wrist, mask, fins, weights... weights! I felt for my weight pockets, and they were empty. Thoughts ran through my mind about where I had them last. After

our previous dive on the fast boat, I had passed up my weights before the tank, and I was supposed to get them from the back deck when we got back. I had forgotten. My eyes had gone to my waist as I felt the empty spaces and when I moved my head back and looked up, Mohammed was

Diver at the bow of the *Rosalie Moller* wreck (above); Egyptian sea star (center)







standing in front of me, weight pockets in hand, as if he were presenting me a gift.

After a dive trip, it is often the case that I find myself reporting that the attentive crew seemed to anticipate divers' needs, even before the divers knew what they needed. But the crew of the *All Star Scuba Scene* take this to a new level. Never before have I realized I forgot something, only to look up at that moment and have a crew member appear with it before me. Plus, weight pouches are usually not very unique and hard to tell from others (mine included)—how did he know they were mine? Even if I had been the only one who had forgotten to pick them up, how could he tell I did not have them in my BCD already? The fantastic crew of the *Scuba Scene* work in mysterious ways.

### Oceanic whitetip sharks

Weight pockets in place, I finished my pre-dive check and jumped off

the back of the stylish teak deck of the 157ft (48m) liveaboard. It was December, and the clear waters of the Red Sea were starting to cool off, but I was cozy in my 5mm wetsuit and hood.

The dive plan was to swim along the wall at Big Brother Island and descend down, near a plateau before the deep drop-off, to look for sharks. Hammerheads, threshers and gray sharks were all a possibility, as was the focus of my attention, the oceanic whitetip sharks. This species tends to be found closer to the surface, though.

Along the wall, thousands of bright orange anthias made the reef look as if it were moving, and there were more cornetfish than I had ever seen in one area before. Their long, silver, pipe-like bodies were like gleaming lines patrolling the reef in groups. I headed down to nearly 110ft and looked out into the blue, spending about ten minutes there before giving up on the deeper sharks and heading

back to shallower depths in hopes of seeing oceanic whitetip sharks.

I was hoping to get a photo of an oceanic whitetip shark worthy of Dr Elke Bojanowski, our onboard shark expert and the founder of Red Sea Sharks; she was also our cruise director for the week. Studying sharks for over 20 years, one of her projects was using photos (collected over

many years) to identify individual sharks. In an onboard presentation, she told us how oceanic whitetip sharks can be identified by unique markings on their fins. The goal was to get photos of both sides of the shark's dorsal fins, pectoral fins and tail. With these, she could match them with where the shark had been seen before.

Sunrise on the Red Sea (above); Oceanic whitetip shark with pilot fish and remora, swimming overhead (above); Cornetfish patrol the reef in groups (right).







Cleaner wrasse risks its life getting into the mouth of a moray eel, to clean its teeth (top left); Healthy and abundant corals in the Red Sea (above); Red Sea or two-banded anemonefish in anemone (left)

come closer. It seemed to approach by circling in, close to the divers, and then circling back out. It would then return, a bit closer,

for another circle around us.

Then, I noticed it was coming straight for me. With camera ready and a quick check to make sure I was in the right position, the shark approached within a few feet of me. Shots were snapped, and I hoped I got something good.

Back on board, I was excited to share my images with Dr Bojanowski and maybe add one more photo to her collection for science. This is one of the many ways that we, as divers, can be citizen scientists and help researchers around the world.

It may be a small thing, but lots of small things add up to big things.

During shark season in the Red Sea, Dr Bojanowski hosts Shark Week trips where divers have a normal week on the liveaboard but also have nightly shark presentations, and the boat visits the dive sites getting the most shark action. Divers are encouraged to share their photos of sharks from the Red Sea with the Red Sea Shark trust, no matter which boat they dive from, what time of year, or which dive site.

### The liveaboard

Our week started out in Hurghada, which I had reached relatively easily with a flight from Brussels in Belgium, and a flight from Chicago before that. The boat, which can hold up to 26 divers, had quite a few cancellations due to situations

happening in nearby countries. But in Egypt, things did not seem to be any different, albeit with the same impact one may have experienced at home. We visiting divers had all watched the news to get updates and learn about the conflicts but did not see them directly affecting us. The cancellations meant that the already massive boat had even more space for each of us.

The *Scuba Scene* is one of the largest liveaboards in operation and also one of the newest. It started trips in the spring of 2023. It is so big that in my jet-lag haze on the first night, I could not remember how to get to the dining room, after our initial tour. There are five deck levels starting with a massive, partly shaded sundeck at the top, with a hot tub and tons of seating space. The next level down has more sun and

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Lifejacket demonstrations during the safety briefing (above); Divers on safety stop (right); Divers gearing up in the fast boat, with the Scuba Scene liveaboard boat in the background (lower right); Dive guide, Ata, blowing bubble rings on a safety stop (left).

also on that level. Next was the level where the majority of the cabins were located, as well as the dive deck. Below that was the dining room.

Usually, cabins end up in that lowest “below-deck” level. I really appreciated the change in the normal layout on this vessel. With recent tragic liveaboard events, it makes so much more sense that the sleeping quarters are above the water line. If something were to happen, it would most likely take place at night, and the higher up that sleeping people are, the better. If something were to happen at mealtime, people are more alert, and it would be easier for them to find their way through escape routes.

**Safety**

Which brings me to safety on

the Scuba Scene. The safety briefings on arrival and the first morning were some of the best and most thorough that I have seen in all my years of diving on liveaboards. I respected how applicable they were to the specific boat. Instead of just stating that there were emergency hatches in certain places, they used photos and videos to show the exact escape routes and encouraged us to check them out. We also found life jacket locations and had to demonstrate that we knew how to use them.

One thing that really stood out was that the night watch (which is obviously mandatory) were held accountable in doing their duties with the use of QR code stickers throughout the vessel. When the night watch did their rounds, they had to take a photo, which



would have a time stamp, of each sticker to prove that they actually went everywhere. One would never expect crew members to not be doing what they are supposed to, but this sort of verification makes it tough to cut corners, and there is documentable proof of safety. I thought this was a great idea and a high standard that other companies should implement as well.

**Diving safely**

I also noticed how our first day of diving was set up to train us on how to dive on this specific boat and to be safe while diving. As we would be doing dives from the main ship as well as from the two fast boats, our first dive was off the back of the liveaboard. The crew



requested that we do weight checks upon entry, and at the end of the dive, deploy our SMBs to make sure we were comfortable doing so.

One thing people do not

always talk about is how an empty scuba cylinder can change one’s neutral buoyancy. Here, the crew brought this to our attention and said we should finish our dive with our





Dolphins photographed on the checkout dive, with a 105mm macro lens (above); Anthias and chromis on reef wall (right)

tanks low (750psi/50bar) and check our weights to make sure we could stay down for a safety stop, comfortably.

Our second dive was from the fast boats. Again, it was a great way to practice and learn the liveboard's method of diving from the skiffs in easy conditions, so that on future days, when there might be choppy or strong currents, we would be comfortable doing so.

With lots of help from the crew (I swear they would carry us to the skiffs, if we asked), we got into the fast boats, and the crew helped us put our fins on. Arriving at the drop location, we put on our masks (I tried to

dunk my mask over the side of the boat, but a crew member stopped me and did it for me), then on the count of three, we back-rolled into the water.

When the dive was over, we passed up our weights first, then our gear. With assistance, we climbed up an easy ladder and sat back in the fast boat. Then, we were offered water and dates during the short ride back to the liveboard where we were met with juice and warm towels. I kept thinking that I had better not get too used to all this service!

On some dive boats, "checkout dives" can end up being at dive sites

that may not be so great. Assuming this, I put on my macro lens (there is always something macro to shoot), and our first dive was a lovely reef near Hurghada.

I was right below the boat, checking for critters in small reef clusters in the sand, when I looked up to see a bottlenose dolphin almost staring me in the face. It was one of those typical photographer-moments, where I thought, "It figures, I've got the macro lens on!" But I took a few shots with my 105mm lens anyway.

About six dolphins encircled us and stayed almost five minutes, giving everyone a great look at them. So

much for the checkout dive being mediocre!

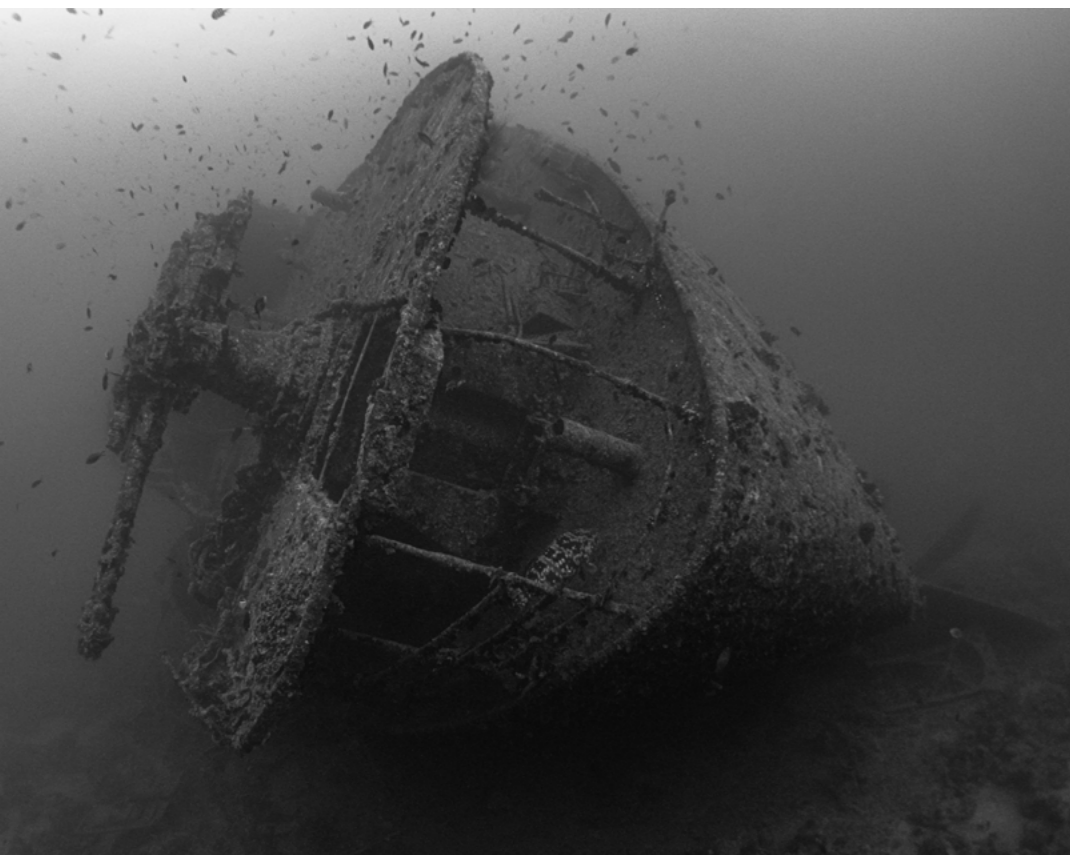
### Heading north

Our itinerary on this trip included wrecks and reefs. After our day of diving the Brothers Islands, the liveboard headed north overnight, to

add a few wrecks to our dive list. The WWII British SS *Thistlegorm* was one of the wrecks we visited, and I had been lucky to dive this amazing wreck before.

The devastating loss of the ship occurred in October 1941, after making its way from Britain, the long way





The stern of SS *Thistlegorm* (left); Goatfish on the *Thistlegorm* (above); During the photo shoot, a backlit diver hovers over blackbar soldierfish and sweepers swarming over motorcycles on trucks in a cargo hold on the *Thistlegorm* (right)

aircraft found it first and dropped two bombs on the stern of the ship, sinking it.

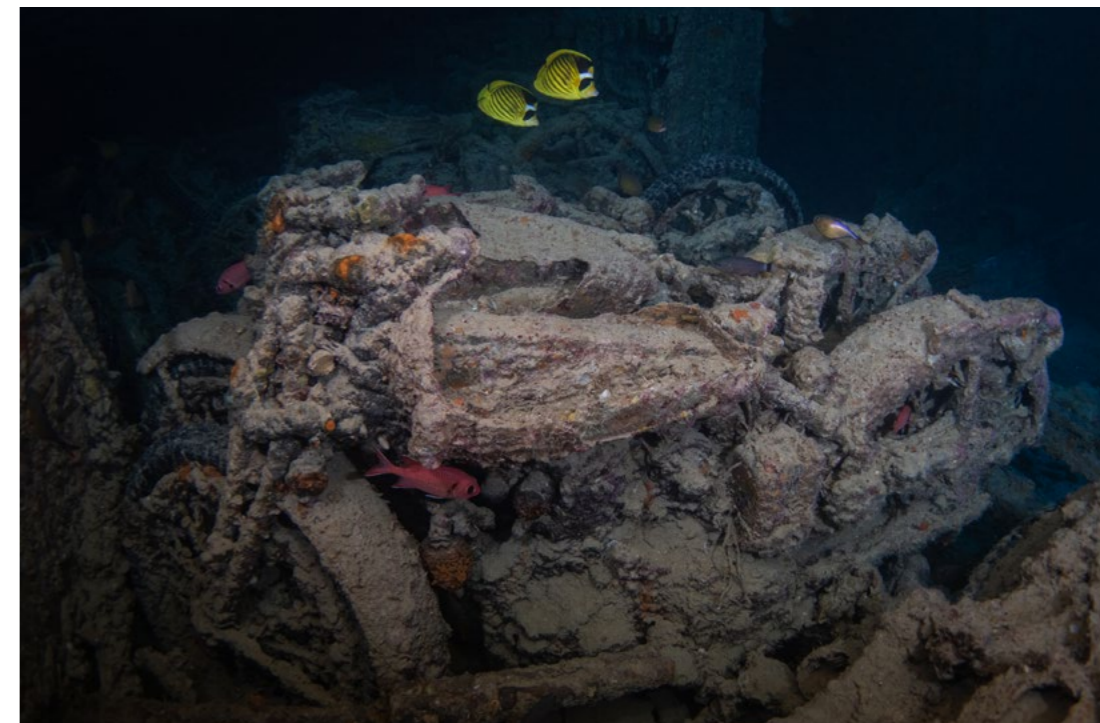
This ship is now an underwater museum of artifacts of the time, my favorite being the dozens of BSA motorcycles sitting in the beds of Bedford trucks. Since my last trip, I had been envisioning a photo shoot in one of the cargo holds with these trucks and motorcycles, so I convinced a few of my new dive friends to join me.

My plan was to set up off-camera lights, at least three 15,000 lumen Kraken Sports video lights, as well as having my divers "butt light" each



other. This is where you swim right behind a diver, and with a very bright light, try to illuminate the diver from behind.

With my dive models, we discussed this whole plan. It started with me entering the cargo hold to set up the off-camera lighting and the models waiting until I was done, to try and reduce sediment falling from the ceiling from bubble disruption. Once I was ready, I would signal them in, and they would go to the opposite corner and swim towards me, one lighting the other. Once they reached me, they would pass the light and switch places and do it again. If it worked



Red Sea racoon butterflyfish over motorcycles on trucks in the *Thistlegorm*

around; the ship had traveled all the way south, past the horn of Africa and back up the coast into the Red Sea. When approaching the

Suez Canal, the entrance had been blocked by a collision, and the ship anchored until it was possible to enter the canal. Unfortunately, German



# travel

Under the boat was a flag, confirming that we were coming back up on the correct ascent line (right); Photo shoot in cargo hold of *Thistlegorm* where a diver swims over motorcycles on trucks (far right)



the first time, we would be finished, and I would collect the lights. We also had a signal if we needed to do it again and what to do if the models needed to end the dive.

Underwater, our plan worked almost like clockwork. We only had a few hiccups with other divers swimming through our scene. But overall, it went great. Once we were finished, I grabbed the lights and still had some time to explore a few other cargo holds and photograph more motorcycles. It is always really nice to have divers will-

ing to help out with images like these, and hopefully they find their time worth it for the results.

As I made my way back to the line connected to the stern of the *Scuba Scene*, I looked up to confirm that I was on the right ascent line by looking for the *Scuba Scene* flag, which hung below the boat. Often, popular sites like the *Thistlegorm* receive many boats at one time, and they end up tying off together in a mess of lines. It would be easy to go up to the wrong boat, and trust me, I wanted to return to our boat for hot towels!



I saw our boat's flag and also noticed a massive school of batfish above me. During my entire safety stop, they hung out in a school right next to me.

### Service and beyond

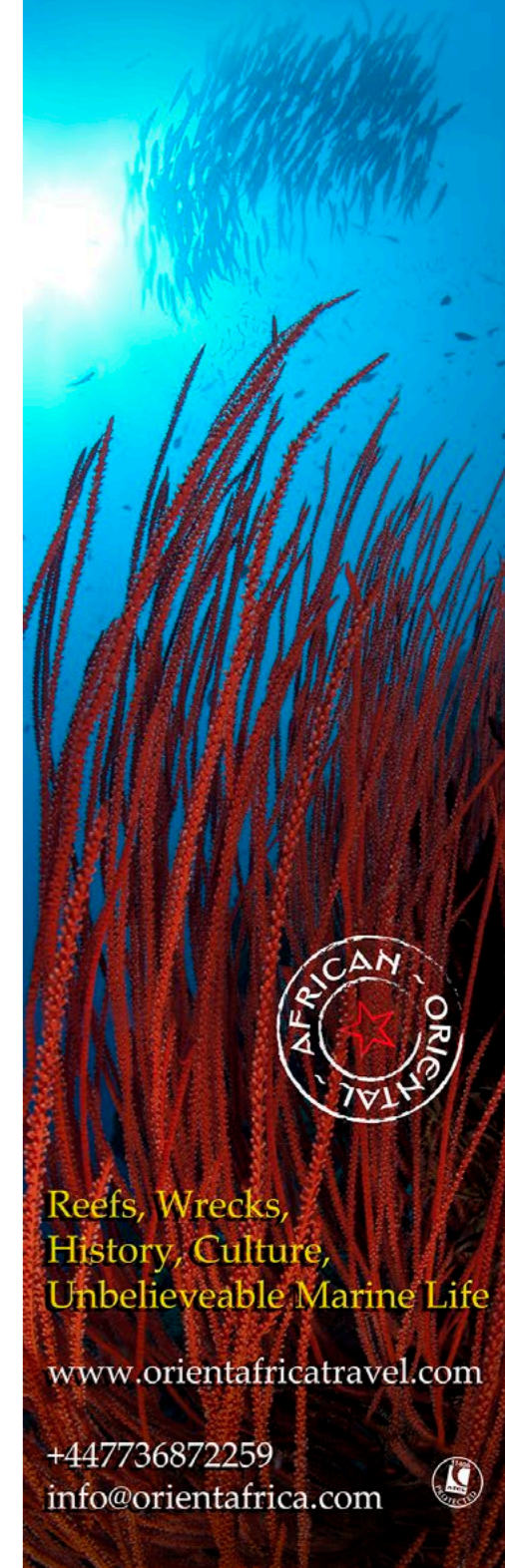
I never like coming back to the surface after a dive (it is better underwater, right?), but coming back aboard the *Scuba Scene* was delightful. At the

School of batfish on the safety stop at the *Thistlegorm* wreck (left); Motorcycles on trucks inside the *Thistlegorm* (far left)

ladder, the crew would take my camera and fins, help me to my seat, unzip my wetsuit and wrap a warm towel around my shoulders. Before I could even get my first stage off, there was juice, and as soon as I was finished playing with my gear, it seemed like it was always time for a meal—be it breakfast, lunch, snack time or dinner.

The food was not to be missed, especially the sweets. I have a bit of a sweet tooth, and the liveaboard had its own pastry chef aboard all trips! I wanted to eat dessert first, and the afternoon snacks of donuts and pastries were my favorite. The main meals were incredible too, including steak and salm-

# Papua New Guinea



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Cardinalfish with eggs inside its mouth (top left and left); Eyes of embryos in the eggs can be seen through the transparent folds of the jaw (center); Red Sea combtooth blenny (above); Delicious desserts (far left)

Every few minutes, cardinalfish need to run water over their eggs to keep them clean and free of algae. If you wait long enough, you may be rewarded with a millisecond in which they spit the eggs out of their mouths to rotate them, and then suck them back into their mouths.

I waited and waited for this to happen, and this fish just would not cooperate with my photographic demands. But it did keep opening its mouth wide (probably with the same effect of having the water run past the eggs and aerating them). I was able to get some shots of the eggs in the mouth of the fish, with its teeth like a prickly white fence protecting its babies. Later, back on the boat, I

on, and on our last night at sea, there was a huge rack of lamb, which our chef carved and served in front of us.

**Wreck diving macro**

After three amazing dives on the *Thistlegorm*, we moved to another wreck site called The Barge. There was not much left of the barge, just the remains of the bottom and outside hull, which rose only a few feet from the seafloor. However, it created a nearly bowl-like structure, which

now harbored an immense amount of marine life.

I remembered from a previous trip that I had found cardinalfish brooding eggs in their mouths, hiding on what would have been the outside of the ship. I went searching where I thought I had seen them before. Sure enough, I found several cardinalfish, hardly

moving. Looking closer, I spotted one that looked like it had a golf ball in its mouth, the sides of the lower jaw stretched out and almost transparent. These were the signs that the cardinalfish had a brood of eggs.







Red Sea

The deck (left) and a diver at the broken mast (above) of the *Rosalie Moller*; Stonefish in the sand (lower left)



with that one cardinalfish and its future offspring, I moved just slightly down the side of the barge and found another one with an extended jaw and took several photos. Luckily, the dive site was almost entirely around 30ft in depth, so I could spend plenty of time taking photos.

Swimming over to the other side of the barge, I saw something large moving in

the sand. Getting closer, I saw that it was a stonefish, out and about, walking around. Usually, these fish are found buried in the sand, with only their stony-looking faces visible. Watching this one sort of hop-walk

slowly along the sand, I looked in the direction it was sluggishly moving, and there was a second stonefish! That one was mostly buried in the sand.

Again, the shallow depth allowed me to stay for a long time, waiting to see if something was going to happen. Were they going to fight? Were they going to mate? I waited and waited, but the slow-motion action was not going very fast. I checked my dive computer, which said I had been down 70 minutes. The crew had requested that we be back on board after 75 minutes, so I left the slow-moving love affair to go to my safety stop and back to the surface.

**Rosalie Moller**

On our final morning, we started off at the wreck of the *Rosalie Moller*, another British WWII wreck that was

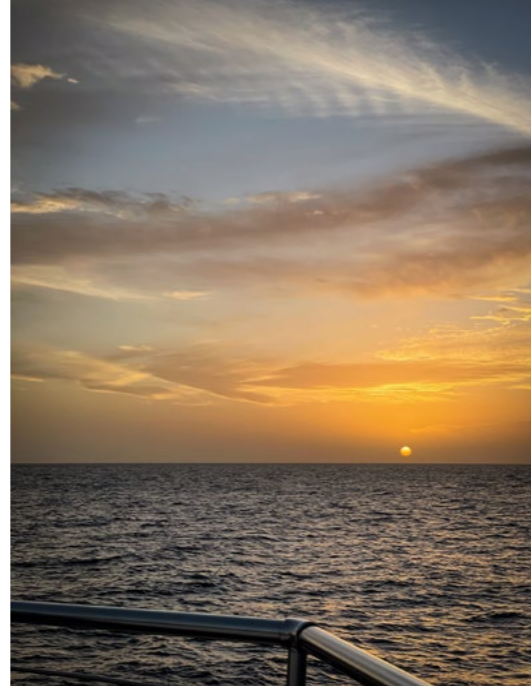
sunk two days after the *Thistlegorm*, also by German aircraft. The captain of the ship had seen the explosion of the *Thistlegorm* and asked permission to move his ship, so the same thing would not happen to it, but he was denied; and two days later, his vessel was struck by two aircraft bombs. This wreck now sits a bit deeper than the barge, with the top deck around 100ft (30m) and a maximum depth in the sand at 165ft (50m).

The wreck was remarkably different underwater though. With almost no growth, this ship still looked very much like a ship and was quite intact. The depth made it a bit darker, and it had an eerie feel to it. I swam with one of the dive guides, Ata, along the top of the wreck and could see a bathtub and toilet in one area, as well as the fallen smokestack and both fallen masts.

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Two-bar anemonefish guards its eggs (top far left); Sunset on the Red Sea (top center); Close-up of the anemonefish, which seems to be fist-bumping (fin-bumping?) my dive buddy (above and left)

**Nemo**

Our final dive of the week was at Dolphin House. This dive site was known for dolphins; however, I had been here numerous times and never saw dolphins. This time we did see some playing off in the distance, but they did not come to visit on the dive. It was still a fantastic dive though.

The coral reef was magnificently covered in hard corals. It was a breath of hope to see the density and diversity of hard corals on the reef, and I could not help pausing for a moment to admire it. Not to mention, this was an incredibly popular

site for divers and snorkelers. There were at least ten boats in the area when we arrived. However, it was great to see the healthy coral, even with lots of humans around.

With my dive buddy, Nick, we were swimming along the point where the reef met a sand channel when an anemonefish swam right out of the reef and up into Nick's face. Chances were, it had eggs and was defending its future offspring from predators. Nick turned around to face it and the bold, tiny fish charged at his face. I started laughing and snapping photos, as Nick put his arm out

and the fish bit his hand. However, after the fish bit him, it turned to go back to its host anemone, and in one of the photos I took, it looks almost as if the fish fist-bumped (fin-bumped?) him. It was pretty adorable.

Heading back to the pier in Hurghada, the crew helped us wash and dry our equipment, and we spent our last afternoon and evening chatting with new friends about our trip and future dive plans.

All good things come to an end, and the next morning, after packing and saying goodbye to the crew, we disembarked from the boat. I had a

moment then, as we all walked down the pier together to go our separate ways to airports or hotels. Someone made us stop to take a selfie, with a phone on the ground facing straight up into the sun, and then another person, with her own phone, took more selfies. We laughed as we walked, and my mind flashed back to arriving at the boat a week prior.

I had been a little confused about the pickup time and arrived after everyone else was already there. I walked into the salon to fill out paperwork and into a room of complete strangers. It is so amazing how, on some dive trips, you start out on a boat full of people that you have never met, and then part ways, with arms wrapped around each other, hugging

and exchanging contact details.

I always say that diving brings together a special group of people, but I think it is also the atmosphere in which we meet that fosters this community. The All Star Scuba Scene sets the stage for bringing people together, making it all the more likely to turn strangers into friends. You can hardly help but have a good time, make new friends and lifelong memories. ■

*Thanks go to All Star Scuba Scene liveaboard, staff and crewmembers.*

*Brandi Mueller is an American photographer, writer, captain and scuba instructor, who is based in Micronesia half of the year and traveling the rest. She is the author of the book, The Airplane Graveyard. You can see more of her work at: [brandiunderwater.com](http://brandiunderwater.com).*



# Equipment

Edited by  
Peter Symes



## Scubapro Luna

With its large, high-contrast display screen and LED backlight, Scubapro's Luna 2.0 AI dive computer aims to redefine readability and functionality. Designed for ease of use, it features wireless air integration, allowing effortless monitoring of tank pressure and accurate calculation of true remaining bottom time (RBT) by considering air consumption. With a slim thermo-plastic housing and intuitive two-button control, operation is straightforward. Choose from two algorithms for decompression calculation and enjoy three dive modes: Scuba, Gauge and Apnea. Nitrox compatible with three selectable gases (21-100% Nitrox), it accommodates diverse diving preferences, making it a versatile companion for underwater adventures. [scubapro.johnsonoutdoors.com](http://scubapro.johnsonoutdoors.com)



## Shearwater Tern

The Shearwater Tern and Tern TX dive computers are designed to enhance convenience and versatility for sport divers. With a compact design and advanced features, Shearwater Research aims to redefine ease of use and functionality in dive computers. Both models boast a 1.3" AMOLED screen for clear visibility in varying lighting conditions and support Air, Nitrox, 3 Gas Nitrox, Gauge and Freedive modes. The Tern TX model stands out with transmitter-enabled capability and a digital compass, allowing connection to up to four Swift transmitters. Equipped with Bluetooth wireless technology, switchable vibration alerts and upgradeable firmware, these computers feature a 316 stainless steel bezel and buttons, along with a 22mm strap size with quick connect (one long and one short strap included), all encased in ballistic nylon polymer for durability. Built in Canada and depth-rated to 120m, these computers meet EN standards for dive compliance and come with Shearwater's Remora quick connect bands and webbing straps for easy customisation. [shearwater.com](http://shearwater.com)



## SUEX Goldfinder XK-XJ

The Suex Goldfinder XK-XJ DPV is engineered for technical divers, boasting a durable build and advanced features. Its high-performance Li-ION battery enables up to 360 minutes of runtime at cruising speed, with a maximum speed of 100 m/min for 110 minutes. With a depth rating of 200 metres, it is ideal for cave exploration and deep dives. Monitor the DPV's status in real-time with the Calypso app and access additional functions through the Eron D-1 dashboard. [suex.it](http://suex.it)

## Dynamic Nord BCD SBC-20

This German brand's new ADV BCD SBC-20 is made from abrasion-resistant 1000 Denier Cordura, ensuring long durability. The BCD features an expansive bladder capable of supporting significant weight, while its broad waist strap offers a snug and comfortable fit. Its non-slip texture ensures a firm hold on the tank, enhancing safety and stability underwater. Incorporated seamlessly into the design are slender overpressure and rapid-release valves. Complete with a high-performance inflator, dual pockets, and six hard anodized aluminium D-rings, the SBC-20 comes in three colours: Black-Blue, Black-Red, and Black-Winter Sky. The new SBC-20 BCD is now available at Dynamic Nord dealers and in its online store. It retails at € 399 and comes in unisex sizes XS-2XL. It weighs 3.3kg in XS to 3.85kg in 2XL, with a lift capacity of 90 Newton/20 lbs in XS to 220 Newton/49 lbs in 2XL. [dynamicnord.com](http://dynamicnord.com)



## Holoswim 2

Diving into swimming performance tracking, the Holoswim Smart Swim Goggles 2 offer a high-tech solution for keeping tabs on your metrics while exercising. Whether in a public pool or open water, these goggles feature a real-time near-eye display that keeps you focused on your swim. From stroke count to calories burnt, they track essential data such as swimming distance, pace, laps, performance by laps, rest time and SWOLF score. Additionally, they boast precise swimming style recognition for freestyle, butterfly, backstroke and breaststroke. With state-of-the-art anti-fog technology ensuring visual clarity underwater, these goggles come with no annual or monthly subscription fees, providing a lifetime of free usage. By connecting to a compatible Garmin watch, the wearer can view real-time swim metrics in the goggles such as heart rate, swim time, distance and more. Holoswim goggles have undergone rigorous tests, including anti-corrosion tests against chlorine to ensure their long-term durability. Swimmers with nearsightedness of less than -6.0 diopters are still able to achieve a clear vision of the swim metrics through the display inside the goggles. [holoswim.com](http://holoswim.com)



Edited by Peter Symes



PETER SYMES

In response to an infant's death after ingesting a button battery, a new law requires the US Consumer Product Safety Commission to establish safety standards for button batteries to make sure they are safe for children, while in their packaging and in household devices.

## Reese's Law mandates new safety standards affecting dive gear

**Reese's Law mandates critical safety standards for button and coin batteries in diving devices, marking a significant shift in consumer product safety.**

In 2022, the US Consumer Product Safety Commission (CPSC) was tasked with developing safety standards for button and coin batteries, ensuring their safety in packaging and when incorporated into household devices.

The resulting legislation, driven by the tragic death of 18-month-old Reese Hamsmith due to the ingestion of a button battery, mandates comprehensive safety standards

for devices using button and coin batteries, including those prevalent in dive equipment.

**Impact on the dive industry**  
Dive products, notably dive computers, often utilise user-replaceable button-sized or coin-sized batteries. Reese's Law will significantly influence the design, manufacture and retail of these products, including those imported into the United States. The industry is poised for a transformation to comply with the new safety standards, reflecting a broader commitment to consumer safety and child protection.

**Mandatory safety standards**  
In September 2023, the CPSC adopted ANSI/UL 4200A-2023

as the mandatory standard for products incorporating button or coin batteries. This standard introduces rigorous requirements, including secured battery compartments, warning labels on packaging and products, and comprehensive instructions in manuals to prevent accidental ingestion by children.

Recognising the challenges in meeting these requirements, the CPSC has provided a timeline for compliance, with the new standards applying to products manufactured or imported after 19 March 2024. Notably, zinc-air button cell or coin batteries are exempt from the scope of these regulations. ■ SOURCE: US CONSUMER PRODUCT SAFETY COMMISSION (CPSC)

## Halcyon opens European hub

**Halcyon Manufacturing announces new European headquarters in Gdańsk, Poland.**

Halcyon Manufacturing, a leader in premium diving equipment, is expanding its global footprint by establishing a new European headquarters and fulfilment center in Gdańsk, Poland. This strategic move aims to enhance customer service and streamline access to the company's extensive product line across mainland Europe.

### New European base

The Gdańsk facility will centralize operations for improved product availability and customer support.

### Enhanced service

Focus will be placed on effi-

cient handling of orders, warranty returns, exchanges and repairs for the European market.

### Leadership

Agnieszka Hryniewicz, appointed as Global Brand Manager at the end of 2023, will spearhead the European operations.

### Partnership with Fourth Element

Halcyon will share the facility with Fourth Element to leverage synergies and reduce operational costs while maintaining brand individuality.

### Future plans

Halcyon is committed to expanding its sales network across Europe, seeking representation in various markets.

Hryniewicz expressed enthusiasm for this development, emphasizing the goal of

delivering the best customer experience with Halcyon's premium products.

Halcyon CEO, Jarrod Jablonski, highlighted the importance of this expansion in bringing Halcyon closer to its European partners and customers, ensuring the easy availability of its innovative product line.

### Operational at the end of January

Fully operational by the end of January 2024, the new hub marks a significant milestone in the company's commitment to serving the European diving community with excellence.

For more information, visit Halcyon's official website or contact their European headquarters directly. ■

SOURCE: HALCYON

JAXEL / PIXABAY

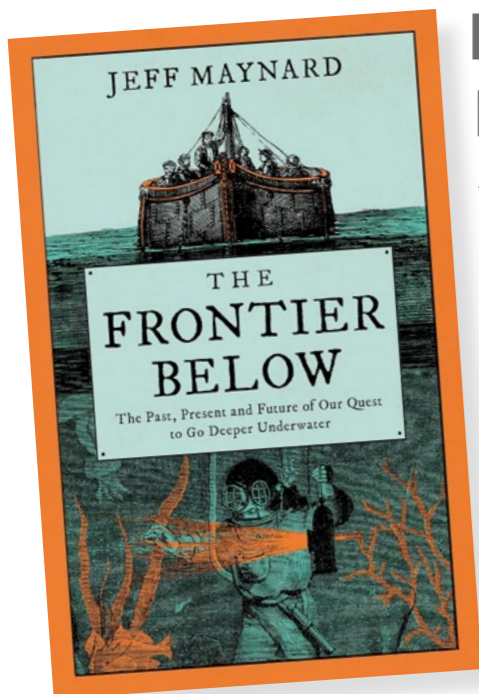


View over city of Gdańsk in Poland





Edited by Catherine GS Lim

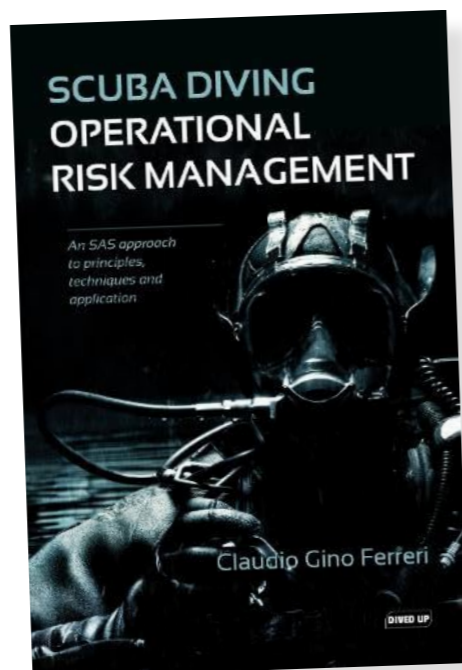


## Dive History

*The Frontier Below*, by Jeff Maynard

This book delves into the perilous journey of ocean exploration, from the initial breath-held dives to today's advanced submersibles that reach the ocean's deepest trenches. It chronicles the technological evolution over two millennia and the human tenacity to conquer the ocean depths. Drawing on extensive research, unpublished sources and personal interviews, this book also considers future oceanic exploration and reflects on the overlooked heroes who ventured not up into the sky, but deep into the abyss.

Publisher: William Collins  
Date: 13 April 2023  
Hardcover: 320 pages  
ISBN-10: 0008532729  
ISBN-13: 978-0008532727

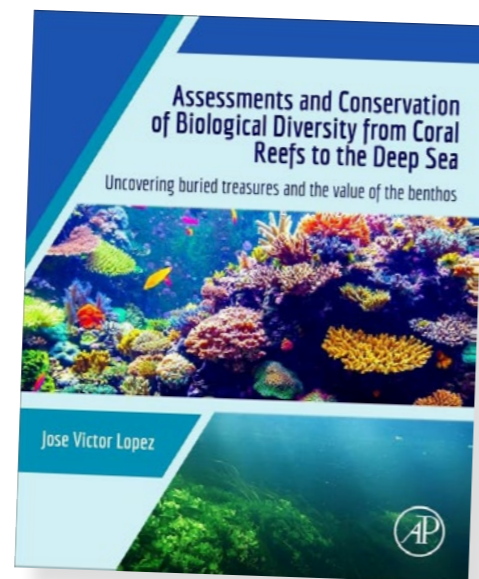


## Dive Safety

*Scuba Diving Operational Risk Management: An SAS approach to principles, techniques and application*, by Claudio Gino Ferreri

This pioneering guide offers a practical approach to risk management in diving at every level. It presents a step-by-step manual focused on ensuring diver safety, improving rescue operations, and learning from close calls. The author explains how to identify and counteract the root causes of danger and their consequences. The book provides enduring principles and methods that will remain useful, even as diving technology and techniques evolve.

Publisher: Dived Up Publications  
Date: 27 February 2024  
Paperback: 192 pages  
ISBN-10: 1909455504  
ISBN-13: 978-1909455504

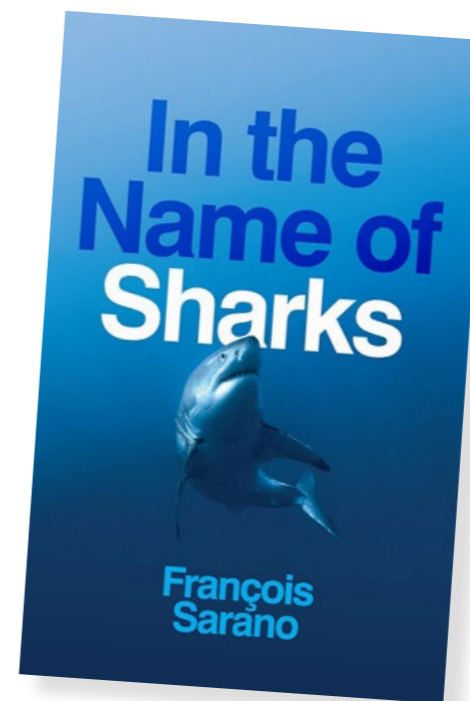


## Reef & Deep Sea Biodiversity

*Assessments and Conservation of Biological Diversity from Coral Reefs to the Deep Sea: Uncovering Buried Treasures and the Value of the Benthos*, by Jose Victor Lopez

This book explores the world's marine benthic habitats that are linked at the ocean's bottom, from a diverse perspective that includes genetics, microbiology and evolution. Through global case studies, it assesses the biological diversity of various aspects like coral reefs and deep-sea species. Targeting marine conservationists and biologists, the book addresses threats like pollution and climate change, and suggests conservation solutions. It also compares shallow and deep marine habitats, highlighting their interconnected nature and the challenges in understanding benthic communities.

Publisher: Academic Press  
Date: 18 December 2023  
Paperback: 236 pages  
ISBN-10: 0128241128  
ISBN-13: 978-0128241127

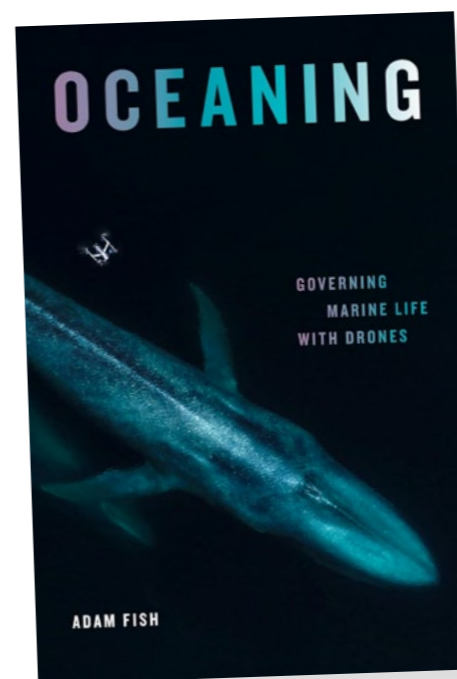


## Shark Nature

*In the Name of Sharks*, by François Sarano

In this book, oceanographer François Sarano recounts a transformative encounter with a great white shark which profoundly changed her perception of the species. It leverages current scientific research on shark biology and behaviour to challenge prevalent prejudices against them. It honours their true nature, highlighting their role as symbols of the wild as well as their vulnerability. This work is a call to recognise and protect sharks in the broader ecological balance.

Publisher: Polity  
Date: 16 January 2024  
Hardcover: 261 pages  
ISBN-10: 1509557660  
ISBN-13: 978-1509557660



## Ocean Conservation

*Oceania: Governing Marine Life with Drones*, by Adam Fish

Drones are transforming ocean conservation. Author Adam Fish writes about how drones aid in protecting marine life and in assessing the health of marine animals and coral reefs. As new dependencies between nature, technology and humans emerge, a paradox emerges in which the wild ocean becomes dependent on technology. This book examines the paradox, suggesting that such conservation does not end nature but creates an "ocean/culture", a thriving ocean that is distinct from but exists alongside humanity.

Publisher: Duke University Press Books  
Date: 23 February 2024  
Hardcover: 248 pages  
ISBN-10: 1478025808  
ISBN-13: 978-1478025801



Text by Simon Pridmore

**In the first of a new two-part series, Simon Pridmore describes a few equipment-related problems that divers commonly encounter and offers some tips on how to avoid or deal with them.**

For the many dives we do which are uneventful, there is always the odd dive where something takes place that reminds us of our vulnerability. This often involves the failure of a piece of equipment and many of us are guilty of not thinking too deeply about what to do if something goes wrong or how to prevent it from happening in the first place.

In this, the first of two articles on the subject, I run through a few problems that you will probably find yourself having to deal with at some point in your diving career, and run through some precautions to take and drills to practise, so you can be as well prepared as possible. Technical divers refer to this process as planning for the “what-ifs.”

# Trials & Tribulations

## *Part 1: Planning for Gear Malfunctions*

### **O-ring blowout**

The O-ring on the cylinder valve (if you are using a regulator with a yoke/A-clamp fitting) is a tiny but crucial link in the process of moving the air from the cylinder to your lungs. If

this O-ring is missing or damaged, a seal cannot form, and air will escape when you attach your regulator and then open the cylinder valve.

The loud hiss of high-pressure air escaping tells you that either you put

the regulator on incorrectly or you have an O-ring problem. Whichever it is, you will almost certainly immediately become the centre of unwanted attention. You can avoid this by making a point of checking

that the O-ring is in place, untornd and unfrayed, before you fit the regulator, and by positioning your regulator first stage orifice snugly over it before tightening the yoke.

O-rings are designed to last many

COMPOSITE BY G. SYMES, IMAGE SOURCE: ENRICO STROCCHI / FLICKR / CC BY-SA 2.0 DEED





Poseidon Rebreather Save-a-Dive Kit with membrane mouthpiece, service kits for breathing loop, scrubber canister housing and hoses, O-rings, CC hoses, metric multi-tool, membrane cover, T-section, complete membrane holder, T-lunginsert, Molex O<sub>2</sub> sensor



OMS kit with O-ring and tools



Trident Dive Deluxe and Standard Save-a-Dive kits with O-rings for tank valves, hoses, regulators and pressure gauges (above)



Trident Dive Deluxe and Standard Save-a-Dive kits with Viton (Nitrox) O-ring kits for tank valves, hoses, regulators and pressure gauges (below)



years, but in the world of scuba diving, factors such as salt, heat and humidity can reduce their lifespan considerably. If the O-ring is absent or looks shabby, replace it. Most dive shops and online stores sell a handy little bullet-shaped tin, which contains spare O-rings and a pick to help you remove the old O-ring from the tank valve. Before these kits became common, good instructors used to keep a couple of spare new O-rings on their dive watch or computer strap, knowing that a leaky O-ring often messes up carefully scheduled plans.

It is good to be self-sufficient and have your own replacement O-rings

readily on hand, so you do not have to ask for help at a time when everyone together you is getting their own gear together and has their own problems to solve. You will also be perfectly placed to help dive buddies if their cylinders start hissing at them when they set up their gear.

Underwater, it is very unusual for the cylinder valve O-ring to fail, but it has happened to me. Then, the only way to fix the problem is to shut down the valve, which is possible if you are diving doubles or carrying another cylinder containing a breathable gas for the depth you are at. If you have just one cylinder, your only option is to go

to the surface, ideally with a solicitous buddy nearby ready to hand over his or her octopus if you run out of air on the way up. There is no reason to panic, just do not delay. You do not have much hesitation time. Tests suggest that your cylinder will be completely empty in only a few minutes.

How do you know it has happened? The sound is unmistakable. It is a deafening explosion behind your head that does not stop. Glance at your pressure gauge and you will see the needle moving. Even if the explosion did not make your mind up, this is a clear sign that you need to stop wondering and head up. You will still

## A New Dive Book from Simon Pridmore

"Simon Pridmore's new book, 'Technically Speaking' is an outstanding tour de force from one of modern diving's most accomplished practitioners and best-selling authors."

— David Strike, Oztek & Tekdive Convenor

"Simon has completed a complex task with consummate skill and has accurately unravelled the when's, the who's and some of the why's, much of which would have been unjustifiably lost in the mists of time if not for this work."

— Kevin Gurr, Technical Diving Inventor & Innovator

"It will take some doing to better this account of tech's first steps... as no matter how much you know or think you know; you will still find many obscure historical gems..."

— Kevin Denlay, Early Adopter & Wreck Finder

Technically Speaking is the latest book from best-selling Scuba series author Simon Pridmore. It is a selection of themed talks telling the early history of technical diving—where it came from, how it developed, how it expanded across

the world, who the important movers were and how, in the decade from 1989 to 1999, the efforts of a few determined people changed scuba diving forever.

These ten years saw the greatest shake-up the sport has ever seen but technical diving's road to universal acceptance was anything but smooth, many obstacles had to be overcome and there were times when even viewed in retrospect, it seemed that its advocates might fail in their mission. Ultimately, success came down to per-

severance, people power, good timing and more than a little luck.

Available in hardback, paperback and ebook at **Amazon Worldwide, Apple, Kobo, and Tolino.** See **SimonPridmore.com**



be able to breathe through the regulator as you ascend—while the air lasts. Do not bother with your safety stop if you are on a no-deco dive. It is infinitely better to miss it than run out of air underwater.

Reduce risk by doing these things:

- Check your cylinder valve O-ring before every dive;
- Replace broken O-rings when you detect even a slight leak;
- Avoid going into deco when you are diving with only one cylinder; and
- Practise air-sharing ascents with your buddies from time to time.

### Regulator free-flow

Having discussed one way by which you can quickly lose the air in your cylinder during a dive, I should also mention another way. Your regulator is designed with a downstream valve so that, if it fails, air will pour out of your scuba cylinder uncontrollably until it is empty. When you first learnt to dive, your instructor told you this was a good thing, and you went along with that because, at the time, you were more worried about suddenly having no air to breathe rather than having too much.

Of course, it is not a good thing.



NASA astronauts practice buddy-breathing during an under-sea training session (right). If you have a free-flowing regulator, move towards the surface with minimum delay and with your buddy right beside you in case you need his or her octopus.

In your beginner course, you probably simulated the experience of breathing across the powerful stream of air coming from a free-flowing regulator, while sitting on the seabed or the bottom of a pool. This is good training in one respect, in that, having done this in a controlled environment, you will know what to do if it happens for real.

On the other hand, the training is flawed in that this exercise might mislead you into thinking that the

thing to do if you have a free-flowing regulator is to stay where you are. In fact, as with a blown valve O-ring, unless you have an independent air source to switch to, rather than stay where you are and breathe in more carefully, the thing to do is to move towards the surface with minimum delay, again ideally with your buddy right beside you.

Proactive measures you can take to make sure your regulator does not free-flow include:



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Divers check their dive gear. When it comes to mouthpiece malfunctions, precautions one can take before every dive is to check the mouthpiece and the cable tie holding it in place, as well as carry spares of each in your save-a-dive kit.



NASA JOHNSON / FLICKR / CC BY-NC 2.0 DEED

- Keeping your octopus well secured to your BCD so it never drags in the sand or against the reef and gets damaged;
- Keeping your octopus' venturi-effect lever (if there is one) at negative when it is not in use;
- Rinsing out both regulator second stages well, post-dive; and
- Keeping your regulator well maintained. Have it serviced at the first sign of a problem.

### Mouthpiece malfunction

Staying with regulator problems, second-stage mouthpieces can be the cause of unusual issues. The rubber

can split, and you can find yourself inhaling a fine mist of seawater with each breath, or the cable tie securing the mouthpiece can snap, leaving the mouthpiece attached to the regulator by friction only. At some point, that will not be enough, and the two parts will separate, leaving you with a mouthpiece between your teeth, a mouthful of water and nothing to breathe.

Even a small defect can turn out to be more than just an inconvenience. A diver once approached me and said that he loved the sport but was going to quit because after every dive he would get chest pains and

flu symptoms for about 24 hours. I checked his regulator mouthpiece. Sure enough, there was a tiny split, so we changed it and the problem disappeared. During each dive, the diver had been inhaling seawater with every breath and giving himself a bizarre form of self-induced bronchopneumonia.

### Precautions:

- Make a point of checking both the mouthpiece and the cable tie that holds it in place, as part of your pre-dive equipment check; and
- Carry spares of each in your Save-a-Dive kit.







COMPOSITE BY G. SYMES

## Runaway cylinder

This is something that happens much more frequently than it should. You are swimming along, when suddenly you feel unbalanced, and the regulator in your mouth starts to tug your head backwards. Your buddy points at you in horror, then disappears from view. The next thing you feel is someone shoving you from behind. At this point, you realise that your cylinder must have slipped out of the BCD cam strap, and your buddy is trying to push it back in.

If you have no buddy around, you can fix this yourself. If you are close to the seabed, first make sure the seabed is not covered with fragile marine life. Find an empty patch of sand or

rock. Then, settle down on your knees, reach behind you with your right hand to support the cylinder, undo the BCD and shrug it off as if you were removing a jacket, left arm first, keeping your teeth tightly clamped onto the regulator mouthpiece.

Bring the whole setup around to the front of your body, keeping it very close to you (especially if your weights are in the BCD), and refit the cam strap calmly (and tightly this time) before donning the BCD again and resuming your dive.

Even if the seabed is not close, you may be surprised at how, with a little practice, you can master this drill while staying neutrally buoyant in midwater.

Try doing it in a pool or shallow confined water first. The drill will improve your buoyancy control as well as boost your underwater confidence. Do not practise it alone though. Get a buddy to watch over you. Then, do the same for them while they try it.

Of course, it is much better if your cylinder never falls out at all. One way to reduce the likelihood of this happening is to soak the cam-strap with water before you lock it down onto the cylinder. But, the best way, and the method most guaranteed to have a 100 percent success rate, is to buy a BCD with twin cam-straps. Then the whole last section of this article becomes irrelevant.

## NEW 4 in 1!

Simon Pridmore has released a new single-volume e-book, bringing together four books in his bestselling Scuba series:

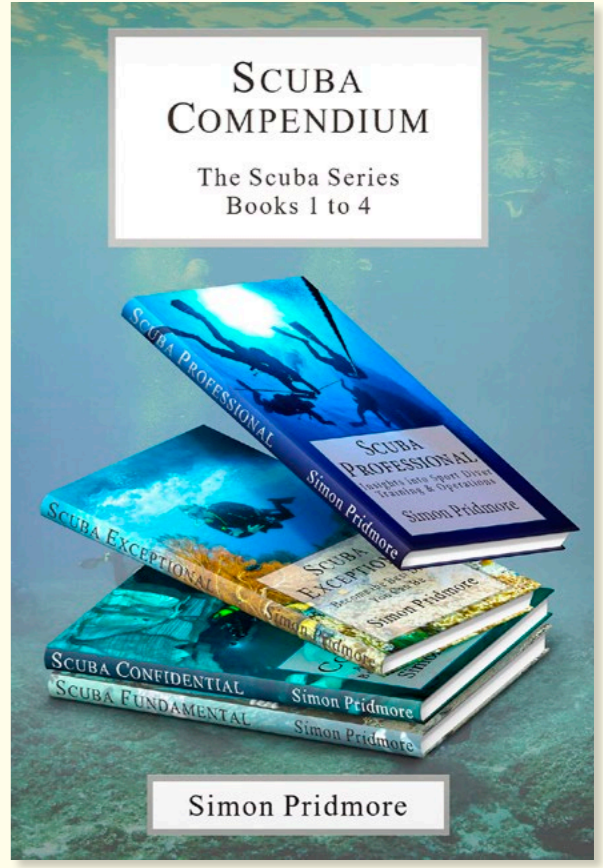
- *Scuba Fundamental – Start Diving the Right Way*
- *Scuba Confidential – An Insider's Guide to Becoming a Better Diver*
- *Scuba Exceptional – Become the Best Diver You Can Be, and*
- *Scuba Professional – Insights into Sport Diver Training & Operations*

As Simon puts it, this is “a remastering and repackaging of the original albums rather than a greatest hits.” Nothing is missing. *Scuba Compendium* gives e-book readers the advantage of being able to access all the knowledge contained in the four books in one place, making this a unique and easily searchable work of reference for divers at every level.

Simon has always promoted the idea of safer diving through the acquisition of knowledge, which is why he has chosen to release this highly accessible version. If you have read his work before, you will know that he provides divers with extremely useful advice and information, much

In my column in the next issue, I will go through a few more equipment trials and tribulations. ■

Simon Pridmore is the author of the international bestsellers *Scuba Fundamental: Start Diving the Right Way*, *Scuba Confidential: An Insider's Guide to Becoming a Better Diver*, *Scuba Exceptional: Become the Best Diver You Can Be*, and *Scuba Professional: Insights into Sport Diver Training & Operations*, which are



of it unavailable elsewhere; his points often illustrated by real life experiences and cautionary tales. He examines familiar issues from new angles, looks at the wider picture and borrows techniques and procedures from other areas of human activity.

E-book File Size: 5298 KB  
Published by Sandsmedia  
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**simonpridmore.com**

now available in a compendium. He is also the co-author of the *Diving & Snorkeling Guide to Bali and the Diving & Snorkeling Guide to Raja Ampat & Northeast Indonesia*. His recent published books include *The Diver Who Fell From The Sky*, *Dive into Taiwan*, *Scuba Physiological: Think You Know All About Scuba Medicine? Think Again!* and the *Dining with Divers* series of cookbooks. For more information, please see his website at: **SimonPridmore.com**.



## Reevaluating shark societies

*Challenging the myth of dominance-subordination hierarchies*

Text by Ila France Porcher

**A recent study evaluates the evidence for dominance-subordination hierarchies in sharks. These are widely believed to dictate shark behaviour, though no remotely convincing demonstration of such hierarchies in any species of Chondrichthyan has been presented.**

In 1954, Warder C. Allee and Joshua C. Dickinson conducted an experiment on the smooth dogfish aimed at establishing dominance-subordination hierarchies in Chondrichthyans. This pioneering study, which lacked subsequent testing and analysis, has laid the groundwork for a persistent belief in rigid social structures among sharks.

The dominance-subordination hierarchy, which is modelled on the social structure of the chicken, was proposed without convinc-

ing evidence in the context of Chondrichthyan vertebrates. It has affected the study of shark behaviour ever since, and stood in the way of the search for the true understanding of their societies.

### The experiment and its flaws

Allee and Dickinson's experiment involved placing sixteen smooth dogfish in confined tanks and observing their behaviour. In such a situation, no shark who wanted to escape the proximity of another could do so, and no shark who wanted to establish a region for himself or herself, could be rid of the others.

In a species with a dominance-subordination hierarchy, this would facilitate high levels of aggression, yet, in spite of active efforts by

In experiments with smooth dogfish confined in tanks, there were no clear incidences of aggression involving dominance-subordination, even though the purpose of the experiments was to establish this type of behaviour.

the researchers to provoke competition for food among the sharks, including starving them for up to six days, they were unable to do so.

Not one clear incidence of aggression involving dominance-subordination was seen, though the stated purpose of the experiment was to establish just such behaviour. This absence of agonistic incidents challenged the establishment of dominance-subordination hierarchies, but with no explanation, the researchers used collision avoidance to claim that dominance and subordination was present.

Though they did not



identify the mechanism by which the presumed dominance was enforced, they concluded that their experiment had established that dominance-subordination hierarchies are present in Chondrichthyes.

Thus, the foundational study by Allee and Dickinson, which is still cited as having established dominance-subordination hierarchies in sharks, lacks robust scientific support.

### Subsequent studies: Challenging the status quo

Subsequent studies of elasmobranch

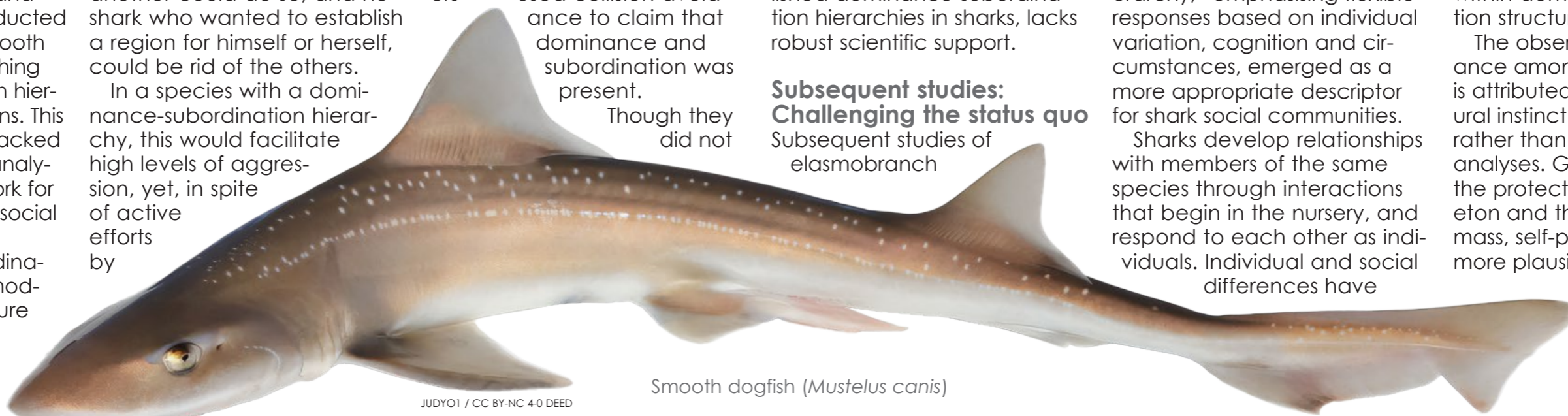
behaviour, including black-tip reef sharks, bull sharks and lemon sharks, consistently contradicted the notion of dominance-subordination hierarchies. Observations revealed a lack of intra-specific aggression, with sharks displaying social behaviours contrary to the expected territoriality and conflict. Instead, the term "heterarchy," emphasising flexible responses based on individual variation, cognition and circumstances, emerged as a more appropriate descriptor for shark social communities.

Sharks develop relationships with members of the same species through interactions that begin in the nursery, and respond to each other as individuals. Individual and social differences have

*Instead, the term "heterarchy," emphasising flexible responses based on individual variation, cognition, and circumstances, emerged as a more appropriate descriptor for shark social communities.*

been found to explain the apparently complex organisation of what is interpreted as social networks. The perceived absence of rigid hierarchies challenges the long-held belief that sharks operate within dominance-subordination structures.

The observed collision avoidance among confined sharks is attributed to the sharks' natural instinct for self-protection rather than complex societal analyses. Given their lack of the protection of a bony skeleton and their much smaller mass, self-preservation is a more plausible explanation for the tendency of smaller sharks to avoid collisions.



Smooth dogfish (*Mustelus canis*)

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# shark tales

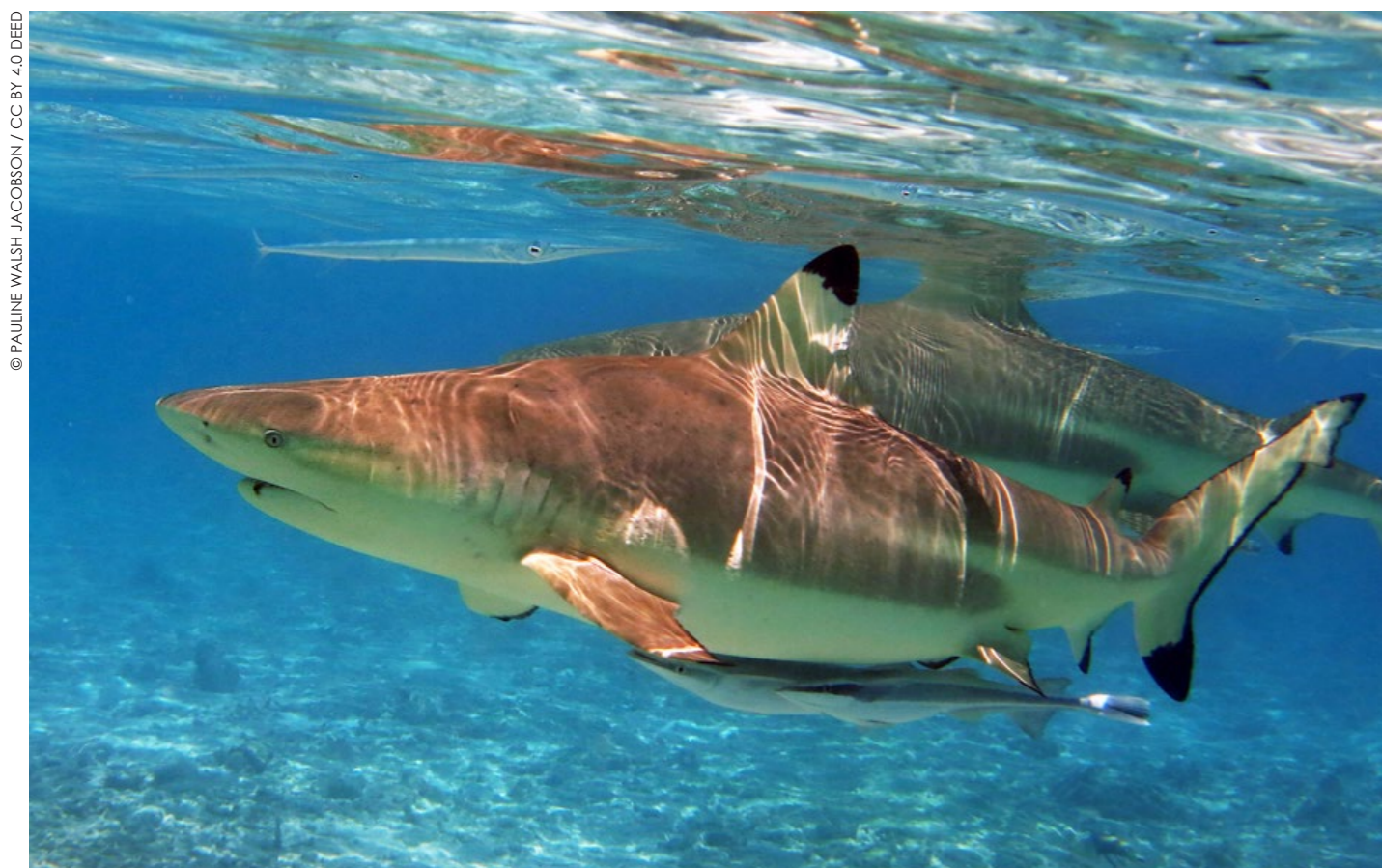


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Bull shark (left); Lemon shark (above); Pair of blacktip reef sharks in French Polynesia (bottom left)



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## Rethinking shark societies

As we continue to unravel the mysteries of marine life, it is essential to approach shark behaviour with an open mind and a willingness to explore alternative explanations, fostering a deeper understanding of the intricacies of elasmobranch societies beyond oversimplified narratives. Sharks, it appears, have unique and complex social relations that differ significantly from traditional models based on terrestrial species. The challenge now is to unravel the intricacies of shark societies and redefine our understanding of their social dynamics. ■

To see the full list of references, go to: [xray-mag.com](http://xray-mag.com)

Ethologist Ila France Porcher, author of *The Shark Sessions* and *The True Nature of Sharks*, conducted a seven-year study of a four-species reef shark community in Tahiti and has studied sharks in Florida with shark-encounter pioneer Jim Abernethy. Her observations, which are the first of their kind, have yielded valuable details about sharks' reproductive cycles, social biology, population structure, daily behaviour patterns, roaming tendencies and cognitive abilities. Please visit: [ilafranceporcher.wixsite.com/author](http://ilafranceporcher.wixsite.com/author).

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Shark dorsal fin, with shark still attached. A new study reveals that shark deaths have increased globally despite shark-finning bans. However, it found that regional shark-fishing or retention bans have had some success, but that science-based harvest control rules for shark fisheries, and more transparency and accountability in fishing practices were needed.



PETER SYMES



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## Shark conservation: A critical reassessment needed

**Despite increased regulations and finning bans, a new study reveals that shark mortality rates have continued to rise globally, necessitating a re-evaluation of current conservation strategies.**

Over the past two decades, sharks have become emblematic of the world's threatened wildlife, leading to heightened scientific, regulatory and public scrutiny. However, a recent study challenges the effectiveness of these protective measures, revealing that global shark mortality has not only persisted but increased, despite increased regulations and finning bans.

### Surge in shark mortality

The study estimated that total fishing-induced shark mortality globally grew from at least 76 million to 80 million between 2012 and 2019, with around 25 million of these being threatened species. This increase was observed despite a more-than-tenfold rise in international and national management measures addressing shark fishing and finning since 2000.

### Ineffectiveness of anti-finning policies

Contrary to expectations, widespread legislation designed to prevent shark finning did not significantly reduce overall shark mortality. Instead, the study found that regional shark fishing

or retention bans had some success in reducing mortality rates. This highlights a critical gap in current conservation strategies, where the focus on finning bans may have inadvertently overlooked broader issues in shark fisheries management.

The study also noted a shift in market demands and fishing practices. As regulations against finning were enforced, new markets for shark meat and oils emerged, complicating the conservation landscape. This diversification in demand has amplified the complexity of shark conservation, presenting unprecedented challenges.

### Effective strategies

Despite these challenges, the study identified some effective conserva-

tion strategies. These include public awareness campaigns, market pressures for sustainable seafood products, and regional fishing bans. The study also highlighted the role of accountable governance in reducing shark mortality, suggesting that democratic governance correlates with better outcomes for sharks.

A key limitation of the study was the quality and transparency of data. The researchers emphasised the need for improved data reporting and transparency in fishing practices to better assess and manage shark populations. This includes more comprehensive documentation of discarding practices and addressing illegal, unreported and unregulated (IUU) fishing.

### A call to action

The findings of this study underscore the need for a comprehensive approach to shark conservation that goes beyond finning bans. This includes area-based conservation, improved shark-specific fisheries management and effective bycatch mitigation. The study suggests that science-based harvest control rules, similar to those adopted for tuna stocks, should be applied to shark fisheries. Additionally, increased transparency and accountability in fishing practices are essential for the successful implementation of these measures. ■ SOURCE: SCIENCE





Text by Ila France Porcher

## Drone discovery: A newborn great white shark

**Drone footage captured off the coast of Southern California has potentially unveiled a groundbreaking discovery: the first-ever glimpse of a newborn great white shark in its natural habitat.**

The remarkable sighting occurred on 9 July 2023, approximately 400m (1,300ft) off the shores of Carpinteria, California. Wildlife filmmaker Carlos Gauna and Phillip Sternes, a doctoral student in the Department of Biology at the University of California, Riverside, stumbled upon the extraordinary sight while filming

Newborn white shark pup (right), captured with drone footage by wildlife filmmaker Carlos Gauna and Phillip Sternes, a doctoral student at the University of California, Riverside. Their findings were published in the journal *Environmental Biology of Fishes*; A thin, white film was observed sloughing off the shark's body as it swam (below), which led the paper's authors to believe it was shedding an embryonic layer.

aerial footage.

Measuring 1.5m (5ft) in length, the juvenile white shark immediately caught the attention of Gauna and Sternes due to its pale colouring, a departure from the typical gray dorsal and white ventral colouring of adult great whites. Upon closer examination of the drone footage, they observed a thin, white film sloughing off the shark's body as it swam, leading them to believe it was shedding its embryonic layer.

According to Sternes, this shedding process is indicative of a newborn great white shark.

The duo documented their findings in a study published in the peer-reviewed journal *Environmental Biology of Fishes*, suggesting that the shark's unusual colouring could be attributed to materials ingested in utero, including uterine milk secreted by the mother.

While some speculate that the shark's whitish hue could be due to an unknown skin disorder, Gauna and Sternes maintain that the most plausible explanation is that they witnessed a newborn great white shark in its natural habitat—a first in scientific observation.

The sighting has sparked excitement among marine biologists and shark researchers, with Gavin Naylor, director of the Florida Program for Shark Research at the University of Florida, describing it as “highly speculative” yet intriguing. Nicholas Ray,

a researcher at Nottingham Trent University, hailed the observation as “hugely significant,” suggesting that it could revolutionise understanding of the elusive reproductive cycle of this endangered species.

### Likely born in shallow waters

The proximity of the sighting to the coast suggests that the shark pup was likely born in shallow waters, which is the case with many other species of shark. However, some researchers believe that great whites are born farther out at sea. While the exact birthing process was not observed, experts speculate that the young shark's presence supports the hypothesis that great whites give birth in coastal waters. Indeed, the researchers noted pregnant great

white sharks in the area.

“It has been hypothesised by other researchers that white sharks are born in shallow, coastal waters in this region, but never observed,” said Greg Skomal, senior fisheries scientist at the Massachusetts Division of Marine Fisheries and author of the book, *Chasing Shadows: My Life Tracking the Great White Shark*.

“While the presence of this young white shark in this area supports this hypothesis, the actual birth was not observed. We cannot rule out that the shark, which is quite mobile, could have moved a great distance from the birthing area. Regardless, this is a very exciting observation.”

However, further investigation and evidence are required to confirm the findings. Despite this, the utilisation of

aerial drones in shark research has provided valuable insights, offering scientists a new perspective on these enigmatic creatures and their behaviour in the wild. ■

*Ethologist Ila France Porcher, author of The Shark Sessions and The True Nature of Sharks, conducted a seven-year study of a four-species reef shark community in Tahiti and has studied sharks in Florida with shark-encounter pioneer Jim Abernethy. Her observations, which are the first of their kind, have yielded valuable details about sharks' reproductive cycles, social biology, population structure, daily behaviour patterns, roaming tendencies and cognitive abilities. Please visit: [ilafranceporcher.wixsite.com/author](http://ilafranceporcher.wixsite.com/author).*



COURTESY OF CARLOS GUANOS, THE MALIBU ARTIST



COURTESY OF CARLOS GUANOS, THE MALIBU ARTIST



# marine mammals

Edited by  
G. Symes



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Researchers were surprised to find that Atlantic blue whales have an astonishing amount of DNA from fin whales in their genomes.

## Blue whale hybrids

**Hidden DNA discovered in blue whales indicates they have been mating with other species, yielding hybrid offspring, as per a recent study published in *Conservation Genetics*.**

Researchers analyzed the genomes of North Atlantic blue whales (*Balaenoptera musculus musculus*) and found surprisingly high levels of fin whale (*Balaenoptera physalus*) DNA, suggesting extensive interbreeding.

Blue whales, the largest animals on Earth, faced severe population decline due to historic whaling, leading to their current endangered status. The North Atlantic

subspecies is particularly at risk. The study aimed to assess inbreeding within this population, crucial for their recovery.

### Analysing samples

Using advanced genetic techniques, researchers created a comprehensive genetic blueprint and analyzed samples from 31 whales. They discovered that each whale carried some fin whale DNA, with an average of 3.5 percent of their genome originating from fin whales.

### Hybrid reproduction

It was previously thought that hybrid whales, resulting from blue and fin whale mating, were infertile. However, recent evidence indicates otherwise, with hybrids

successfully reproducing with blue whales, leading to “backcrossed” offspring.

The extent of interbreeding uncovered in the study exceeded expectations, raising concerns about potential impacts on blue whale genetics. While it is unclear why introgression, or DNA transfer between species through interbreeding, appears unidirectional, it may relate to the larger population size of fin whales, according to study co-author Mark Engstrom, an ecological geneticist at the University of Toronto.

Limited evidence suggests this phenomenon is specific to the North Atlantic. Despite no immediate negative effects observed from carrying fin whale DNA,

Engstrom is concerned that continued introgression could affect the genetic resilience of blue whales, potentially hindering their adaptation to environmental challenges like climate change.

### Hope for recovery

Surprisingly, the study also revealed less inbreeding among North Atlantic blue whales than anticipated. Gene flow between western and eastern Atlantic populations, likely facilitated by ocean currents, contributes to genetic diversity and resilience, offering hope for the recovery of these magnificent creatures with sustained conservation efforts. ■

SOURCES: CONSERVATION GENETICS, LIVE SCIENCE



Portugal  
Dive.com

© Albano Mesquita

## Fantastic Liveaboard in the Azores Archipelago

Sailing the Azores archipelago waters, you'll have a glimpse of its islands while diving the most pristine waters of the Atlantic Ocean. You will enjoy incredible visibilities, fantastic dive spots, the company of numerous species and, of course, the big pelagics.





## First-ever sighting of mimic octopus in Mozambique

In a new study, researchers at the Marine Megafauna Foundation, in collaboration with the Vilanculos Coastal Wildlife Sanctuary, have made a surprising discovery of the shape-shifting mimic octopus in Mozambique.

For the first time, the mimic octopus (*Thaumoctopus mimicus*), a species previously undocumented in African waters, has been captured on camera, signifying a noteworthy range extension of about 4,700km from the Red Sea.

Unlike any other member of its species, the mimic octopus excels in the art of disguise. It possesses the remarkable capability to alter its shape, hue and behavior to resemble various marine organisms, including lionfish, flatfish, sea snakes and more. This extraordinary talent serves not only as a spectacle but also as a survival strategy, aiding the octopus in confounding predators and capturing prey.

### Unexpected

Traditionally associated with the waters of Indonesia, the mimic octopus, initially documented in the 1980s, has enthralled underwater photographers and marine biologists alike with its extraordinary mimicry skills. Andrea D. Marshall, lead author of the study and

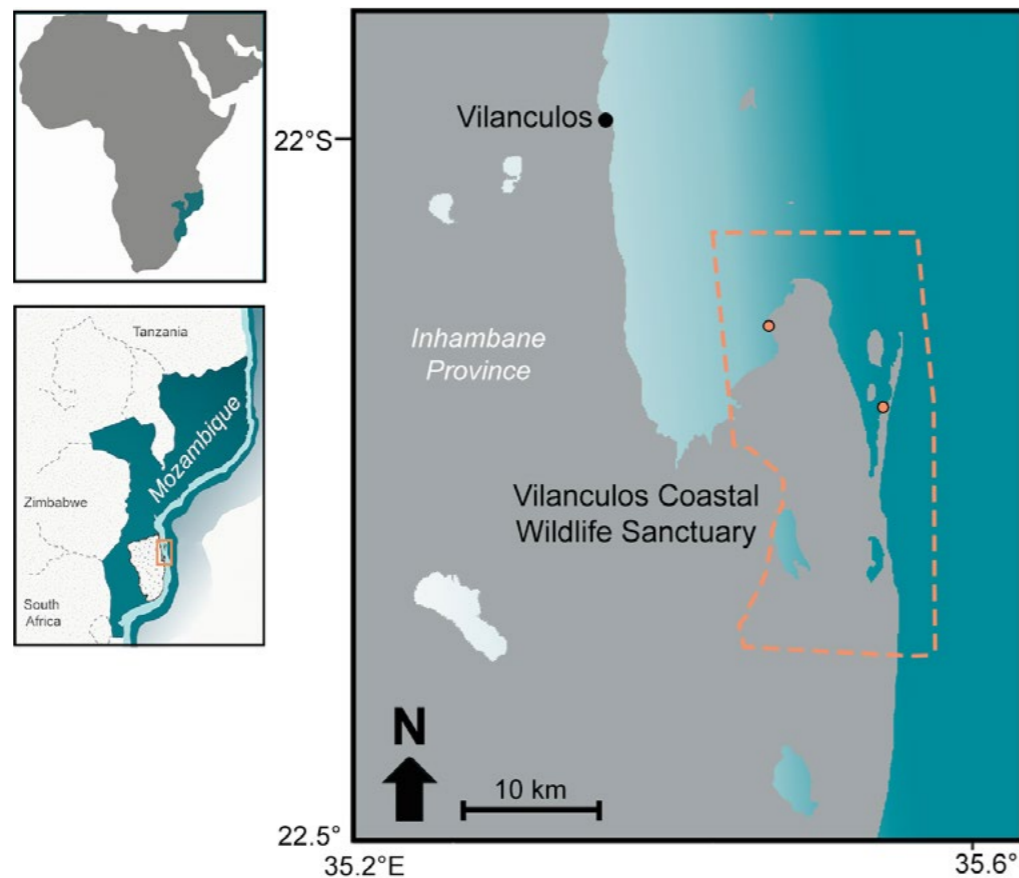
co-founder of the Marine Megafauna Foundation, said, "These sightings represent a significant expansion in this species' known range. Seeing one in Mozambique was startling; it was instantly recognizable, yet its presence here was completely unexpected."

### Ocean wonders

The octopuses were observed in the shallow waters of the Vilanculos Coastal Wildlife Sanctuary, demonstrating their distinctive behavior of mimicking other marine species. Taryn Gilroy, Sanctuary manager, expresses her elation, stating, "Witnessing the mimic octopus within our Sanctuary was incredible. Its previously undocumented presence off eastern Africa underscores the richness and diversity of our marine life."

### Call to action

The revelation of the mimic octopus in novel environs serves as a reminder of the vast and uncharted mysteries lurking in the ocean depths, emphasizing the imperative for sustained research and conservation efforts. Marshall added, "Discovering such extraordinary creatures in new habitats reminds us of the vast unknowns in marine environments, particularly in Africa. We hope this finding will inspire awe and a renewed commitment to ocean conservation."



Map of the Bazaruto Seascape with *Thaumoctopus mimicus*, Norman & Hochberg, 2005, with sighting locations indicated within the Vilanculos Coastal Wildlife Sanctuary of southern Mozambique.



Photographic records of *Thaumoctopus mimicus*. (A-F) An individual sighted in the Inhamambane Estuary of the Vilanculos Coastal Wildlife Sanctuary (VCWS) in southern Mozambique in May 2020 showing (A) frontal, (B) superior, (C, D) lateral, and (E) ventral angles, as well as coloration patterns and behaviors: (B) brittle star mimicry, (F) anemone mimicry, (G) flat fish mimicry and an individual sighted during an opportunistic beach-walking survey in the Chicvacuana area of the VCWS in May 2022 showing (H) feather star mimicry.

The paper, "First photographic records of mimic octopus *Thaumoctopus mimicus* (Cephalopoda: Octopodidae) from southern Mozambique,

Southwest Indian Ocean," is forthcoming in the *Journal of the Marine Biological Association of the United Kingdom*. ■ SOURCE: MARINE MEGAFUNA FOUNDATION





Davide Marchetti in the final tunnel of Cenote Nohoch Nah Chich, after over ten hours of swimming.

*You cannot decide who you are, only what to do.*

Text and photos courtesy of Davide Marchetti

**On 3 May 2023, Davide Marchetti broke a world record in cave diving. He did the longest swim in a cave. Here is his story.**

It has been an awesome experience to achieve my objective, as much as it has been in getting there. I did this record for myself; there is no higher meaning or hidden philosophical message. I am telling you this story, because if an average person like me can manage to reach his goal, everybody can. I wish you all to feel like I did!

I was born and raised in Italy. Since I was a child, I have been passionate about the sea, the mountains, and pushing my limits. Every time I swam from a beach, I went farther and farther away to the point where I could not see people on the shore anymore. For me, being alone in the ocean or on a mountain was the only moment I felt free. My mother never knew where I was, or if I would come back.

For some reason, I felt that I did not need people around me. I never wanted to compete against others,

only against myself. I always looked for a challenge, something that made me feel alive and free.

I tried to be normal and have a regular job. It did not go well. Every time I acted according to society's

standards, I felt depressed. Before becoming a dive instructor, I was living a life that was not my own. I was betraying myself! It was like when a father abandons his kid, but you are both the father and the kid at the

same time. So, I decided to go with my heart and began living the life I had always wanted.

Today, I live and work in Mexico, where I have become a technical cave instructor and have two children.

After discovering my passion for cave diving, I started experimenting with sidemount rigs and a lot of stages, because I had to see how far I could go. I started to set personal records for penetration. It was just the natural thing to

# *Cave Diving* Longest Solo Swim

— *How It Feels to Break a World Record*





As the dive starts, Marchetti jots down notes about time and gas (right); Marchetti approaches the cave, leaving the open-water area behind him (below).



do, like when I was swimming from the beach as a kid.

I always had this urge to reach the top or the bottom or get to the end of something. Once you get to the bottom of the sea and look up, or on top of a mountain and look down, you see your past, present and future, all at once. You realise what you are capable of, and that now you better find some courage for what comes next. You will find yourself.

### Inspiration

Seven years ago, I came across some data on world records in diving, and I was fascinated by the maximum penetration performed by Sheck Exley in Florida. I started reading up about him, and I learnt how he dedicated his life to becoming a better diver and helping others do the same. I was inspired by his story.

Two years ago, I realised that if I kept pushing my distance record, I would have broken

Exley's record. I had to do it. I had no choice! It was the natural evolution of my diving career. I had never tried to be better than him, I just wanted to be better than myself.

His dive was very different from mine. He broke a record while exploring a deep cave with high flow. I was going to plan my dive with the sole purpose of going as far as possible, in the most efficient way possible.

Thanks to him, I finally found my inner challenge. At the same



time, I had the opportunity to show my children that we can achieve whatever we want, if we accept who we are, work hard and be smart. I knew that I was going to spend time away from them, because of my training. One must become excellent at making compromises.

I was going to break the record for the longest solo swim in a cave. I liked that idea, and I knew how to do it... At least, that was what I thought.

### If you decide to do something, do it properly

I set a date and had two years to get ready. Everything got real, really fast. Now was the moment to plan it all in my mind.

My objectives were to see how many tanks I could carry, find the perfect cave, and make a plan. I soon realised

that six tanks were my limit, and if I wanted to use more, I had to place them along the cave line in advance. I knew I wanted to dive with a wetsuit, within no-deco limits and with nine tanks in total, for a penetration between four and five kilometres. I also wanted to start upstream so I could come back with the current.

### Training dives

I decided to do my record in Nohoch Nah Chich, a cave system connected to Sac Actun, one of the longest cave systems in the world, here in Mexico. With six metres of depth, beautiful formations, wide passages, restrictions, interesting navigation and a nice current, it was the perfect place.

When diving for more than six or seven hours, gas is not the

only limit. I was going to need a decent light, CamelBaks for hydration, a catheter for my freediving suit, and a side-mount rig capable of keeping me horizontal with two to six tanks, full or empty.

I was so focused on equipment and navigation, that I forgot the most important factor... me! I thought that going from my usual six-hour dives to eight- or nine-hour dives would have been easier than it was. But when swimming for so long, even if you are fit, just one fin kick too hard can cause a cramp. Breathing inefficiently for just a few minutes can cause CO<sub>2</sub> retention, headaches and trigger stress. Being excessively tired can cause a loss of focus, leading to navigation errors. So, I would constantly be on the verge of failure. It







Cenote Nohoch Nah Chich is a beautiful, wide cave, perfect for long dives (left); The hoses of the two CamelBak hydration packs are visible on the shoulder straps (below).

## Cave Diving

endure fatigue. Every set and repetition I did was, in my mind, one more fin kick, or one more minute I could swim.

Workouts make your body and mind stronger. Thinking about an entire training session can be overwhelming, but if you focus on just one repetition at a time, you realise that you are capable of much more than you thought.

After two years and many trials, all my equipment was ready. My sidemount configuration was beautiful, and it still is. I knew that it was not perfect, but it worked very well. Perfection is relative to your ego; efficiency is relative to your objectives. My body

was better now in my 40s than it had ever been before (which is a total lie, but let's all pretend that it's true).

I told myself: "I build my equipment and my body all by myself, without any help, because I am perfect!"

If that were the truth, I would be an extremely sad and delusional individual.

I still love to be alone, and I have very few friends. But to achieve my goals, I had to let go of my ego, learn how to ask for help, and recognise my limitations. If it was not for my family, friends, colleagues and other professionals, I would not have made it. All the love, support and respect that I



would feel as if I was fighting the final boss in a video game, with my health bar at the minimum the whole time.

During training, I was experiencing some problems with my sidemount configuration. My lower back hurt like hell. My neck was compressed by the weight of the stages on my D-rings, and I was getting dizzy. I had cramps in my calves, tibialis, hamstrings, pectorals and abdominals. My body was giving up. I had to make drastic changes to my harness and workout routine. I had to keep experimenting and failing until I found a solution.

### Feedback and support

The psychological stressors I was exposed to were not only due to my

physical challenges, but also to the negative feedback I received from other dive professionals, acquaintances and social media trolls. I was genuinely surprised by some of the negative comments I got. I was told, both to my face and online, that what I was doing was stupid, pointless, risky or just wrong. I was told to find another job, to go back to my country, to learn how to take care of my family, and to learn how to dive.

On the other hand, the support I got from my family and colleagues was one of the best things that I had ever experienced in my life. They joined my training dives, shared their knowledge, and brought constructive criticism to the table. I decided to focus on that,

instead of the negative comments.

I understand now how people do not want to take the risk to do what they really want to do, because they do not want to be harassed by society. But at this point, I was committed to my goals more than ever, because if I let these negative influences affect me, how could I help my kids overcome the same issues in the future?

### Finding solutions

So, I studied human anatomy to figure out some more ergonomic solutions for my harness. I was very excited because every error was getting me closer to finding a solution. I hired a personal trainer, who helped me develop the muscles I needed to be stronger and





Marchetti makes his way through Cenote Nohoch Nah Chich.

received made this a great experience. When people decide to dedicate their time to you, it means something!

### Time to find courage

It was the day of the record attempt. My support divers and I were getting ready. It was all happening right now.

Since my childhood, I had seen family members dying in the hospital. I remembered how the surgeons were cold and focused when they told you all the horrible things that could go wrong if they could not fix them. They looked like robots when they worked, but they cried

like us when they lost a patient. When operating, surgeons have to stop being human and suffer in silence, so you can live.

When a human being has to focus on an extremely difficult task, he or she has to disconnect from the emotional consequences of the outcome. I love doctors because they never give up trying. I learnt from them to disconnect from my heart, operate with my brain, and take risks, because once you are in it, what other choice do you have?

When I am diving, I have no name, no family, no friends, no past, no future, no desires. I just have a task, then the next task,

until the mission is completed. I enjoy this mental sharpness, as much as I enjoy the environment and the aquatic life. I enjoy every fin kick, every negotiation of a restriction, every gas switch.

When it is time to do something complex, where the risk factor can trigger too many emotions, I need my sharpness. If we let fear and other negative emotions affect our judgment, we will mentally leave the dive and regret the decisions that led us there. One must stay in the dive, working on the solution, instead of rejecting the problem.



# Beneath the Sea

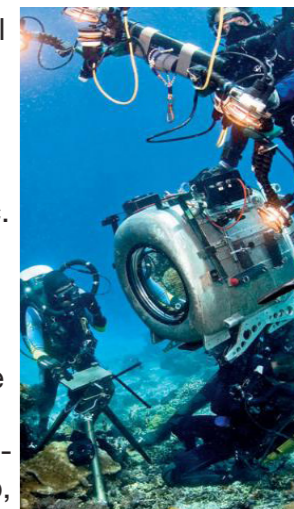
Proudly present their

## Legends of the Sea

### Howard & Michele Hall

Each year Beneath the Sea's Legend of the Sea Program recognizes a personal vision, the drive to follow that vision, and a dedication to purpose; sometimes the expression of calculated, well-reasoned, educated wisdom; sometimes it is plain and simple luck; sometimes it involves exceptional personal bravery in challenges which today seem ordinary, but then --way back then, when the earth and the sea were new, mysterious, untouched, dangerous -- it was heroic.

For over 40 years, Howard and Michele Hall have specialized in underwater natural history film production for television and IMAX/Giant Screen. They have produced numerous award-winning television films for PBS Nature, National Geographic, the BBC, Terra Mater and other broadcasters, and are the recipients of seven Emmy Awards. Award winning IMAX films produced and/or



directed by Howard and Michele include Into the Deep, Island of the Sharks, Deep Sea 3D, Under the Sea 3D, and most recently, Secrets of the Sea 3D which is opening in IMAX theaters in 2023 and 2024. Howard and Michele have participated in many other underwater IMAX productions in various capacities, including MacGillivray Freeman Films' IMAX film Coral Reef Adventure Journey to the South Pacific, Journey into Amazing Caves, and Humpback Whales. In 2011 Howard and Michele were inducted into the International Scuba Diving Hall of Fame. They were honorees of the 2016 Hans Hass Fifty Fathoms Award, and both are recipients of the Academy of Underwater Arts and Sciences' NOGI Award. Howard is a member of the Directors Guild and the Academy of Motion Picture Arts and Sciences. Michele is a member of the Academy of Television Arts and Sciences and the Woman Divers Hall of Fame. They both have graced Beneath the Sea's honor rolls before, first in 2011 as Diver's of the Year for Arts, then again in 2017 claiming the Pioneer award. This year we are proud to honor them again this time with Beneath the Sea's Legend of the Sea award.





*It feels great to experience a high level of focus, without having to repress emotions. One has to accept emotions and let them run in the background. That's it.*

Marchetti passes through "Heaven's Gate," the famous entrance of the cave.

### Challenges on the dive

I knew that on a ten-hour dive, I was going to have some inconveniences; it was inevitable. I had some minor equipment malfunctions and committed some avoidable errors because I was human. Acceptance is the first step in solving problems.

I had a delay during my dive because I made a last-minute change. I tried to pass through a restriction with too many tanks rather than dropping one on the line before the tight passage. Now, I was stuck, head down, holding three tanks with one hand, like an idiot. It was my own fault. Last-minute changes are the worst things to do. We can make mistakes when we change our routine, or when we do something new.

While I was backing off, to leave the tank before the restriction as planned, I told myself a lot of essential things in a fraction of a second:

"I expect and accept problems as part of the dive. I accept that I made a mistake. I accept the negative emotions about my stupidity. I am a normal person and stress is a normal reaction."

"I am the person I want to be. I am where I want to be. I am doing what I want to do. I put myself in this situation."

And the last thing was: "What is done, is done. Move on now!"

In about twenty minutes, I managed to fix the problem that

I had created for myself. I was late, but I was back on track!

### Early experiences

I was not always like this. When I was nine, my father left me alone on a mountain. At first, I cried for what felt like an eternity, waiting for him to come back. I had to become hard, unfeeling, and focus on finding my way back before nightfall. I grew up, repressing my feelings as a survival mechanism. After that day, I started swimming and hiking by myself.

As I grew up, I knew I had to change this unrewarding behaviour. Later, educating my students and my children helped me find a way to accept their emotions and mine. Learning empathy helped me to become better at handling stress.

It feels great to experience a high level of focus, without having to repress emotions. One has to accept emotions and let them run in the background. That's it.

### Back to the record attempt

After more than ten hours and eight kilometres, I completed the dive. I made it! Seeing my friends cheering for my achievement was the best thing ever. Indeed, it was *our* achievement, and sharing it with them made it even bigger!

### A life-changing experience

This experience has had two

positive outcomes in my life. First, I finally have the lifestyle I had always wanted. I eat, drink, sleep, train and study to become a better diver. I feel healthier and wiser, and my kids can learn about this from me.

Second, my students can benefit from all the experiments I did on my equipment and myself. They do not have to do all that I do, but I can apply most of my knowledge to the sidemount and cave diving courses I teach. The balance between ergonomics and hydrodynamics in the equipment configuration, the body posture, and the propulsion techniques are all topics that I can share with them.

I am grateful for letting people into my life, and for all the positive and negative experiences I had. I believe we have to decide with the heart, plan with the brain, and act with courage. ■

*Davide Marchetti is an IANTD Technical Cave Instructor. He was born in Turin, Italy, in 1983. At a young age, he discovered his passion for spearfishing and scuba diving. He became a PADI instructor in 2009 and worked in Italy, Egypt and the Maldives. In 2011, he moved to Mexico where he became a technical cave diver and an IANTD instructor. He has two children and runs his own business, Ghost Divers, in Playa Del Carmen. For more information, visit: [ghost-divers.com](http://ghost-divers.com).*





Digital  
copy of  
slide from  
circa 1981



Figure 1. DSLR camera with macro lens and slide duplicator

Text and photos by John A. Ares

**Got some old slides and negatives of underwater images that you wish you could revitalize and process in postproduction? John A. Ares describes in detail how one can convert film into digital files by using a DSLR camera and a macro lens.**

There are many methods of digitizing film. The methods described in this article are the highest quality and fastest method. Other scanning alternatives to DSLR and macro lens include:

- Getting a drum scan, at US\$20 and up, per shot.
- Sending your media to a domestic processing house to digitize your slides, photos and negatives.

- Sending your photos to a foreign processing house for inexpensive copying (risky).
- Scanning photos using a digital scanner, which can be long and

tedious to do, and scanners can be expensive or of low resolution.

In the 2020s, copying slides or negatives has been an improvised prac-

tice. This makes what we are doing here “jerry-built,” “jury-rigged” or “jerry-rigged.” In the spirit of “jury-rigging”—if you cannot buy it, *make* it. For old-school film photographers,

remember what you did in the dark-room.

### Equipment

Some patience will be required in

# Digitizing Film

*Using a DSLR Camera & Macro Lens*







Figure 2. (right) Fully assembled camera with rings and slide/negative copier

Figure 3 (below) Equipment needed includes a macro lens and slide duplicator (non-optical), plus extension tube and adaptor rings.



getting equipment to fit properly, depending on your particular system.

- Items needed:
- Digital SLR (DSLR or mirrorless)

- with a 50-65mm macro lens
- Extension tubes
- Slide copier (non-optical) to hold slides and film (most likely available on Ebay)
- Adapter rings to hold the slide

- copier to the macro lens
- Strobe with manual control
- Optional remote strobe, with 2 to 3ft extension cord
- Optional negative holder
- Focusing light (small reflector flood light and clamp)
- White flash bounce card or plain white foam-core board
- Dusting supplies, soft brush and air can

My experience in digitizing slides and negatives is with a Prinz slide duplicator (non-optical). Nikon actually makes a device called the Nikon ES 2 slide copying adapter. This is designed to fit Nikon macro lenses. I have no experience using this adapter; however, it might fit more camera models, as it screws into the lens front like a filter. In addition, it might be simpler to use than the setup that I have assembled (Figures 1 and 2).

### Assembly

Get a set of extension tubes and experiment with them to find the correct size. I have a set that includes 12mm, 20mm and 36mm tubes. The 20mm tube is the best fit for my APS-C sensor camera. Perhaps the 12mm tube might be a better choice for a full-frame sensor camera. Here, "experimentation" is the word of the day (Figure 3).

- Prinz slide duplicator (non-optical) (Figure 4, center). Notice the blue pen, which is inserted to demonstrate. There is *no glass* in the slide copier. The Prinz slide duplicator is a discontinued item; find it on Ebay for US\$10-20.
- Alternatively, use a Nikon ES 2 slide copying adapter (Figure 4, left).

PRO TIP: Do not be seduced into buying similar items (Figure 4, right). This item has poor quality glass. Copies will not be sharp. Beware, dozens are on Ebay.

### Negative holder (optional)

- Some modification (jury-rigging) may be necessary to fit negatives into the slide copier.
- Some are available on Ebay, but you may need to make a negative holder to stabilize

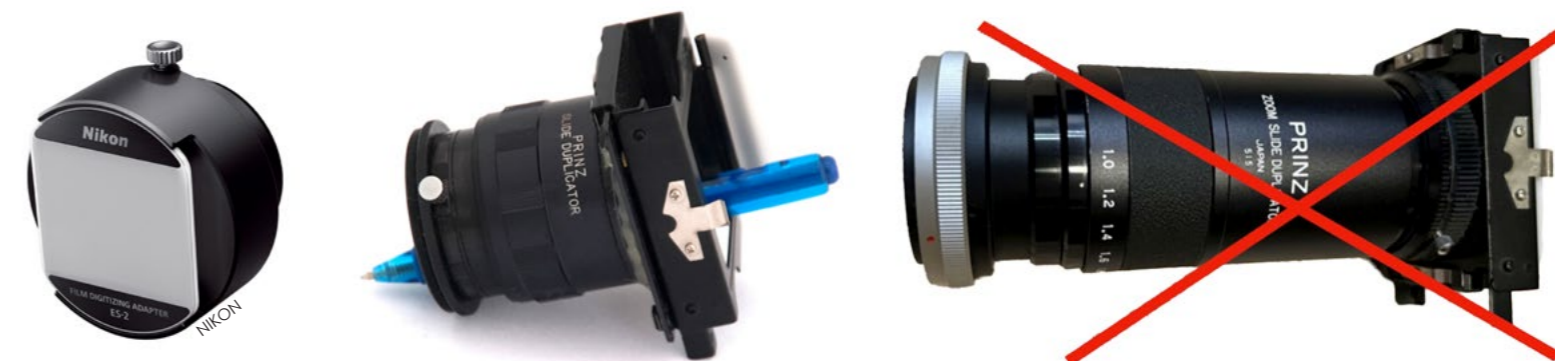


Figure 4. Nikon ES-2 slide copying adapter (on the left); Prinz slide duplicator (in the center), with a blue pen inserted for demonstration; Do not buy cheap copying adapters of poor quality (on the right).



Figure 6. Set your strobe to manual control and adjust the exposure compensation.



negative strips of up to six negatives. (See the use of thumbtacks on a foam core board in Figure 5.)

### Strobe with manual control

Many brands have manual control. Read your strobe manual to learn how to adjust the exposure compensation if you are not sure how to do it (Figure 6).

### Using the focusing light

This can be a small reflector flood-lamp and clamp (Figure 7).

- It is necessary to allow the camera to focus on the slide or negative.
- Position it in front of the slide copier.
- Beware, the light gets HOT—be aware of the film and nearby flammable materials.

Please note the white flash bounce card in front of the camera (Figure 7).

### Alternative method of shooting

If your exposures are not bright enough, you can use the strobe mounted off the camera, facing the macro lens. Connect the strobe to the camera hot shoe by using a remote cable (2 to 3ft long), dedicated to your camera model (Canon, Nikon, etc). Experiment with the distance between the slide copier and strobe. One to three feet should be sufficient.

### Dusting supplies:

- Air can
- Soft camel hairbrush, 1 inch wide
- Optional: White darkroom gloves to prevent fingerprints

Time spent dusting and preparing your slides and film means less dusting in Lightroom or Photoshop.

1. Lightly dust the slide with a brush. Holding the slide/negative firmly, blast both sides with the air can.

## Digitizing Film

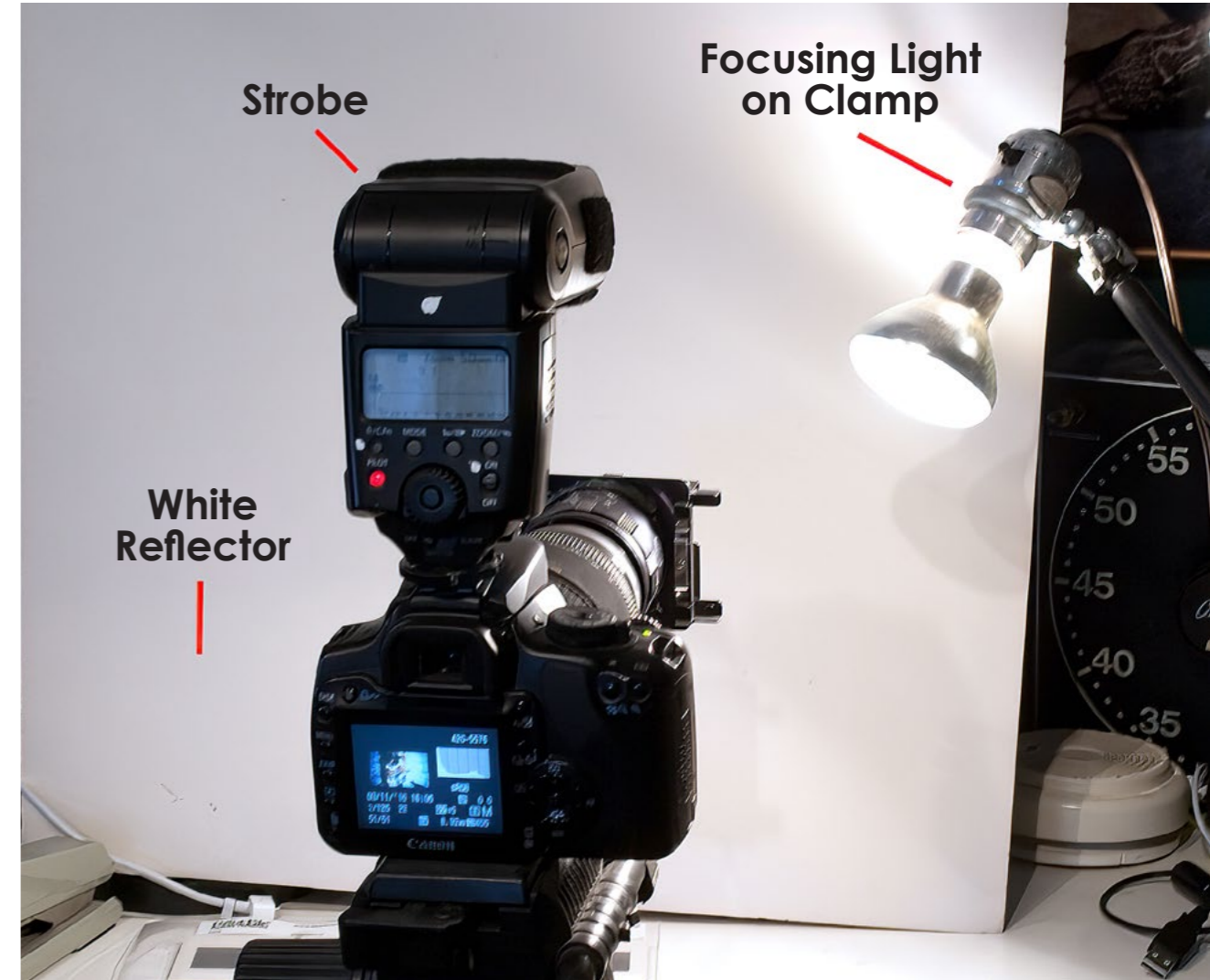


Figure 7. Use a focusing light; beware, it gets hot. Note the white flash bounce card in front of the camera.

2. Insert a slide into the carrier and center it—emulsion side away from the camera.
3. Turn on the focusing light.
4. Extension tube selection (start with 20mm or so). It is trial and error to find the right tube "size" to shoot the full slide.
5. Use auto focus on the lens, because you have shallow depth of field.
6. Use the center focus point—which may need to change, as the camera "searches to focus." Try selecting "all focus points." The camera needs to find contrast in order to focus.
7. Using manual focus may be necessary if the camera continues to search to focus after adjusting the focus point.

There will be three adjustments to properly align and center slides and negatives in the viewfinder (Figure 8).

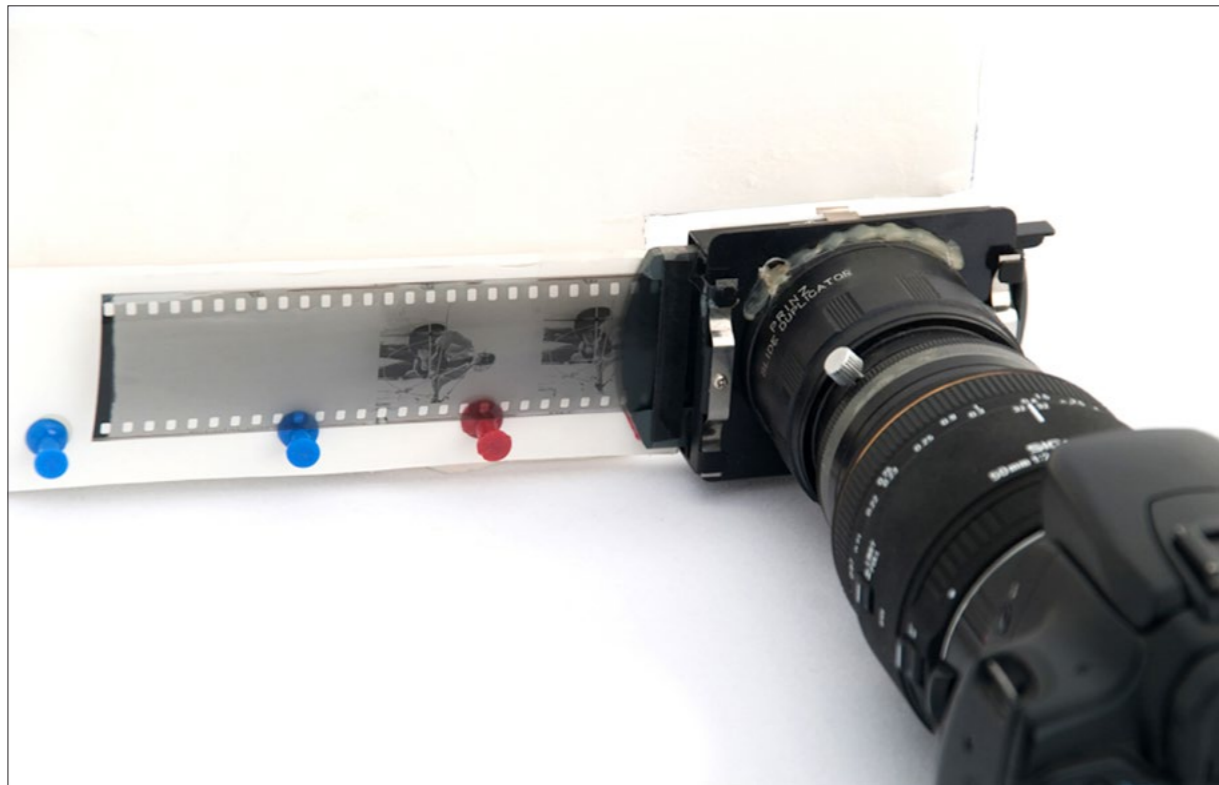


Figure 5. Negative holder made of foam core board and thumbtacks





Figure 8. (right and far right) Three adjustments are needed to properly align and center the slide or negative in the viewfinder: a) right and left; b) up and down; and c) rotation.

### Adjusting Nut for Rotation



Figure 9. Dust and insert slide with emulsion (dull) side facing away from the camera.

### Shooting slides

1. Select your slides.
2. Turn on the camera, strobe and focusing light.
3. Dust and insert the slide with emulsion (dull) side facing away from the camera (Figure 9).
4. Assure alignment and focus.
5. Shoot one slide at a time, bracketing exposures (normal exposure, overexposed by one stop, and underexposed by one stop, for a total of three exposures).
6. Check the histogram on the back of the camera.

### Histogram

- Use Manual mode in the cam-

era and set the shutter speed to 1/125 (approximately).

- Set the strobe to Manual mode.
- Bracket exposures—check the histogram and “expose to the right,” as shown in Figure 10.

### Shooting negatives

- Use the same setup as for slides
- Then, insert the negative carrier fully into the copier, and
- Insert negatives, emulsion side away, pinching the film slightly (Figure 11).

## Update On Diving Medicine

Gary Rose, MD, Tour Leader

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Figure 10. When bracketing exposures, check the histogram and “expose to the right,” as shown.



### Jury-rigging notes

You can make carriers for 120 slides, or other non-35mm slides and negatives, from photo-mounting board.

**PRO TIP:** You can shoot while the camera is “tethered” to your computer, to better check focus, exposure and alignment. Read your camera manual to learn how to do this or do an online search for the procedure for your specific model of camera and computer (See Figure 12).

### Final thoughts

Using this method, there is no need to let your slides and negatives sit forgotten in storage. With a minimal amount of trial and error and a bit of ingenuity, you can bring renewed life to your film images by transforming them into digital files, which can then be more readily processed, corrected and cropped in postproduction software applications. ■

A former senior management consultant for Fortune 100 companies, studio commercial photographer and trained biologist and marine food toxicologist, John A. Ares is an assignment and stock photographer and image consultant based on Staten Island in New York City, specializing in portraits, nature, travel, underwater, food/restaurant and fine art photography. An avid diver, he has been a PADI instructor and instructor trainer, teaching underwater photography courses and traveling to many exotic dive destinations around the world. A member of the New York Underwater Photographic Society (NYUPS) and American Society of Media Photographers (ASMP), he has served as an associate editor and photographer for Seafood America magazine and his work has won com-

petitions of American Photographer magazine. He also conducts training seminars and has been a presenter at Beneath the Sea and NYUPS. For more information, visit: [JohnAres.com](http://JohnAres.com).



Figure 11. Insert the negative carrier fully into the copier (above) and insert negatives, emulsion side away, pinching the film slightly (right).



Figure 12. (left) To better check focus, exposure and alignment, one can shoot while the camera is “tethered” to a computer, using an appropriate type of USB cable. See your camera’s user manual to learn how to do this, or search online for the procedure for your specific camera and computer model.



COMPOSITE BY G. SYMES



# Seascapes

*Contributors' Picks*

Text and photos  
by John A. Ares, Sheryl  
Checkman, Larry Cohen,  
Anita George-Ares, Kate Jonker,  
Matthew Meier, Brandi Mueller, Gary  
Rose, Michael Rothschild and Olga Torrey

**We asked our contributors to share their favorite photos that show underwater seascapes, and they came back with a range of wide-angle shots featuring a variety of marine life, large and small. Here, X-Ray Mag contributors share their chosen images from the tropical waters of Fiji, Papua New Guinea, the Philippines, Indonesia, Malaysia, the Maldives, Türkiye, the Red Sea, Mozambique, Saba, the Bahamas and the Galápagos Islands, to the subtropical and temperate waters of South Africa, Newfoundland in Canada, and the US East Coast.**





## Seascapes

Jack fish rubs parasites off its body on the shell of a passing green sea turtle, Galápagos Islands (left). Gear: Nikon D850 camera, 8-15mm fisheye lens, Ikelite housing, natural light. Exposure: ISO 500, f/14, 1/160s

Eagle rays, Galápagos Islands (below). Gear: Nikon D850 camera, 8-15mm fisheye lens, Ikelite housing, dual Ikelite DS230 strobes. Exposure: ISO 500, f/13, 1/125s



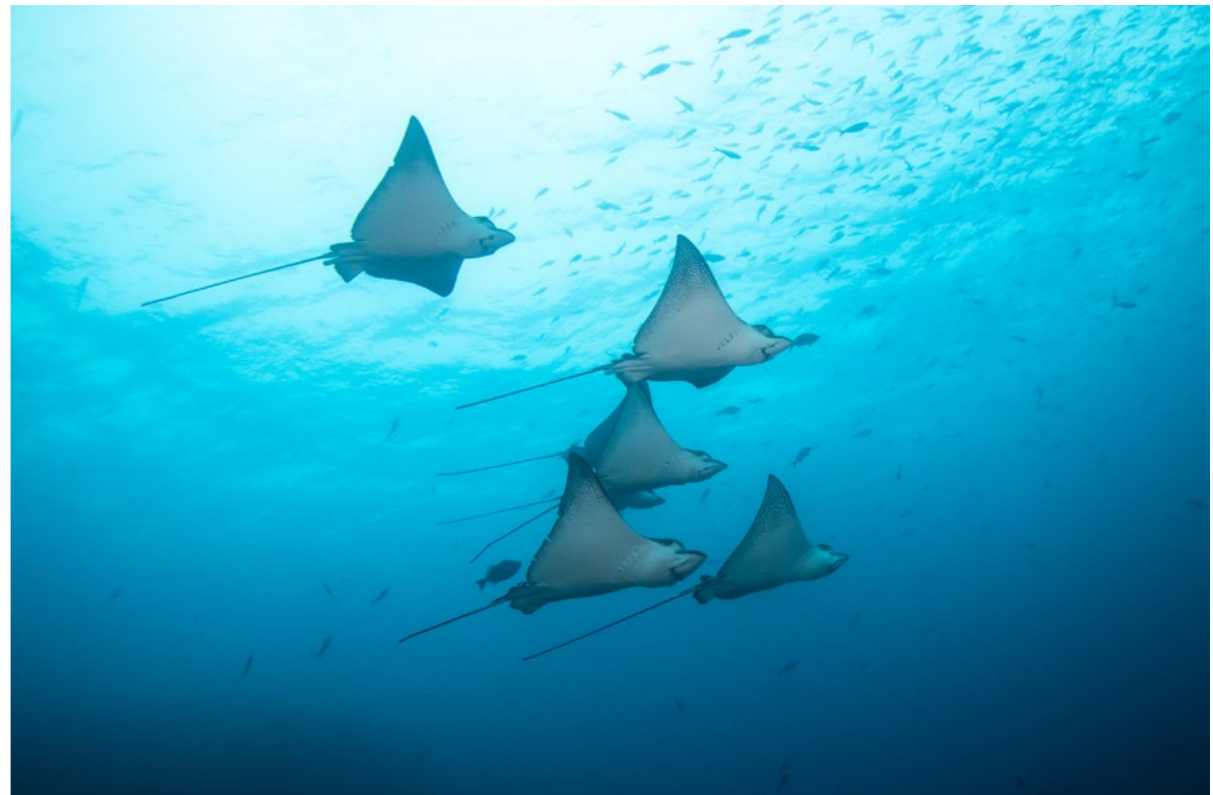
School of Pacific creolefish, Galápagos Islands (top left). Gear: Nikon D850 camera, Nikon 8-15mm fisheye lens, Ikelite housing, dual Ikelite DS230 strobes. Exposure: ISO 400, f/10, 1/160s

### The Galápagos Islands

Text and photos by Brandi Mueller

The topic of "seascapes" strikes me as potentially all-encompassing when we are talking about wide-angle underwater photography. It seems to me that almost every image we take underwater is a seascape of some sort, but I decided to focus on images from the Galápagos Islands in Ecuador.

The islands are known for big animals in big scenes. While not tropical, sponges and temperate corals cover rocky terrain and create interesting backgrounds that support, but do not distract, from the apex animals that steal the show.



Playful sea lions swirl around divers, the shell of a cruising sea turtle serves as a place for fish to rub parasites off their bodies, and colorful fish swim by like a sudden pink rain shower. Sometimes, the vast blue

waters here are the perfect backdrop for massive schools of hammerheads and eagle rays. These scenes are some of the first things that come to mind when I consider seascapes. Visit: [brandiunderwater.com](http://brandiunderwater.com)

Playful sea lion, Galápagos Islands (above). Gear: Nikon D850 camera, Nikon 8-15mm fisheye lens, Ikelite housing, dual Ikelite DS230 strobes. Exposure: ISO 400, f/10, 1/125s

Hammerhead sharks, Galápagos Islands (previous page). Gear: Nikon D850 camera, Nikon 8-15mm fisheye lens, Ikelite housing, natural light. Exposure: ISO 500, f/10, 1/160s



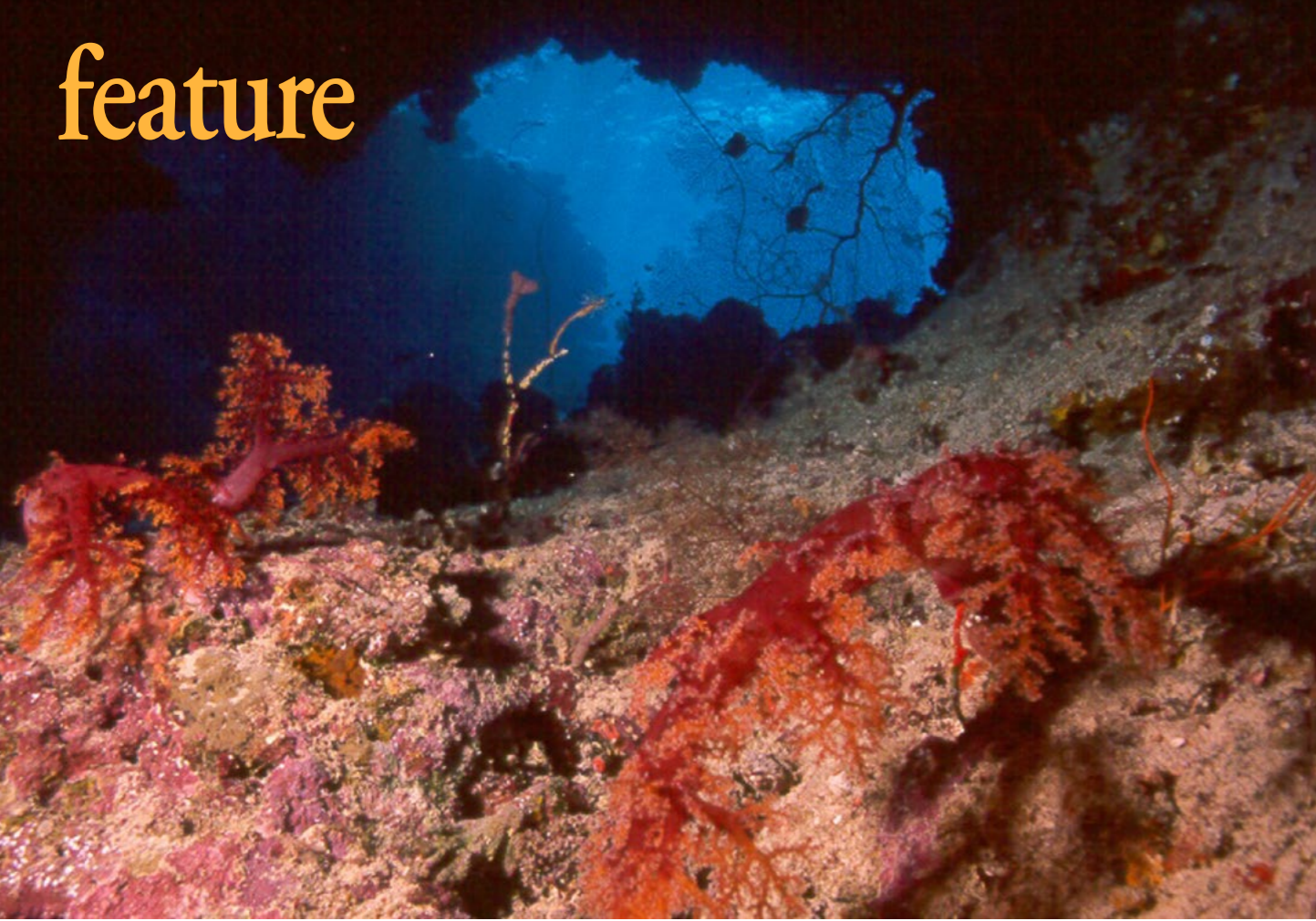


Photo 2. (left) Great white shark behind a wall of fish, Guadalupe Island, Mexico. Gear: Canon EOS 10D camera, Sigma 11-17mm f/2.8 lens at 11mm, Ikelite housing, available light. Exposure: ISO 1600, f/16, 125s



Photo 1. (left) E-6 Grotto, Fiji. Gear: Nikonos II camera, 20mm lens, single Ikelite DS125 strobe. Exposure: ISO 400, f/8, 125s

## Fiji and the Philippines

Text and photos by John A. Ares

When you see them, seascapes produce a “wow” reaction. Not every dive site has a “wow” seascape, but you experience a sense of grandeur when in the middle of the scene.

The E-6 grotto in Fiji was one of the most fantasy-fulfilling dives ever (Photo 1). With striking colors, gentle curves of soft corals arching overhead and ample room to swim through, this was one gorgeous dive.

The great white shark behind a wall of fish produced a 3D experience in Photo 2. The fish in front were about six feet away from the me and barely masked the shark lurking behind, maybe 10 to 15ft farther.

In Photo 3, the wall of fish under-



Photo 4. (below) Three divers near a cavern with soft coral, Sumilon Island, Philippines. Gear: Canon EOS Rebel T1i camera, Canon EF-S 10-18mm f/4.5-5.6 IS STM lens at 10mm, Ikelite housing, twin Ikelite 161 strobes. Exposure: ISO 400, f/4.5, 1/60s

neath the boat was composed of thousands of individuals. Our shark cage was gently swinging back and forth, creating a different view every few seconds. The visibility was nearly 200ft.

Three divers near a cavern off Sumilon Island are shown with soft

corals in Photo 4. Two of the divers were ascending and changed positions during my sequence of photos. I took about four shots, and this one was the best. Sumilon has exceptional swim-throughs and can have strong currents. Visit: [JohnAres.com](http://JohnAres.com)

Photo 3. (above) Wall of fish underneath dive boat, Guadalupe Island, Mexico. Gear: Canon EOS 10D camera, Sigma 11-17mm f/4.5-5.6 IS STM lens at 11mm, Ikelite housing, available light. Exposure: ISO 1600, f/3.5, 100s





# feature

Looking up, Alimatha, Maldives (right). Gear: Olympus TG-5 camera at 4.5mm, Olympus PT-059 housing, ambient light. Exposure: ISO 200, f/2.8, 1/125s

Nurse sharks and diver, Alimatha, Maldives (far right). Gear: Olympus TG-5 camera at 4.5mm, Olympus PT-059 housing, ambient light. Exposure: ISO 200, f/2.8, 1/8s

Tawney nurse shark, Dhiggiri, Maldives (below). Gear: Olympus TG-5 camera at 5.87mm, Olympus PT-059 housing, ambient light. Exposure: ISO 160, f/9.0, 1/200s



## Seascapes



### The Maldives

Text & photos by Sheryl Checkman

The sea is an infinite, deep blue space that is home to creatures both big and small, and to which we divers are allowed to visit. Water comprises approximately 71% of the Earth's surface. The seascapes I chose for this feature show the relationship between the water, some of the sharks that live in it, and we humans who come to observe them. These photos were all shot with ambient light.

On a recent trip to the Maldives, I had several opportunities to watch nurse sharks swimming through the water in ways I have never seen before.

At Dhiggiri in the Vaavu Atoll, I watched from a unique perspec-

five as a large tawney nurse shark, and its companion sharksucker (or remora), swam directly above me. During a nurse shark dive at Alimatha, also in the Vaavu Atoll, hundreds of nurse sharks, smelling the human-provided bait, arrived en-masse, as one lone diver swam in their midst. Also, at Alimatha, I looked up from below to see at least seven nurse sharks silhouetted against the surface above.

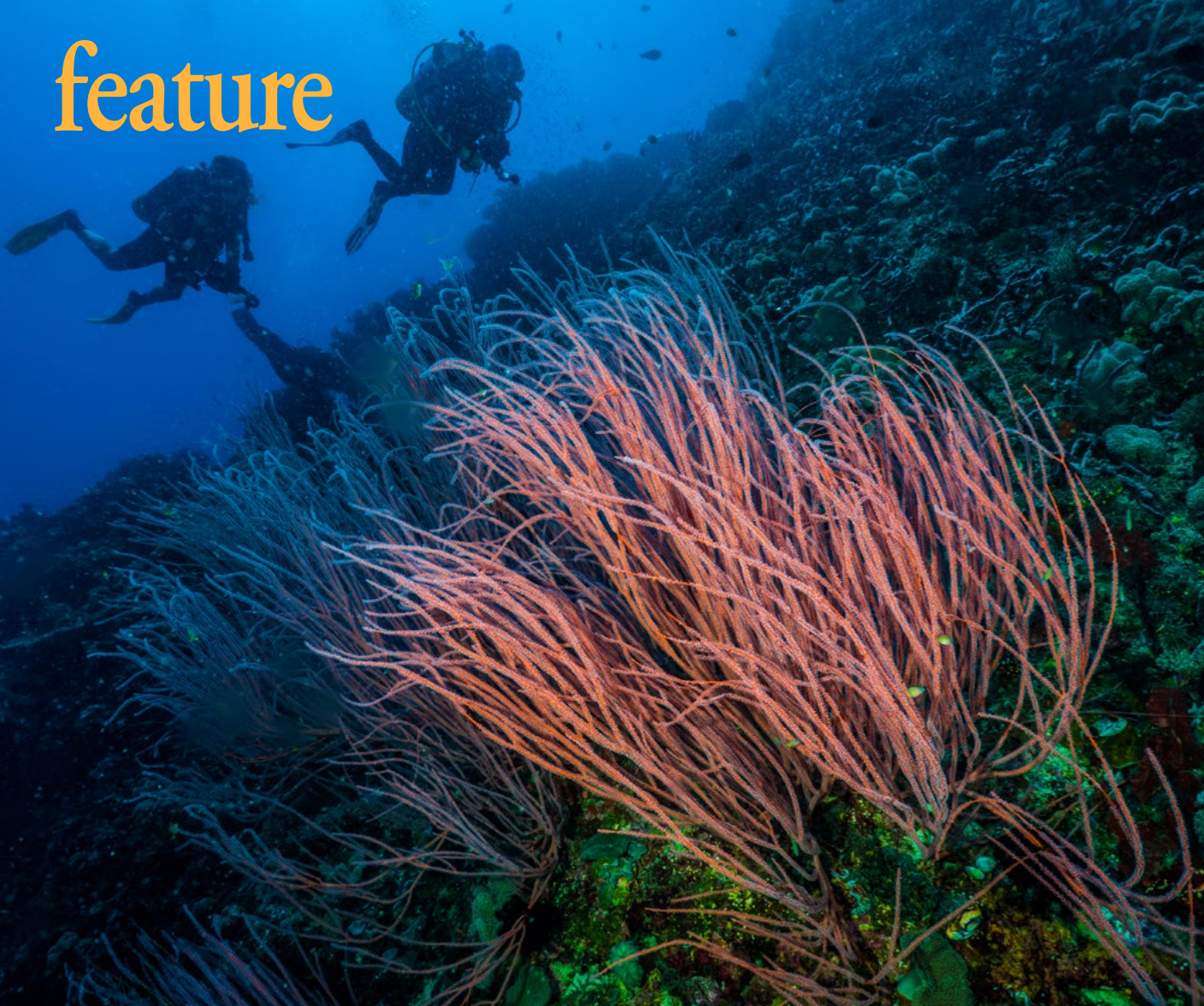
And, while hooked in at Moo Fushi Corner in South Ari Atoll, I watched as a whitetip reef shark rested on the sand—a position I am more used to seeing with nurse sharks. Appearing to smile at me, I think it was okay with my coming to visit and enjoy the seascape that this shark calls home. Visit: [Instagram.com/SherylCheckman](https://www.instagram.com/SherylCheckman)



Whitetip reef shark, Moo Fushi Corner, Maldives (above). Gear: Olympus TG-5 camera at 18mm, Olympus PT-059 housing, ambient light. Exposure: ISO 200, f/6.3, 1/200s







Clarion angelfish, Socorro Island, Mexico (left). Gear: Olympus OM-D E-M1 camera, Olympus 9-18mm Lens, Aquatica housing, Sea&Sea YS-D1 strobes. Exposure: ISO 400, f/8, 1/125s

The Arch, Papua New Guinea (below). Gear: Olympus OM-D E-M1 camera, Olympus 9-18mm Lens, Aquatica housing, Sea&Sea YS-D1 strobes. Exposure: ISO 400, f/4.0, 1/80s

Whip coral on wall, Papua New Guinea (left). Gear: Olympus OM-D E-M1 camera, Olympus 9-18mm Lens, Aquatica housing, Sea&Sea YS-D1 strobes. Exposure: ISO 250, f/5.6, 1/60s



Diver in cave, Three Islands, Türkiye. Gear: Olympus E-330 camera, Olympus 7-14mm Lens, Olympus housing, Olympus FL36 flash in PFL-E01 flash housing. Exposure: ISO 400, f/4.0, 1/30s

### Papua New Guinea, Mexico & Türkiye

Text and photos by Larry Cohen

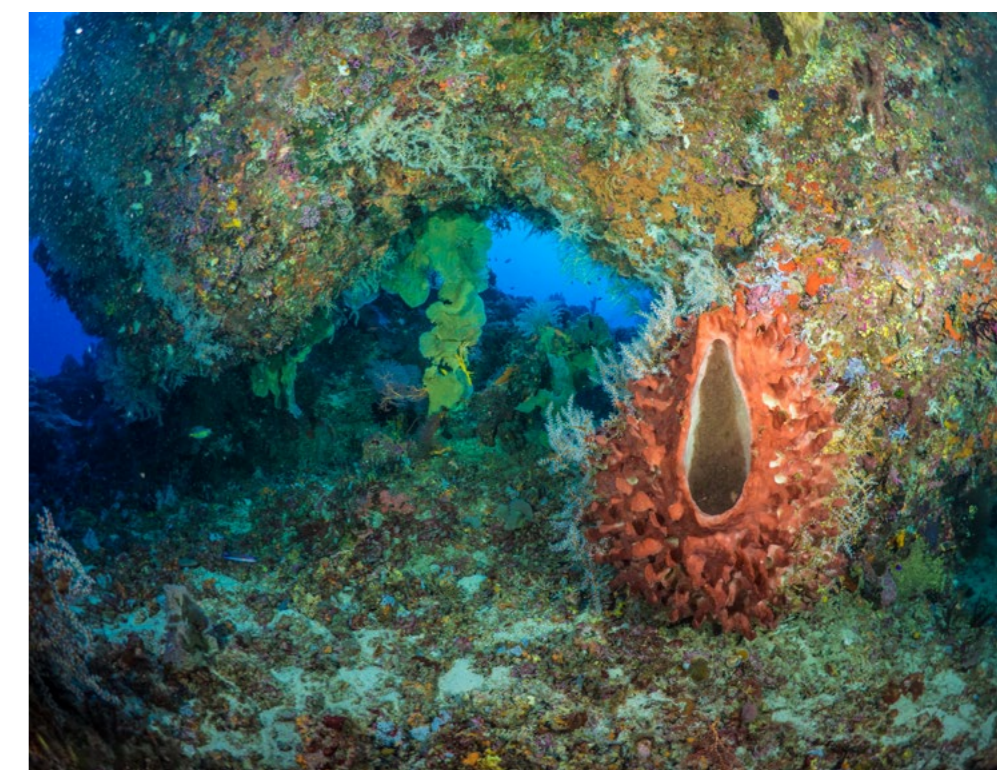
Underwater photographers have the privilege of experiencing different seascapes around the world. The main feature might be coral reefs with colorful sponges or interesting rock formations. One of my favorite places to view seascapes is Papua New Guinea. When diving on Elaine's Reef, I wanted to capture the beauty of the whip coral on the wall. As I pushed the shutter button, two divers swam into the frame. Back on the boat, they apologized for getting into my shot. I then showed them how this accident added depth to the image.

The Arch is an exquisite dive site in Papua New Guinea's Kimbe Bay. This offshore site is reached via liveaboard boat. The giant sponge inside the arch makes a spectacu-

lar seascape photograph.

In Mexico, the Revillagigedo Archipelago off the western coast is known for giant manta rays, sharks and other large animals, but the area's seascapes are also magnificent. There are many fascinating walls, pinnacles and small marine life. While circling the wall around Socorro Island, I spotted a school of Clarion angelfish. This colorful fish is only found off the Pacific coast of Mexico. They are popular aquarium fish but cannot be taken legally. Tank-raised juveniles are sold for as much as US\$3,000.

In the Mediterranean, the Three Islands is a dive location near the resort town of Kemer in Türkiye (Turkey). At one dive



site, there is a small underwater cave, the entrance of which is a hole in the side of the island. The rocky seascape is not colorful but intriguing, as one swims into the entrance. Visit: [liquidimagesuw.com](http://liquidimagesuw.com)



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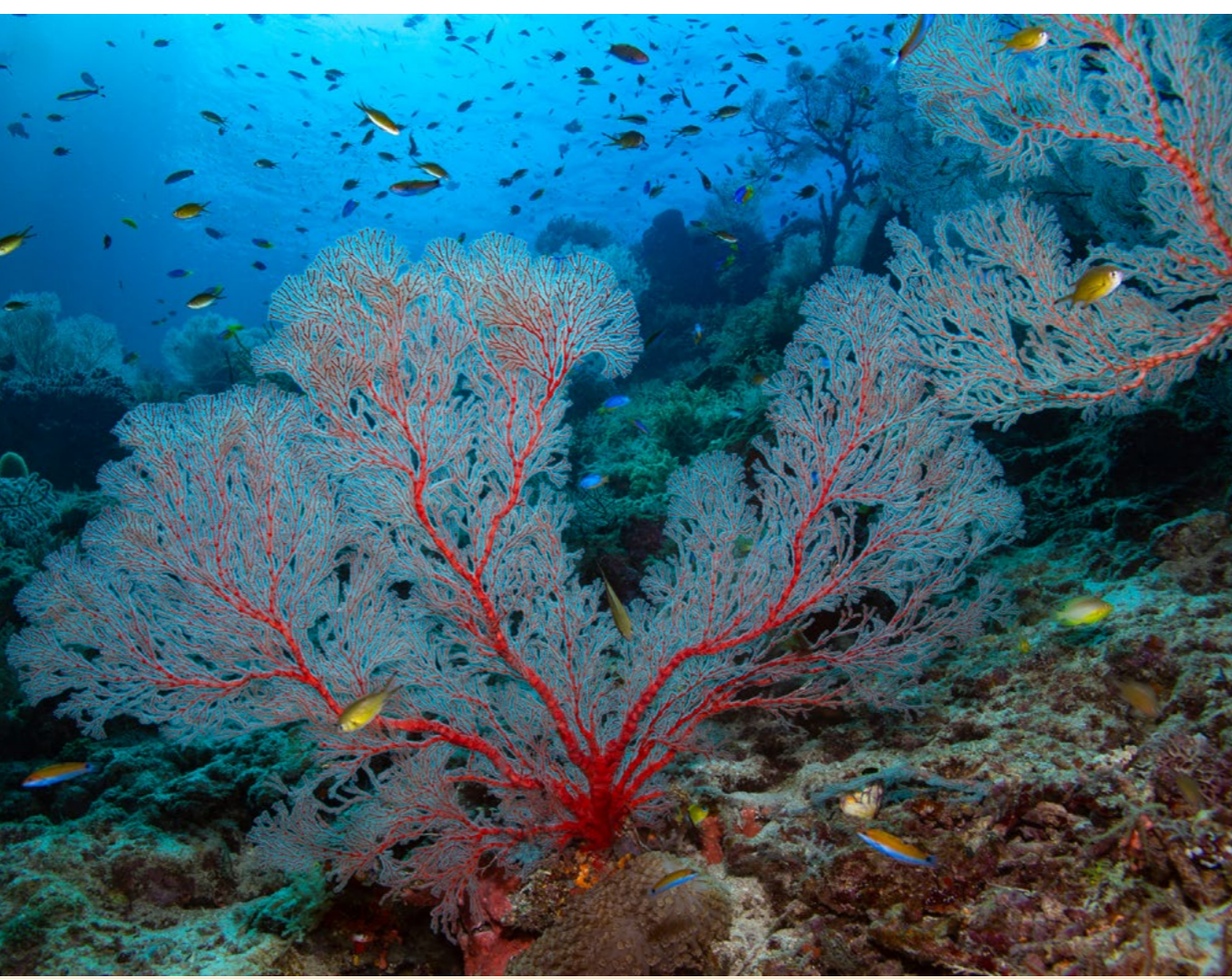
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## Raja Ampat

Text and photos by  
Anita George-Ares, PhD

My favorite seascapes were taken off the small island of Daram, located near the prominent Misool Island in South Raja Ampat, Indonesia. Photo 1 was taken at the Andiamo dive site. Photos 2, 3, and 4 were taken at the Warna Berwarna dive site. Warna Berwarna is an Indonesian name meaning “beautiful colors.” This site is characterized by numerous large sea fans and dense schools of fish.

These seascapes incorporate some important elements in landscape composition: vibrant colors,

texture, repetition, depth and layers. In Photo 1, a ternate chromis poses by a crinoid, a rose-colored sea fan and a carpet of orange soft corals. In Photo 2, a single red sea fan dominates the seascape, while in Photos 3 and 4, the repetition of sea fans creates interesting patterns and symmetry.

The seascape in Photo 4 was characterized by white sea fans against blue water. Converting the image to black and white added structure and contrast while highlighting the beauty of the sea fans and school of fusiliers. The image was converted to black and white using Nik Silver Efex Pro 2 software. Visit: [facebook.com/profile.php?id=100016947967639](https://facebook.com/profile.php?id=100016947967639)

Photo 1. (top left) Ternate chromis and sea fan, Andiamo, Daram, South Raja Ampat. Gear: Canon EOS Rebel SL1 camera, Canon EF-S 18-55mm f/3.5-5.6 IS STM lens (at 18 mm), Ikelite housing, one Ikelite DS161 strobe, Bigblue VL4200P light. Exposure: ISO 400, f/8, 1/160s

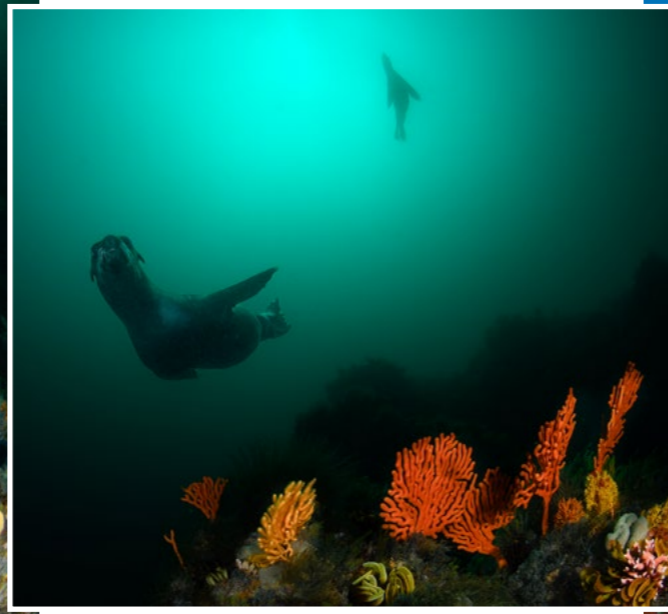
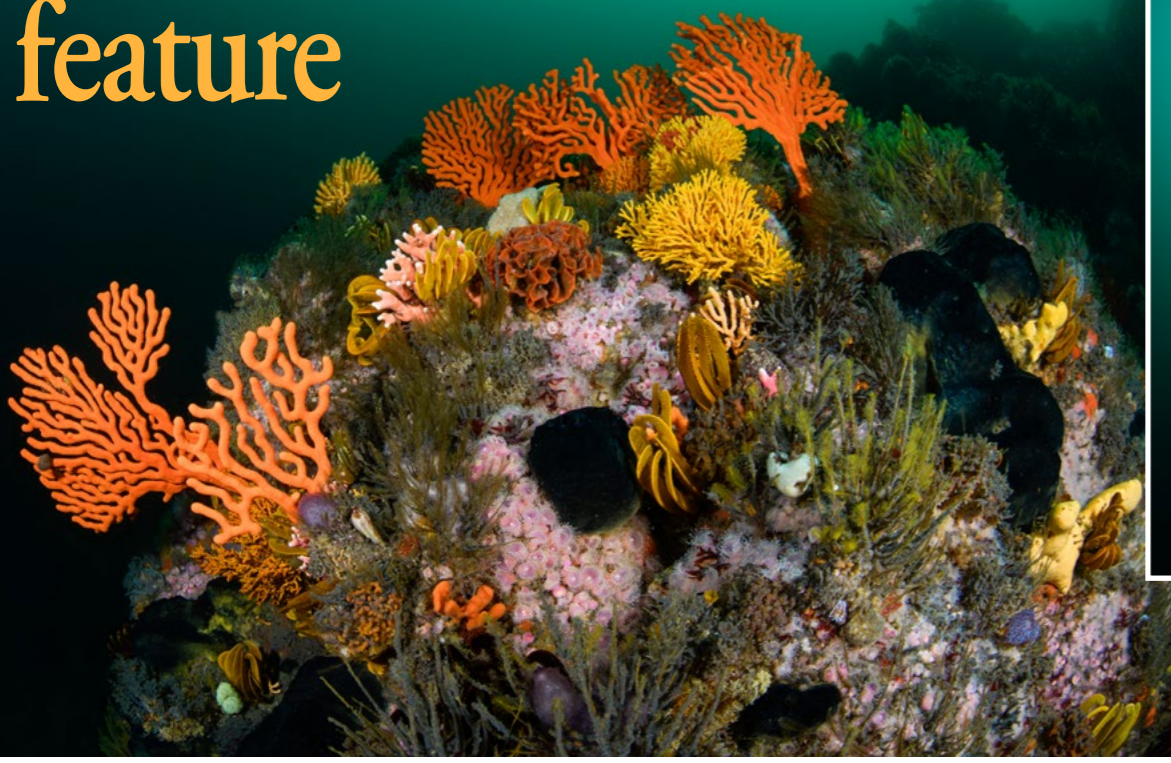
Photo 2. (left) Red sea fan, Warna Berwarna, Daram, South Raja Ampat. Gear: Canon EOS Rebel SL1 camera, Canon EF-S 18-55mm f/3.5-5.6 IS STM lens (at 18 mm), Ikelite housing, one Ikelite DS161 strobe, Bigblue VL4200P light. Exposure: ISO 200, f/11, 1/125s

Photo 3. (top right) Sea fans and silvery fish, Warna Berwarna, Daram, South Raja Ampat. Gear: Canon EOS Rebel SL1 camera, Canon EF-S 18-55mm f/3.5-5.6 IS STM lens (at 18 mm), Ikelite housing, one Ikelite DS161 strobe, Bigblue VL4200P light. Exposure: ISO 400, f/11, 1/160s

Photo 4. (top center) Sea fans in black and white, Warna Berwarna, Daram, South Raja Ampat. Gear: Canon EOS Rebel SL1 camera, Canon EF-S 18-55mm f/3.5-5.6 IS STM lens (at 18mm), Ikelite housing, Ikelite DS161 strobe, Bigblue VL4200P light. Exposure: ISO 200, f/11, 1/160s







Cape fur seals (above), Steenbras Deep, False Bay, South Africa. Gear: Canon R5 camera, Canon 8-15mm circular fish-eye lens, Marelux housing, Supe D-Pro strobes. Exposure: ISO 320, f/14, 1/100s



Shark and Yolanda reefs (above), northern Red Sea. Gear: Canon EOS 7D Mark II camera, Tokina 10-17mm fisheye lens, Sea&Sea housing, Inon Z-240 strobes. Exposure: ISO 160, f/9, 1/160s; Steep walls at Habili Ali (right), northern Red Sea. Gear: Canon EOS 7D Mark II camera, Tokina 10-17mm fisheye lens, Sea&Sea housing, Inon Z-240 strobes. Exposure: ISO 160, f/8, 1/160s



Sea fans, pink noble corals and strawberry anemones at Steenbras Deep (top left), False Bay, South Africa. Gear: Canon R5 camera, Canon 8-15mm circular fisheye lens, Marelux housing, Supe D-Pro strobes. Exposure: ISO 320, f/14, 1/100s; Sea fans at False Bay (left), South Africa. Gear: Canon R5 camera, Canon 8-15mm circular fisheye lens, Marelux housing, Supe D-Pro strobes. Exposure: ISO 400, f/16, 1/100s; Ember parrotfish (bottom left), Checkers Reef, Ponta do Ouro, Mozambique. Gear: Canon EOS 7D Mark II camera, Tokina 10-17mm fisheye lens, Sea&Sea housing, Inon Z-240 strobes. Exposure: ISO 320, f/11, 1/125s



## Distinctively Different

Text and photos by Kate Jonker

When I think of seascapes, those of the Red Sea, Mozambique and False Bay in South Africa immediately come to mind, as they are each unique and distinctive—easily recognizable in underwater images.

In the northern Red Sea, vibrant hard coral reefs provide a kaleidoscopic setting for diverse marine life, including schools of fish, sharks and turtles. For me, the large sandy plateau behind Shark and Yolanda reefs, adorned with pale soft corals and schools of unicornfish epitomises a mesmerising seascape.

Venturing to the southern Red Sea reveals caves, coral reefs and steep walls adorned with vibrant soft corals, gorgonian fans and sea whips. Swimming alongside the steep-sided walls, where several species of sharks, dolphins and large fish roam, is an awe-inspiring experience.

Closer to home, Mozambique's flat reefs of fossilised sand dunes offer a stark contrast. Teeming with colourful fish in shallow waters, and attracting sharks like hammerheads in the deeper reefs, Mozambique promises an exhilarating and memorable diving experience.

Returning to False Bay in

Cape Town introduces cooler waters, kelp forests and rocky reefs. Home to seals, small sharks and vibrant invertebrates, the eastern coastline of False Bay captures my heart with its rambling kelp forests and vibrant reefs.

Whether it is the warm allure of the northern Red Sea, the dramatic walls of the southern Red Sea, the wild reefs of Mozambique, or the marine-rich ecosystems of False Bay, each seascape ensures a captivating, diverse and unique underwater adventure for diving enthusiasts and underwater photographers. Visit: [katejonker.com](http://katejonker.com)







## The Colorful Waters of Fiji

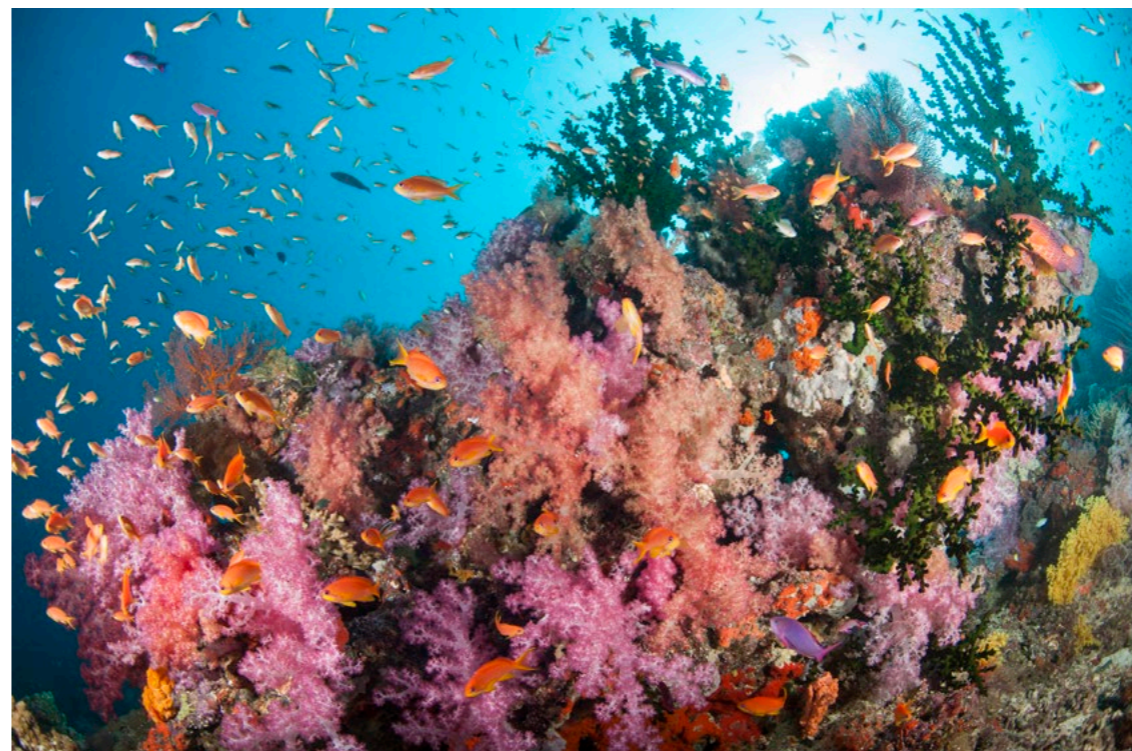
Text and photos by Matthew Meier

The term “seascape” can be interpreted in different ways and every individual will have their own definition, but, for me, I envision wide expanses of colorful coral reefs, exploding with life. In my experience, Fiji has some of the most “fishy” and vibrant reefs on the planet, so when this request hit my inbox, I immediately knew where to start searching in my library of images.

The Bligh Waters, located north of the island of Viti Levu and Rainbow Reef in the Somosomo Strait between the islands of Taveuni and Vanua Levu, is my favorite destination



to witness a kaleidoscope of multicolored soft corals and abundant reef fish. The only real issue I had was narrowing the selection down to just four photos, as I try to showcase the brilliant variety and breadth of life that can be seen on these spectacular reefs. Visit: [MatthewMeierphoto.com](http://MatthewMeierphoto.com)



Scalefin anthias, soft corals, gorgonians, dark-green black sun corals and orange sponges on wall, Bligh Waters, Fiji (above). Gear: Nikon D3 camera, Nikon 16mm fisheye lens, Subal housing, Sea&Sea YS-250 strobes. Exposure: ISO 200, f/6.3, 1/250s

Scalefin and purple anthias over leather soft coral and a sea fan covered in pink and purple soft corals, Bligh Waters, Fiji (above). Gear: Nikon D810 camera, Nikon 16-35mm lens, Subal housing, Sea&Sea D3 strobes. Exposure: ISO 800, f/6.3, 1/125s

Scalefin anthias over pink and purple soft corals, gorgonian sea fans, dark green black sun corals and orange sponges on a rocky reef wall, Bligh Waters, Fiji (top left). Gear: Nikon D3 camera, Nikon 16mm fisheye lens, Subal housing, Sea&Sea YS-250 strobes. Exposure: ISO 200, f/6.3, 1/250s

Scalefin anthias, chromis, butterflyfish and a spotted unicornfish above colorful soft corals, Rainbow Reef, Fiji (far left). Gear: Nikon D3 camera, Nikon 17-35mm lens, Subal housing, Sea&Sea YS-250 strobes. Exposure: ISO 200, f/6.3, 1/100s



# feature

All photos were taken with a Nikon D500 camera, Tokina 10-17mm lens, Nauticam housing and Inon Z-330 strobes.

Photo 1. (right) Lionfish on reef, Saba. A beginner's mistake: no clear and defined subject, and poor lighting. Exposure: ISO 100, f/8, 1/100s, FL 17



Photo 2. (left) Coral head in shallow water, Bahamas. The coral head, with its brilliant color, is the subject. Exposure: ISO 200, f/14, 1/125s, FL 10

Photo 3. (below) Hanging elkhorn coral, Bahamas. The elkhorn coral is sharply focused, and the diver is in focus, giving the viewer a sense of floating on the wall. Exposure: ISO 200, f/18, 1/160s, FL 17

## Define Your Subject

Text and photos by Gary Rose, MD

Many first-time and beginner underwater photographers shoot their initial photographs of “all-encompassing” seascapes. They then progress to taking photos of individual fish. With a little time, they learn that the deeper they go, there is an inverse proportion to the amount of sunlight that penetrates to the depths with an accompanying loss of the warm colors—yellow, orange and red. It is at about this time in their photographic skills development, that they learn to focus on, highlight and define the subject(s) being photographed.

Photo 1 is an example of a poorly planned seascape with a lionfish. My intention was to capture the subject (the lionfish) in its habitat. However, the lighting highlighted an excessive amount of the surrounding coral, which distracts from the subject. Then, the viewer's eye is strongly drawn to the towering sponges in the background. The lionfish is lost in all of the surrounding clutter. It would have been much more effective to capture the lionfish from the side, creating negative space behind it, which would then have separated it from all of the surrounding jumble and distractors.

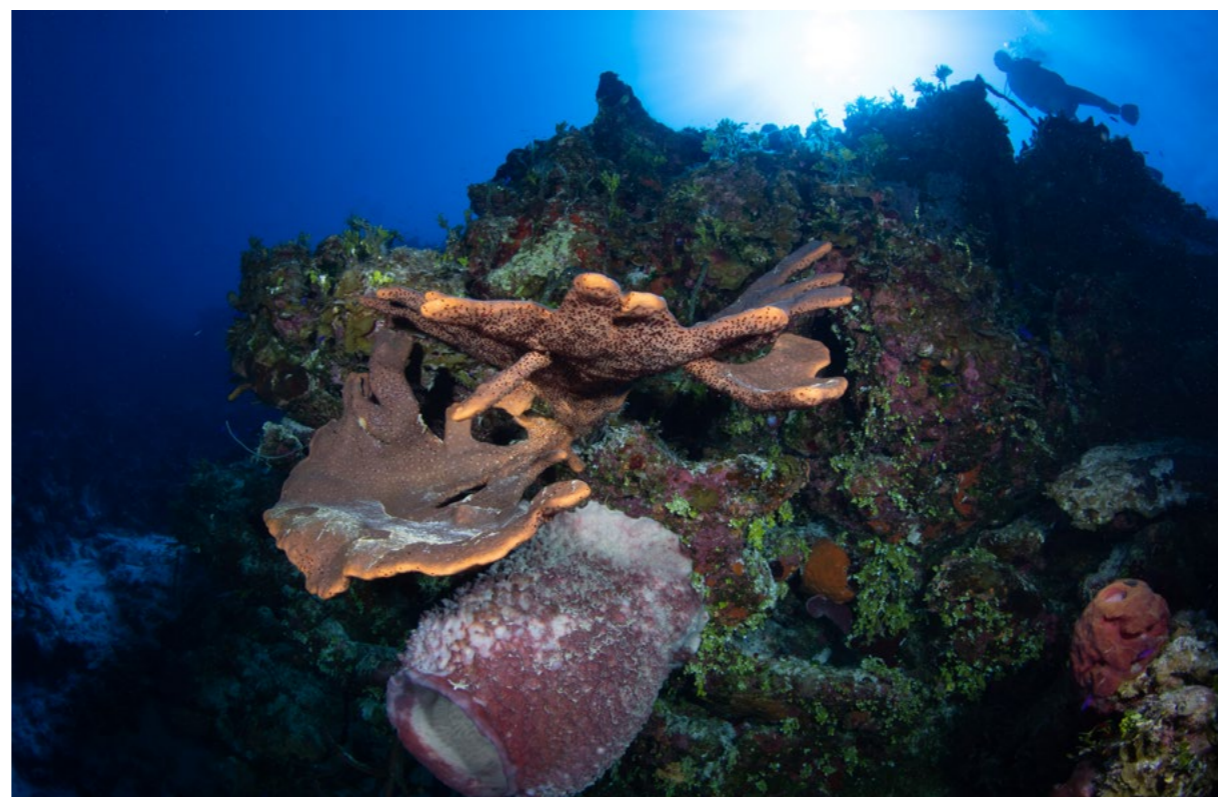
At first glance, the multiple hues

Photo 4. (right) Elkhorn coral and barrel sponge, Bahamas. The elkhorn coral is in high resolution, as the rest fades with distance, giving a startling 3D appearance. Exposure: ISO 200, f/18, 1/160s, FL 10

of the tropical blue sea in Photo 2 create a beautiful negative background space, which highlights the alluring colors and topography of this gorgeous coral formation. The entire coral head is in sharp focus. The muted focus of the background corals emphasizes the texture and tranquil colors of the coral head. I often include a diver (lower left background) in my photos to create depth of field and human interest.

The very large elkhorn coral, which is the featured subject of Photo 3, is suspended from a hanging ledge on a very deep wall. This creates suspense, adds drama, and with the addition of the diver, the dark blues and plunging wall in the background, the viewer is given the feeling of being suspended in the water, floating within the current as it sweeps by the wall.

On the other hand, the very sharp resolution of the elkhorn coral in Photo 4, the adjoining and muted

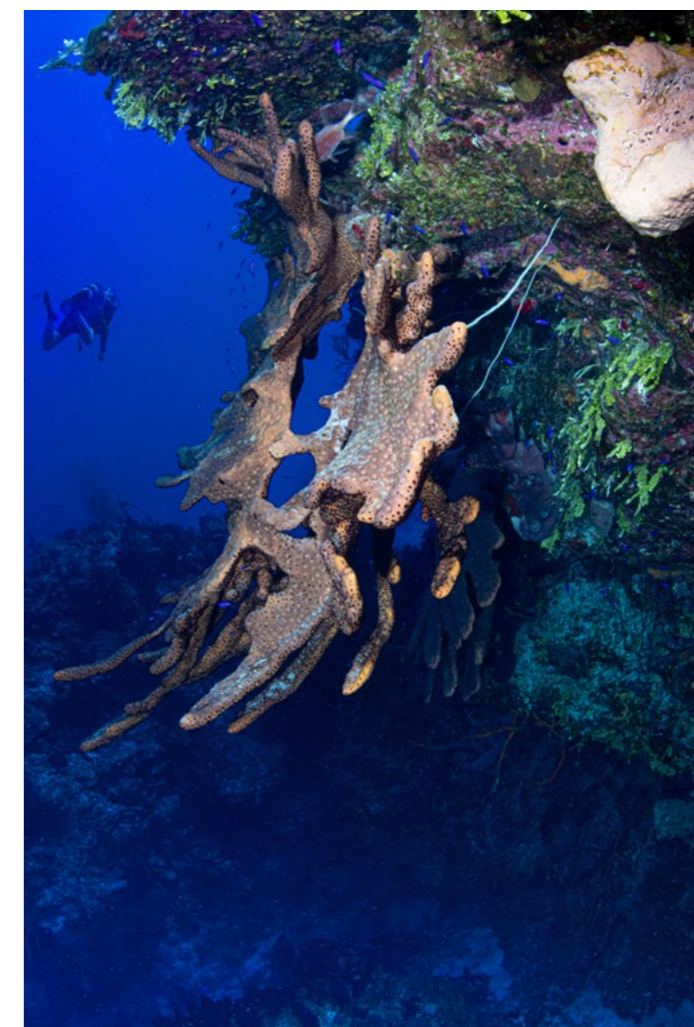


giant barrel sponge, the wall soaring up and extending to the diver (upper right corner), and the very bright sunburst, all work together to create a very startling 3D effect. This is especially apparent when this photo is viewed on a wall in a gallery, from a few feet away.

Photos 3 and 4 were shot within a few minutes of each other, at dif-

ferent angles, at the same location, on a deep descending wall. Most of the same elements are included in both compositions and are wonderful examples that enable a comparison of how different viewing perspectives can completely change the flavor of a photograph.

It is imperative that underwater photographers always think about



and define what it is that they are shooting. Once the subject is determined, then the creativity and art begin. Visit: [garyrosephotos.com](http://garyrosephotos.com)







Over-Under Shots

Text and photos by Michael Rothschild, MD

I use a compact 100mm dome port for my fisheye lens, which is better for travel when luggage space is at a premium. One tradeoff, compared to a larger dome, is the limited ability to do over-under photos, so I do not do a lot of them. But this topic lends itself well to these shots. Over-under images are a great way to depict the boundary between two worlds—sea and surface. These photos evoke the story of the two transitions that are part of every dive: splashing in at the beginning, and breaking the surface at the end.

Each of these images uses the air-water interface to make the sea itself the subject, as opposed to its usual role as background. Photo 1 shows a diver poised to reboard a dive boat. A key compositional element here is the ladder that just let him haul his sidemount rebreather to the deck. Photo 2 shows the same diver in the shallows of a shore dive, dwarfing the lone surface observer in the background. And Photo 3 shows a harbor shack, its bright red paint contrasting with the blues and greens of the seagrass and rocky ledges, over which it was built. Visit: [dive.rothschilddesign.com](http://dive.rothschilddesign.com)

Photo 1. (top left) Dive boat, New Jersey, USA. Gear: Canon EOS 7D Mark II camera, Tokina 10-17mm fisheye lens (at 10mm), Nauticam housing, available light. Exposure: ISO 400, f/11, 1/400s

Photo 2. (above) Diver in the shallows, Harbour Main-Chapel's Cove-Lakeview, Newfoundland, Canada. Gear: Canon EOS 7D Mark II camera, Tokina 10-17mm fisheye lens (at 12 mm), Nauticam housing, dual Inon Z-330 strobes, exposure compensation -0.7. Exposure: ISO 100, f/12, 1/250s

Photo 3. (left) Harbor shack in Dildo, Newfoundland, Canada. Gear: Canon EOS 7D Mark II camera, Tokina 10-17mm fisheye lens (at 10 mm), Nauticam housing, dual Inon Z-330 strobes. Exposure: ISO 200, f/16, 1/60s



# feature

Bluestriped and French grunts, Cozumel, Mexico (right). Gear: Olympus OM-D E-M5 camera, Panasonic 8mm fish-eye lens, Nauticam NA-EM5 housing, Sea&Sea YS-D1 strobes. Exposure: ISO 250, f/7.1, 1/60s

White margate, porkfish and bluestriped grunts, Cozumel, Mexico (far right). Gear: Olympus OM-D E-M5 camera, Olympus 7mm-14mm lens, Nauticam NA-EM5 housing, Sea&Sea YS-D1 strobes. Exposure: ISO 320, f/10, 1/125s



## Seascapes



Anthias on staghorn coral, Jolle's Reef, Papua New Guinea (left). Gear: Olympus OM-D E-M5 camera, Olympus 7mm-14mm lens, Nauticam NA-EM5 housing, Sea&Sea YS-D1 strobes. Exposure: ISO 250, f/8.0, 1/50s

### Mexico, Malaysia and Papua New Guinea

Text and photos by Olga Torrey

In Mexico, Cozumel is well known for clear visibility on the lush reefs. There are plenty of opportunities for photographers to photograph various fish, eels, turtles and other marine life. When I swam into a large school of tropical grunt fish, I was glad I had a fisheye lens to capture the whole school around a large formation of coral reef. On another day in Cozumel, I saw a bigger school of tropical grunt fish. I used a wide-angle lens to capture about 200 adults and juvenile grunt fish.

In Sabah, Malaysia, while diving under the pillars in the Celebes Sea, I encountered a large school of silverside fish. It looked like an enormous moving cloud, gracefully morphing into different shapes. At that time, I wished I had a fisheye lens to show the full scale of the silverside fish school.

The staghorn coral (*A. cervicornis*) is an endangered species that has declined by 90% due to coral disease and bleaching. While diving in the Pacific Ocean in Papua New Guinea, I saw a healthy abundance of coral reefs with different fish species occupying this species of coral as their home. Visit: [fitimage.nyc](http://fitimage.nyc)



Silversides, Matakang Island, Sabah, Malaysia. Gear: Olympus OM-D E-M5 camera, Olympus M.Zuiko 12-50mm f/3.5-6.3 EZ Micro lens, Nauticam NA-EM5 housing, Sea&Sea YS-D1 strobes. Exposure: ISO 200, f/5.6, 1/60s

