



GLOBAL EDITION  
February 2016  
Number 71

Wreck  
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Papua New Guinea  
**Manta Rays**

France  
**Golfe-Juan**

Honduras  
**Roatán**

Tech  
**Twilight  
Zone**

UW Photography  
**Science of  
Lighting**

DIVING 50 STATES

# American Journey

COVER PHOTO BY DON SILCOCK





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Photo by Don Silcock

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# Whose responsibility is it anyway?

In this issue, we report on how a most bizarre case unfolded in the Mediterranean in which a British dive instructor, who lost two close friends in a tragic dive accident while on a vacation there, eventually found himself charged with involuntary manslaughter, facing extradition and possibly a long time in jail. In due course, all charges were dropped—and rightly so—before the case came before a court, bringing to an end a nightmarish chain of events of Kafkaesque proportions for the accused. I refer here to the case of Malta vs Martin. Rosemary Lunn's report on the matter can be found on page 13.

In hindsight, the whole malaise may be seen as a disturbing tale about a systemic failure of epic proportions in the judiciary, and be left at that.

But the case also raises the question any diver should ask of him or herself when going diving: Whose responsibility is it anyway?

We each make our own choices, and thus, safety is our own responsibility. It is really as simple as that.

Diving is not anything we are forced into (although cases of social pressure may somewhat qualify), but a leisurely undertaking that brings us joy, adventure, recuperation, encounters with nature and good times in the company of good friends.

In doing so, we accept the inherent risks.

We can, however, go a long way to mitigate and minimize inherent risks by undertaking good training, using quality equipment and diving within our limits and ability—applying common sense.

Minimizing and mitigating risk while maximizing joy and safety is exactly what this publication will keep revolving around. Thus, in this issue, on page 55, Gareth Lock writes about “non-technical skills”, which is not strictly about diving, but how fostering better decision-making, communications and situational awareness can improve our performance and safety in our day-to-day lives as well as in our diving. In other words, safety by mindset.

The responsibility for our safety ultimately rests on just ourselves, and others should not be blamed for our choices or misfortunes. We owe it to our loved ones to dive responsibly and return home safely from our adventures and not cause them grief. We also owe it to our dive buddies to not put them in harm's way because our complacency or negligence gets us into trouble.

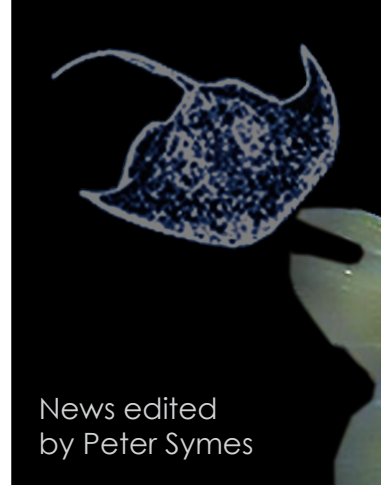
What we do have is a moral, and in many instances, legal obligation to come to the rescue of other people in distress—in dive-related situations or not—in so far that it does not jeopardize one's own safety.

Having proper training and mindset serves the dual purpose of reducing the number of accidents happening in the first place, and when they do, preventing mishaps from progressing into full-blown disasters.

Dive safely, and you get to dive another day.

— X-RAY MAG Team





News edited  
by Peter Symes



from the deep

# NEWS

The Ambon damselfish are slower to get out of the way of predators in noisy environments.

## Noise affects whole ecosystems

**Fish become more likely to be eaten by predators, crabs forage less and bottom dwellers reduce their burrowing and bioirrigation activities when subjected to man-made noise.**



OPENCAGE, INFO CC BY-SA 2.5

The Manila clam burrows and overturns the bottom substrate

Real-world noise, such as that from motorboats, can have a direct consequence on fish survival, a multinational study has found. Looking at the behavior of the Ambon damselfish (*Pomacentrus amboinensis*) and its natural predator, the dusky dottyback (*Pseudochromis fuscus*), the scientists found that when the sound of motorboats was around, the damselfish were six times less likely to startle from a simulated predator attack. They were also about 20 percent slower in getting out of the way, allowing the simulated predator to get 30 percent closer before they fled. What this means for different species of fish and other aquatic wildlife will depend on the animals in question. That a common source of noise in the marine environment has the potential to impact fish demography highlights the need to include anthropogenic noise in management plans.

### Bottom dwellers

In a different study, researchers from University of Southampton exposed three species—the langoustine (*Nephrops norvegicus*), the Manila

clam (*Ruditapes philippinarum*) and the brittlestar (*Amphiura filiformis*) to two different types of underwater sound fields: continuous broadband noise (CBN), which mimics shipping traffic; and intermittent broadband noise (IBN), reflecting marine construction activity. The sounds were reproduced in controlled test tanks, and experiments were run on one species at a time.

The results showed that the sounds could alter the way these species behaved when interacting with their environments. With the langoustine, which disturbs the sediment to create burrows in which it lives, the researchers saw a reduction in the depth of sediment redistribution. The Manila clam, a commercial fishery species in Europe, which lives in the sediment and connects to the overlying water through a retractable siphon, reduced its surface activity. However, the sound fields had little impact on the brittlestar.

### Not just whales

"There has been much discussion over the last decade of the extent to which whales, dolphins and fish

*Unlike many pollutants, we have control over noise. We can choose when and where we make it, and with new technologies, we can make less noise.*

stocks, might be disturbed by the sounds from shipping, windfarms and their construction, seismic exploration, etc," said Professor Tim Leighton, one of the study's co-authors. "However, one set of ocean denizens has until now been ignored, and unlike these other classes, they cannot easily move away from loud man-made sound sources. These are the bottom feeders, such as crabs, shellfish and invertebrates similar to the ones in our study, which are crucial to healthy and commercially successful oceans because they form the bottom of the food chain."

Unlike looming challenges of ocean acidification and climate change, noise is a problem well within the reach of humans to remedy. Motorboats have become a prevalent and increasing source of anthropogenic noise, with emerging evidence that this noise has wide ranging effects on coastal ecosystem, marine quiet zones or buffer zones and steering activity away from known spawning sites, are just a couple of options. ■ SOURCES: SCIENTIFIC REPORTS, NATURE COMMUNICATIONS

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*"The effective protection of the full suite of fish species and life history characteristics will depend on the establishment of large reserves with strict enforcement."*

# It may take 100 years of protection

Large permanent reserves are required for effective conservation of old fish. The recovery process in large, well protected marine reserves is faster than in smaller, poorly protected reserves where fish communities could never fully recover from overfishing.

A new study conducted by the Wildlife Conservation Society and James Cook University combined fish censuses from more than 300 coral reefs to examine how they changed in response to fishing methods and the number of years they had been closed to fishing. They also compared the reefs in marine reserves with the remote Chagos Archipelago, a relatively pristine marine ecosystem off limits to exploitation due to its status as a large military base in the Indian Ocean.

Unlike previous research focused

primarily on the weight or biomass of fish as a measure of reef recovery, this study evaluated the life histories of fish communities. In doing so, the researchers found much slower change—well beyond the 20 years that it took for biomass to recover—and some factors, like growth rate, were not expected to change for more than 100 years. The study also tested the effects of the size of the protected area, the length of closure time, and how successful the protected area was at eliminating fishing.

## It is not about biomass

When looking at all factors, the authors found that biomass was one of the few measures that leveled off after a limited number of years, whereas metrics—including body sizes, age and feeding habits—continued to change for 40 years and growth rates were projected to decline for over 100 years.

"Fish biomass has been the common way to evaluate fish communities, but what our research shows is that it does not tell the entire story," said Dr McClanahan, Senior Conservationist for WCS and co-author of the study. "Analyses based primarily on fish biomass produces an incomplete and somewhat misleading scenario for fast recovery from overfishing. What we found was a slow and continuous reorganization of the fish community well past the stabilization of biomass."

## Time and space

The age of marine protected areas clearly plays a role in reef fish recovery, but so does size. Reserves should be at least five to

10 square kilometers. "Reducing closure size slowed recovery rates, particularly in the low compliance and young closures," the study stated. Reef fish that do not recover well in small, new or low-compliance reserves include parrotfish, triggerfish and groupers.

## Enforcement essential

The team hypothesized and found that estimated recovery rates would vary with the success of the closure regulations. Closures with weak compliance recovered to only half the biomass levels of the high compliance closures and also produced small

and younger fish communities, an indication of incomplete recovery. Including sharks in the analysis had some effects on the final body sizes, but overall the findings would be nearly the same if sharks were excluded. Nevertheless, slow-growing sharks, parrotfish, triggerfish and groupers are among the species with poor recovery in small, young and low compliance closures. ■ SOURCES: WCS NEWS RELEASES, PROC. OF THE ROYAL SOCIETY B

One hundred years are needed to fully recover slow-growing fish. Humphead wrasse is a species that takes a long time to stabilize.



# Maldives

Maldives Blue Force One & Maldives Blue Force Two

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The Needles, off the Isle of Wight, are among the areas designated as a Marine Protection Zone



## UK expands its protected marine areas

The 23 new zones stretch from the coast of Northumberland down to Land's End and include Europe's longest chalk reef off Cromer in Norfolk. But, with the 27 marine conservation zones (MCZ) designated in 2013, the total of 50 is far below the 127 sites proposed by an earlier GB£8 million government consultation. The 50 MCZs, along with other types of protected areas, now cover 20 percent of all English waters, almost 8,000 square miles (20,700 sq km).

### Paper parks?

The announcement has been welcomed by conservation and wildlife organizations. However, they, along with fishermen's groups, are concerned that there is no management plan. They say it will be difficult to balance competing interests in the reserves.

In the UK daily, the *Guardian*, Professor Callum Roberts, at the University of York and one of the United Kingdom's leading marine conservation experts, welcomed

the new MCZs but stated: "We need more because the network we have is far from complete. Despite the [50] MCZs, the UK's rich marine life has very little protection. That may sound paradoxical, but six years after the Marine Act was passed, MCZs are still paper parks. They have no management at all, so life within them remains unprotected. They will be worse than useless, giving the illusion of protection where none is present." ■

## Ascension Island becomes reserve

Ascension Island, a British Overseas Territory, is set to become a marine reserve almost as big as the United Kingdom, the British government has announced. The reserve totals 234,291 sq km, slightly less than the size of the United Kingdom. It could be ready for formal designation as soon as 2017, once further data has been collected and analyzed. Just over half of the protected area will be closed to fishing. The fishery in the other half will be policed under a grant of GB£300,000 from the Louis Bacon Foundation, a charitable body.

Ascension Island is home to one of the world's largest green turtle populations, and some of the biggest marlin. It also has a large colony of tropical seabirds and a unique frigate bird.

The island's government will monitor the reserve using satellite imaging and patrol vessels. It will be looking out for illegal shark finning and fishing of endangered shark species. It will require fishing vessels to use de-hookers and dip nets to free any sharks, turtles and seabirds that are caught by accident.

The Great British Oceans Coalition, which includes the Blue Marine Foundation and the Royal Society for the Protection of Birds, has been campaigning since 2014 for the designation of all or part of Ascension's waters.

Charles Clover, Blue Marine Foundation chairman, said: "Ascension has been at the frontiers of science since Charles Darwin went there in the 19th century, so it is entirely appropriate that it is now at the center of a great scientific effort to design the Atlantic's largest marine reserve." ■

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Diver Andrew Rampton hovering over the bridge section of *Hermes*

Text and photos  
by Pete Mesley

One of the things I value the most about planning specialized wreck diving trips around the world is not only getting an opportunity to dive these sites, but also getting totally immersed in the history and circumstances that put these steel hulks at the bottom of the ocean. The more I read and learn about the bravery and heroism of the people who died in fierce battle during these conflicts, the more I am humbled by diving these graveyards of the deep.

*Hermes* was no different. On 5 April 1942, HMS *Hermes* and the destroyer HMAS *Vampire* were sent to Trincomalee in Ceylon (now called Sri Lanka) to prepare for Operation Ironclad, the British

invasion of Madagascar during World War II. After advance warning of a Japanese air raid on 9 April 1942, the vessels left Trincomalee and sailed south down the Ceylon coast before

the air raid arrived. The vessels were spotted off Batticaloa by a Japanese reconnaissance plane. A decision was made to get both ships back to Trincomalee so they could have fighter support.

The Japanese launched the force of 85 Aichi D3A Dive Bombers, escorted by nine Zero fighters, onto both ships. *Hermes* was first to be sunk, taking an unprecedented 40 direct hits, kill-

ing 307 men including Captain Richard F.J. Onslow. HMAS *Vampire* also met the same fate, with the captain and seven other crew members being killed in the raid. The Japanese only suffered

minor losses, losing four bombers.

#### Diving the wreck

It did not take us long to cover the six-mile journey from base on the oily calm seas of the Bay of



# HMS Hermes Wreck

— *History at its Best*







Diver Steve Hubbard swims past the BL 5.5-inch medium guns on the starboard side of the ship swimming toward the stern

Bengal to the wreck of *Hermes*. Flying fish launched into the air on both sides of the boat, skimming over the cobalt blue ocean, as we made our way towards the site.

Feli, our dive guide and owner of Sri Lanka Diving Tours, quickly moored the wreck securely.

Gearing up in the 36°C sun soon brought new meaning to the phrase "Hurry the hell up and get into the water!" We descended, following the bright yellow shot line, which swayed nonchalantly in near zero current. What a bonus. It was a little different the last time we were here. Swift cur-

rents kept the shot line as tight as a guitar string humming a perfect "A" note. So, we took advantage of such great conditions.

Fifteen meters down, we could see most of the wreck. Not just a bland hull, but a hull completely covered by a forest of brilliant white black coral trees. Lying heavily on her port side, the main deck had almost completely collapsed onto itself.

Feli had secured the shot line just aft of the superstructure. We offloaded our decompression stage cylinders near the base of the shot. Only a few

meters away was one of the BL 5.5-inch medium guns (BL mean-

ing Breach Loading). There were six of these guns mounted, three



Diver Andrew Rampton admires the starboard propeller covered with colorful sponges and corals



Shell box for the QF 4-inch Mk V naval gun on the deck of *Hermes*

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Badly damaged bow section of *Hermes* (above). Note the row of toilets exposed below the split hull; Barrel of the QF 4-inch Mk V naval gun still pointing high into the air (top right)

on each side, just below deck level.

We swam a short distance forward and the entire superstructure came into view. I had to ascend a few meters to appreciate the full view of the structure.

What was once the “spotting top” for the 5.5-inch guns lay calmly on the white sand. The rest of the superstructure lay squashed among the rubble. There was a long post with a base that used to be some sort of cylindrical tank holder. At first glance, it looked like a crow’s nest, but no such thing had existed on *Hermes*.

Coming down to roof level, I noticed a large rangefinder. This was an impressive invention in its day. Put simply, a rangefinder had a single eyepiece and used a prism to merge images from both lenses into a single image for the operator. The operator adjusted the rotation of the prisms using a dial until the images overlapped in the eyepiece. The degree of rotation of the prisms determined the range to the target by simple trigonometry.

A few meters past the bridge section were two of the deck guns—QF 4-inch Mk V naval guns, to be exact. *Hermes* had

four of these guns, two forward and two aft of the bridge superstructure, on the starboard side. One was pointing high, as if still on aircraft watch, while the other lay flat, gun barrel resting on part of the collapsed deck of the ship. In between both of the guns was a shell-holding box with live shells still stacked with the doors open. The devastating attack had come swift and quick.

History

*Hermes* was built by the Royal Navy and launched in September 1919. Not only was she the world’s first ship to be



Hermes



Row of toilets inside the bow section

100m

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Historical photo of HMS *Hermes* at Yantai, China, circa 1931; *Hermes* sinking (lower right inset) after being attacked by a Japanese air raid in 1942 off Batticaloa, Sri Lanka

# Hermes



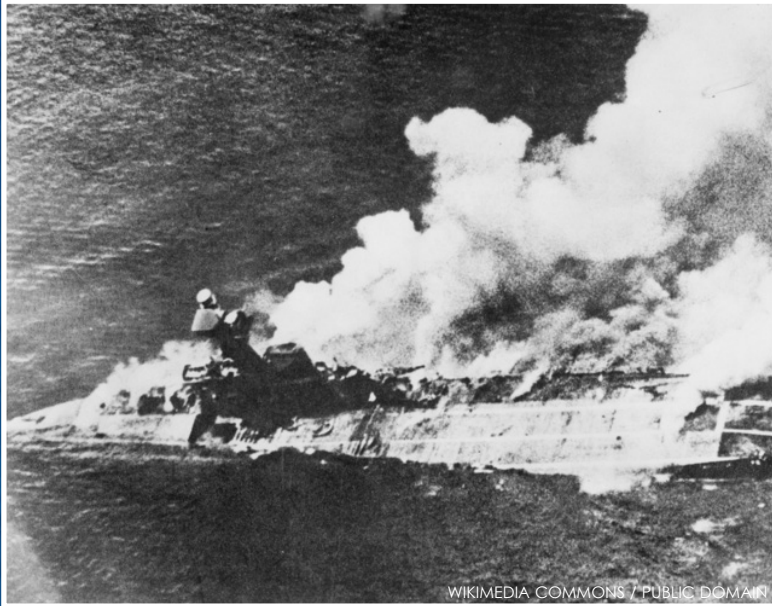
designed and built as an aircraft carrier, but she is also the only dive-able aircraft carrier on the planet that was sunk during battle. She was 183m long, 21.4m wide and weighed in at 13,900 tons, fully-loaded.

Just missing out on World War I by a year, *Hermes* was only commissioned in 1924. From that year

until about 1938, she served with the Atlantic Fleet before spending the majority of her career assigned to the Mediterranean Fleet, working with other carriers developing multi-carrier tactics. Returning home to Britain in 1937, she was placed in reserve before becoming a training ship in 1938.

The Second World War began in September 1939, during which time *Hermes* was put to work conducting anti-submarine patrols and hunting down German commerce raiders and blockade runners. In 1942, *Hermes* joined the Eastern Fleet at Ceylon. After the raid on Colombo (on the western side of Ceylon) on April 5 by the Japanese, *Hermes* was sent to Trincomalee.

On April 9, she



Divers explore the impressive bridge section of *Hermes* played across the sand







Diver Andrew Rampton inspects the badly damaged bow section of *Hermes*

was spotted near Batticaloa by a Japanese scout plane and attacked by several dozen dive bombers shortly afterwards. The carrier and her escorting destroyer, *Vampire*, were quickly sunk by the Japanese aircraft in what the Japanese would claim as their deadliest and most accurate air raid in history.

More diving

Moving forward to the bow, two massive anchors came into sight on the starboard side, still sitting tight into the ship. I only realized how big they were when a diver swam past them. Swimming over to deck level,



Main rangefinder on bridge section of *Hermes*; Diver Steve Hubbard in between two QF 4-inch Mk V naval guns in midships (left)

rows of tightly laid toilets came into view. The side of the ship looked like it had been sliced open by a giant can opener, making a perfect cut into the hull and exposing the navy men's latrines.

Suddenly, it got dark. I looked above my head. An impressive school of jacks, swimming in complete unison, grabbed my attention. Mesmerized for minutes, I realized that this wreck was a lot more than just rusting metal and history. It now played host to an entire ecosystem.

I headed towards the stern, which did not seem that far away. Swimming the entire length of the ship, aided by a gentle current, was really pleasant. Picking up our staged cylinders on the way, we skimmed over the mas-

sive forest of black coral trees and the starboard propeller came into view. The sight of a massive propeller, covered in colorful sponges and corals is a vision hard to beat. *Hermes* had just two, three-bladed screws driven by two geared steam turbines, driven by six water tube boilers, giving her an impressive 24 knots of speed.

The signal was given to end the dive.

Dive operator and location

Feli runs a good operation, which includes a Haskel Booster, Trimix blending station, CCR tanks and Sorb for rebreather divers. The resort is basic, but has all the essentials: air-conditioned twin rooms with ensuite—all you ever need! The dive resort takes 12

divers comfortably and offers complimentary Wi-Fi.

Sri Lanka is just full of color and culture, spanning hundreds of years. It is a very interesting place to visit. Just don't forget to leave ample time to have a good look around the country. It is simply stunning. □

Based in New Zealand, Pete Mesley, owner and sole operator of *Lust4Rust Diving Excursions*, runs specialized trips to some of the world's best wreck diving destinations. He runs a tight ship and is totally dedicated to safety by bringing an experienced hyperbaric physician with emergency medical kit on all his trips. For more information on *Lust4Rust Diving Excursions* trip schedules, please visit: [www.lust4rust.co](http://www.lust4rust.co).

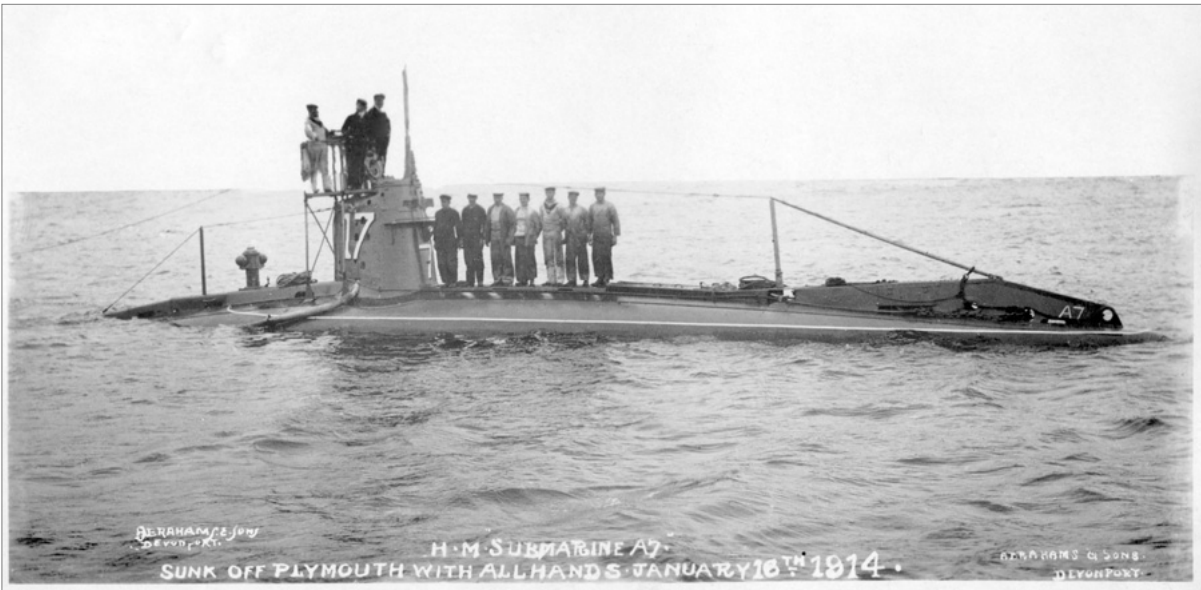






# A7 Project results now published

The project website includes the history of the early Royal Navy submarine, wreck site information and the project results. The website also includes plans, drawings, project documents and referenced papers available for download.



Archive photo of HMS A7

The A7 Project is an investigation of the early Royal Navy submarine HMS/M A7 lost with all hands during a training exercise in Whitsand Bay, Cornwall, on 16 January 1914. Efforts to salvage her failed, and her wreck is a protected site. She lies today where she sank, buried up to her waterline in a flat, mud seabed in about 37m (121ft) of water. Diving on her is prohibited without a licence from UK's Ministry of Defence. In 2014, the SHIPS Project team in Plymouth completed an archaeological investigation of the A7 submarine, having been granted a license by the UK Ministry of Defence. The A7 Project is funded by ProMare UK, is part of the SHIPS Project (Shipwrecks and History in Plymouth Sound) and supports the NAS Lost Beneath the Waves Project.

The A7 submarine is the last complete example of the first type of submarine developed by the Royal Navy. The class was developed rapidly and in secret by a Royal Navy officer with no previous experience in submarines, yet what was produced was the forerunner of the British submarines that fought in WWI. The remains of the A7 submarine are still largely intact, so the undocumented secrets of how this submarine was constructed and operated still remain a mystery. But the hull is corroding, and this project suggests that a conservative estimate for the survival of the hull to be between 40 to 50 years. ■  
SOURCE: SHIPS PROJECT



3D multibeam sonar image. The stern is stuck in the sediment.



# 4,000-year-old Minoan shipwreck discovered in Turkish waters

Turkish researchers have discovered a 4,000-year-old shipwreck in the Marmaris Hisarönü Gulf, which is believed to be a trading ship from the Minoan civilization. It is the oldest shipwreck ever recovered in Turkish waters.

## More than 100 wrecks

The find is a result of a project initiated in 2007 to document Turkey's underwater heritage. The project coordinator, Associate Professor Abdurrahman Harun Özdaz, said underwater archaeologists, marine physicists and marine biologists were working on the project as part of a 15-person team. "We have been carrying out the only underwater archaeological research project in the area nonstop since 2007. We have so far discovered more than 100 wrecks and their potential fields. Also, more than 20 underwater harbors and more than 400 anchors from

between the Bronze Age and the Ottoman era have been found," he told the *Hürriyet Daily News*. However, the latest discovery has been described as the most significant and historically important finding to date.

## Minoan merchant ship

The ship is thought to have been a merchant ship of the Minoan civilization, that arose on the island of Crete and other Aegean islands and flourished from approximately 3650 to 1400 BC. Observations of the wreck and its objects suggest that it had been based on Crete but sank in a storm in the Gulf of Hisaronu. It now sits 40m below the ocean's surface. Professor Özdaz has said that excavations will continue on the wreck, while testing and conservation work of finds from the ship will be carried out in the Bodrum Museum. ■







opinion

# The bizarre case of Malta vs. Martin

# Accused

## of involuntary homicide

— *How to Score an Own Goal in Diving Tourism*

**After losing his girlfriend and a friend in a dive accident, Stephen Martin was first commended for his handling of the situation but later found himself accused of involuntary manslaughter by the Maltese authorities who issued an international warrant for his arrest. The case was eventually dropped after the dive community kicked up a storm, politicians intervened and BSAC came to his aid.**

Text by Rosemary E. Lunn

Photos by Peter Bullen, Peter Symes and BSAC

In June 2014, Jeremy Coster, Alan Cranston, Nigel Haines, Larissa Hooley and Stephen Martin flew from England to Malta for a week's shore diving. It was an unremarkable holiday until Tuesday, June 17, when a tragic accident ended two lives and changed others forever. An excerpt from the British Sub-Aqua Club (BSAC) incident report read:

"A group of divers was carrying out a week's diving. They had already conducted five to six dives each over the two preceding days.

"The local weather conditions were not ideal for diving [at the initial site chosen by the group] so the group, on advice from a local dive centre, travelled to an area with more sheltered diving before deciding on one shore dive site where other divers were already conducting dives in what were

considered favourable conditions. The group entered the water and split into buddy pairs.

"Thirty minutes into the dive, which was conducted between 10 to 15 metres (32 to 49 feet), one diver was seen to be descending rapidly, and before her buddy could respond, another pair from the group descended and found the diver unresponsive in a depth of 35m. The pair conducted a controlled buoyant lift, and the diver's buddy surfaced shortly after.

"While the rescue pair commenced a tow of the diver towards an exit point, the diver's buddy gave in-water rescue breaths. During the course of the dive, the weather conditions had deteriorated significantly and surface conditions made exit from the water difficult and exhausting.

"Other divers from the group, who had surfaced earlier and

already exited, assisted to recover the diver and commenced CPR. A diver in the group alerted emergency services, and a rescue team arrived including a helicopter and rescue vessel.

"One of the rescue divers who had assisted with the controlled buoyant lift and tow

had considerable difficulty in exiting the water and was later taken to hospital. The other rescue diver, who had also assisted with the lift and tow, was not seen exiting the water. When it was noticed he was missing, an immediate surface search was conducted by the rescue vessel.

"The search located the missing diver on the surface; the diver was unresponsive. The diver was recovered and CPR attempts made. Both divers who received CPR did not recover and were pronounced deceased."

### Martin's account

At the time, Stephen Martin—Diving Officer for Brighton BSAC and a BSAC Open Water Instructor—had been diving 15 years. He had completed approximately 1,500 dives. The group, which included his girlfriend of five years, Larissa Hooley, opted to dive the popular route from Gozo's Inland Sea and exit the water at the Blue Hole.

Martin said, "We buddied up and checked each other's equipment. After we entered the water, we proceeded through the fissure and kept close to the coast at about 10 to 12 metres (32 to 39 feet). I was buddied with Larissa Hooley at the front of the group. The

The



STEPHEN MARTIN

BSAC







*With the inquest completed, any reasonable diver would believe that all the authorities involved would consider the case closed.*

others followed. About 20 minutes into the dive, my buddy made a sharp turn seaward, without warning, and descended sharply whilst still finning. I thought she must have dropped something and went to recover it. Nigel Haines and Jeremy Coster were immediately behind us, and followed my buddy down.

"Nigel Haines caught up with Larissa Hooley at 35 metres. She was blank-eyed and unresponsive. He, along with Jeremy Coster, conducted a 90-second controlled buoyant lift to the surface. When they surfaced, Larissa Hooley's regulator was out of her mouth and she was cyanosed. On the surface, I tried rescue breaths whilst Jeremy Coster and Alan Cranston got out of the water. I towed Larissa Hooley to the rocky shore. The sea state had become rough with about a one-metre (three-foot) swell, which made an exit difficult over the rocks, and exit through the Blue hole now impossible.

"Help arrived in the form of a German doctor. She happened to be amongst the tourists visiting the area. She tried to resuscitate Larissa Hooley and conducted CPR on her until the emergency services arrived, and declared her to be dead. Nigel Haines had seemingly been fine as he helped bring Larissa Hooley to shore but, as she was removed from the sea, we realised that he was no longer with us and, with his BC inflated, had drifted out to sea.

"Jeremy Coster and Alan Cranston attracted of a RHIB. It drove out and picked Nigel Haines up. He was brought ashore unconscious and was also found to have died."

## Standard procedures

As is normal in this situation, the police impounded key pieces of equipment. Some of it (cylinders and lead) had been rented from the local dive centre Maltaqua. The majority of the scuba equipment, including dive computers, GoPro cameras and footage, was owned by the diving party. To date (20 months post incident), the Maltese authorities have kept all of the equipment owned by Jeremy Coster, Nigel Haines and Larissa Hooley. It is not known when, or indeed if, it will be returned.

Martin and the rest of the divers naturally cooperated with the Maltese officials' inquiries. They then returned to the United Kingdom, aware that an inquest would be held to examine the deaths of Haines and Hooley. This is standard procedure in England and Wales where the cause of death is sudden, not known and unexplained. The incident was also reported to BSAC via an incident report form.

## Maltese inquest

Meanwhile in Malta, in the autumn of 2014, officials held a separate magisterial inquiry into the double deaths. Martin was not advised, nor asked, to take part in this inquiry, and this policy was also extended to the other divers in the party. In other words, none of the divers were given an opportunity to assist in the inquiry as one would expect, and they were therefore unable to accurately respond to the allegations.

The inquiry found, in Martin's absence, that he had been negligent because of the unorthodox dive pro-

file, he had not checked the weather conditions, and he had failed to keep a close watch on Larissa Hooley.

## UK inquest and case closed?

On 26 February 2015, the English inquest into the two diving deaths was held at Brighton and Hove coroner's court. Neither the coroner, Veronica Hamilton-Deeley, nor the Sussex Police had received a response from the Gozo authorities, despite their numerous requests for information on the case. (It is standard procedure for a coroner to adjourn an inquest if an active investigation is ongoing in another jurisdiction.) Neither she nor the Sussex Police had received a response to their requests for information on the case. (It is standard procedure for a coroner to adjourn an inquest if an active investigation is ongoing in another jurisdiction.)

## Cause: IPOs

The Brighton inquest heard that both deceased divers had suffered immersion pulmonary oedemas (IPO). The expert witness, cardiologist Dr Peter Wilmshurst, told the inquest that Hooley's was most probably spontaneous. Her reduced oxygen intake would have explained her rapid breathing and erratic behaviour. He then observed that Haines' immersion pulmonary oedema was probably caused through stress after taking part in an attempt to save Hooley. Hamilton-Deeley returned verdicts of accidental death on both Haines and Hooley.

With the inquest completed, any reasonable diver would believe that

Gozo's Bue Hole, here seen from above, is a spectacular and thus popular dive site



PETER BULLEN





## opinion

all the authorities involved would consider the case closed. For the surviving divers and the families of everyone involved, it was now a time to move on and start living again, instead of existing and grieving. However, this was not to be.

### Arrested and handcuffed

"The first thing I knew about the Gozo prosecution case was on Tuesday, 7 July 2015, when two British police-man knocked on my door," Martin recalled. "They briefly asked if I had been involved with two fatalities in Malta. When I confirmed that two of my friends had died in Gozo, they told me to get my passport. I was driven to the nearest custody centre, where I was placed in a locked cell overnight. The next day, I was hand-

*"The biggest problem with it [European Arrest Warrant] is that the British courts have no power to refuse them, or to consider the evidence or the lack of it. Under an EAW the prosecution does not have to present any evidence to the extradition court. It merely has to complete the paperwork correctly."*

— Gerard Batten,  
UKIP MEP for London

cuffed and taken to London in large white prisoner van."

The arrest, conducted just over a year after the fatal dive, was a complete surprise to Martin, given the verdict of accidental death issued by Brighton and Hove coroner's court. In fact, Hamilton-Deeley, the British coroner, had commended Martin and the surviving divers for risking their lives trying to save Haines and Hooley.

It transpired that the Maltese authorities had not taken the same view as Brighton and Hove coroner's court. Gozo magistrate's court had issued a European arrest warrant; they wished to prosecute Martin because they deemed him the most experienced person on the dive. He was advised that he had been charged with involuntary homicide by the Maltese Attorney General. On Wednesday, 8 July 2015, Westminster Magistrates Court served Martin with a European extradition order to Malta.

At this point, the duty solicitor advised Martin to not agree to the extradition. If he had agreed to the extradition, Martin would have been flown to Malta within a couple of days and placed on remand, pending trial. By refusing extradition, it

gave Martin a breathing space of seven days to appeal against the extradition. At the eleventh hour, his paperwork was processed, and he successfully appealed for an extension to allow more time to prepare his defence.

Martin was bailed and electronically tagged, told to report to a police station three times a week, and observe a night-time curfew. He started to prepare his defence case.

"I was terrified," said Martin. "I am not a gangster, just a scuba diver, who nearly died trying to rescue two friends. I couldn't understand why the Maltese authorities were pointing the finger at me."

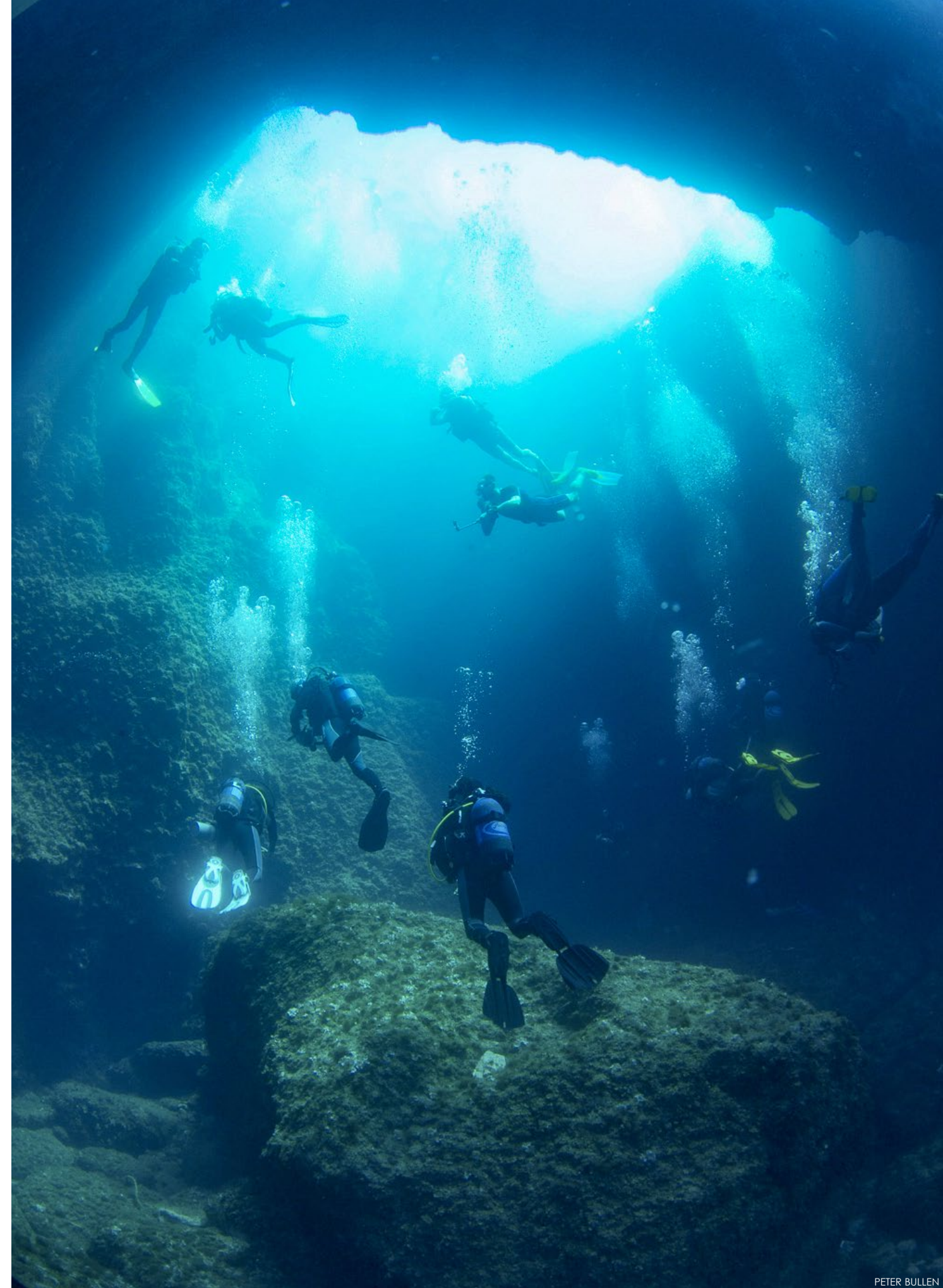
### Warrant

The Gozo warrant stated that Martin had failed in his duty to generally observe the group. However, this was a typical scuba diving holiday, not a training course, and whilst Martin was one of the most qualified divers in the group and the only instructor present, he was not the group's leader. There wasn't one. Martin acted as a conscientious buddy on each dive.

The warrant also stated that Martin had failed to check the weather conditions before the dive. That day, the group were due to dive the Um El Faroud on Malta. Instead, they abandoned this dive precisely because of poor conditions at the wreck site, took photos of the dramatic sea state, ate an ice cream and discussed alternative dive sites.

The divers dropped by Maltaqua (the operation with whom they were diving) who suggested the group

Gozo's Bue Hole, here seen from below the surface is a unique dive site which see thousands of divers each year



Dr Peter Wilmschurst

PETER BULLEN







Gozo's Blue Hole is situated right in front of the arch in the center of the image. It can be accessed via a swim-through from the 'Inland sea' which is located right behind the building on the right

take the ferry over to Gozo and dive the Inland Sea and Blue Hole. When the group arrived at this dive site, they observed there were divers in the water. After asking other divers about the conditions, they decided to dive after being told the conditions seemed fair for diving.

Furthermore, the Gozo warrant stated that Martin should have given first aid to Hooley whilst she was still underwater. Every diver, bar very new divers into the sport or non-divers, will know that this is a ridiculous, absurd and impossible course of action to take. It can compromise the airway, and frankly, attempting to do so just wastes valuable time.

It is drummed into divers that should a diver fall unconscious underwater, a controlled lift should immediately take place, conducted in such a manner that it won't impact on the safety of the rescuer(s). Once on the surface, positive buoyancy should be achieved by all parties, rescue breaths administered, the airway protected, and the alarm raised. All of these tasks were completed during Hooley's rescue.

The Gozo warrant stated that the dive profiles of Haines and Coster, who both went to Hooley's aid when she descended unexpectedly, showed an "unorthodox" fast descent (to 35m) and ascent rates. However, 35 metres in 90 seconds is quite reasonable and necessary during an emergency rescue, which was also confirmed by the British expert Dr Peter Wilmschurst who testified at the Brighton inquest.

Finally, the Gozo warrant stated that Martin had failed to check for unknown equipment faults. The group were diving their own scuba equipment. They knew exactly how it had been serviced and cared for, and comprehensive buddy-

checks had been conducted pre-dive. Other checks thereafter are not normally made, and this is standard practice and behaviour the world over.

## Calling in BSAC

At this point, Martin quite rightly turned to his training agency, BSAC, for support and assistance. As part of their annual membership, BSAC members receive a number of benefits. These include a monthly magazine and third party insurance.

Whilst criminal acts are uninsurable, criminal defence costs, especially for something like involuntary homicide can be covered by insurance. Martin thought the BSAC insurance policy included criminal defence costs.

However, it soon transpired that BSAC's insurance policy had changed sometime between 2007 and 2014, and this protection no longer existed. It is possible that the underwriters had pulled the criminal cover in 2007 because a new act came into being in the United Kingdom: the Corporate Manslaughter Act of 2007. The insurance industry was not sure of the implication of this act, and it caused a negative knee-jerk reaction amongst the underwriters.

## No insurance coverage

"Following lengthy negotiations, it is with regret that we have been informed by our insurers that the 2014-2015 policy does not provide cover for your criminal defence costs," stated Mary Tetley, BSAC Chief Executive Officer at the time.

It really looked as though Martin was fighting and funding his case on his own. What was equally worrying was that none of the 26,000 odd BSAC members had been updated about this change of



PETER BULLEN

insurance cover either. Many members thought they still had criminal defence coverage because this benefit had been advertised on the BSAC website until at least August 2015.

Understandably, BSAC members were not happy.

*"The big reason everyone and his dog is so excited about this is the fact that we had all thought we were covered for defence costs and we weren't and we are all going 'shit! That could have been me in Malta'"*

— post on the Dive Forum

## Asking the public for help

Martin turned to the social media—specifically, The Dive Forum—contacted the local and national press, spoke to television reporters, and wrote to his local Member of Parliament, Sir Peter Bottomley. Martin was briefed that the MP would contact the Maltese High Commission in London to express concern over what would seem an excessive reaction to the emergency that had enveloped the divers and resulted in a failed rescue.

Just under a month after he was arrested, on Thursday, 6 August 2015, Martin was contacted by BSAC's Chief Executive, Mary Tetley, who assured him of pro-active help. This included the financial issues he faced, along with reviewing BSAC's insurance policy, which has always been a significant membership benefit.

## Fallout

Historically (since 1800), there have been close ties between the Maltese islands and the United Kingdom. Indeed, following the great siege in World War II, King George VI awarded the George Cross to the island of Malta, writing that the medal would "bear witness to the heroism and devotion of its people". Today, the George Cross is woven into the Maltese flag.

Following the shock arrest of Martin, British divers were unsure whether or not to consider continuing to dive Malta and Gozo. As news spread about his fate, Maltese dive centres also started to worry about the court case, as BSAC dive clubs cancelled trips. Resident Maltese divers were (quite rightly) disturbed by the whole process and the negative impact this case would and could have on the local diving industry, and British divers reviewed their travel plans.





## opinion

### Trained to dive independently

The BSAC ethos is to train divers that can plan, run and execute safe independent dives. As part of their training, BSAC divers learn about all aspects of dive planning including charts, tides, boat handling, weather, gas blending, rescue techniques, oxygen administration, etc.

The idea is that a club, or a group of

*"Why should I be locked up because I am the most experienced diver or dive professional on an unguided dive, when another diver has a fatal medical issue underwater, and despite doing everything possible to rescue them, they die?"*

divers from a club, can run adventurous diving, or indeed, an expedition in remote locations because they are suitably skilled. Technically, this diving can be classed as "unaccompanied" because the group is

not being guided by a local guide.

The cornerstone to BSAC club diving is the Diving Officer or DO. Each BSAC

branch has a DO. They are responsible for all diving, training and water-based activities, including boats. They facilitate the club members diving. BSAC clubs like using Malta and Gozo for club trips because it allows them to train, nurture and mentor divers in these useful skills in benign (-ish) conditions that are similar to UK waters. Whilst the Mediterranean waters are warmer and clearer, they still have currents and waves similar to UK seas.

As the Martin case progressed, rumours began to spread that indicated the prosecution had come about because the group had been diving "unaccompanied". They had not dived with a local guide. This proved worrying to British divers.

Chief Executive Officer of the British Sub-Aqua Club (BSAC), Mary Tetley



ROSEMARY E LUNN



PETER BULLEN

### Legal costs funded

With the BSAC now providing GB£100,000 for the legal costs in his defence, things began to look brighter for Martin.

He said, "It is now two months since I was initially arrested and processed through the extradition process. Having little exposure to the law or police, this whole process has been very draining and occupied a great deal of my life. I realised a while ago that worrying just clouds your vision and makes you feel old. It does no good. With BSAC onside now, a lot of my worries have been allayed."

British divers continued to lobby their members of Parliament and European Parliament, the press was kept apprised of the situation, and a Facebook campaign—"We stand with Stephen Martin"—was launched. Officials from

the BSAC were in touch with the Malta Tourist Authority, whilst Martin's Maltese lawyer looked at getting the prosecution reviewed.

On Friday, 16 October 2015, the administrative court granted Martin leave to appeal against the extradition request. This hurdle was important because it meant the court thought there was arguable merit in some of his grounds for an appeal. A date was set. The hearing at the High Court in London would take place on Wednesday, 20 January 2016, where the appeal against extradition would be heard. If this appeal proved unsuccessful, Martin would be removed from the United Kingdom and taken to Malta no later than ten days later.

### BSAC goes to Malta

On Saturday, 10 November 2015,

BSAC's chief executive, Mary Tetley, and National Diving Officer, Sophie Hepstonstall, travelled to Malta to discuss the case with senior representatives of the Maltese authorities. The various meetings held gave BSAC the opportunity to directly express its deep concern over the criminal prosecution of one of its members (Martin) and to discuss the wider implications of the case and its potential effect on BSAC members.

Speaking ahead of the visit, Tetley said: "The resonance of Stephen's case among the UK and BSAC diving community is loud and clear and we intend to express this concern directly to the Maltese authorities."

Meanwhile, the Facebook campaign "We stand with Stephen Martin" continued to raise awareness of his case by directly petitioning Norman Hamilton,







## opinion

the Maltese High Commissioner in London, and Peter Grech, the Maltese attorney general.

### Incredulity

The diving fraternity sat, watched and waited to see what would happen next. No one had ever expected the Maltese authorities to issue such ludicrous criminal charges. And divers asked the question: "Can anyone recall a criminal prosecution of this nature

previously, anywhere in the world?"—a situation in which the UK inquest found no wrong-doing, yet the country in which the fatal dives took place still wished to prosecute. To everyone watching, it seemed a bizarre decision.

One post on The Dive Forum read: "What I don't understand in all this is how the event could be deemed accidental by the UK coroner but then becomes auto-

matically categorised as criminal, based purely on another country's wild accusations. My personal opinion is that Stephen is in a horrible situation that has been wholly created by the Maltese authorities. It will do nothing bar damage the Maltese economy and make things really hard for one of our members."

Christmas 2015 came and went. Martin was still tagged, under curfew and reporting to the police three times a week. Meanwhile, the

### Role of the court expert

The Maltese legal system is very different from the British legal system. The Maltese police do not solely conduct the investigation. Instead, they appoint a "court investigating expert" as soon as an incident occurs, and that person can interview witnesses and suspects as part of the judicial process. Following the Martin fatal dive, a Gozo-based hyperbaric doctor, Dr Mario Saliba, was appointed as the court investigating expert.

This would seem to corroborate the stories that Saliba would turn up at the hospital or the police station following diving incidents, where he would record statements from the people involved in the incidents. Martin confirmed that he and the other members of the diving party were interviewed by Saliba in the immediate aftermath of the incident.

"I was terrified and crying," said Martin. "Dr Mario Saliba, who looks after the chamber on Gozo

took a statement from me. He didn't advise me of my rights. He did introduce himself as a BSAC representative and said he was taking a statement from me for the BSAC Incident Report. I feel he misled me. He threatened to have me arrested because I could not find my medical certificate. I didn't know what would happen to me and wondered if I would end up on remand in Malta for an unknown period."

According to zoominfo.com, Saliba is a "specialist in diving medicine". He is listed as a "UK Sport Diving Medical Referee".

It is also believed that he is a BSAC Sport Diver. However, BSAC stated: "Dr Saliba is not a member of BSAC. He is an appointed medical referee for the UK Diving Medical Committee (UKDMC), which is an independent body of doctors with specialist diving medical training that provides medical advice to divers and training agencies, both professional and recreational, in the UK. The UKDMC appoint the medical referees on their own criteria and BSAC is not responsible for the appointment of medical referees. Dr Saliba is categorically not a

'BSAC representative'."

### Qualified

Although Saliba is not a member of the BSAC, nor a BSAC representative, it still appears he could be an appropriate advocate for scuba divers in this instance, because he does have an understanding of immersion pulmonary oedemas.

In April 2013, Saliba had published a paper entitled, "Immersion pulmonary oedema in a scuba diver", in the peer reviewed *Journal of the Malta College of Family Doctors*. At the



PETER SYMES

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end of the paper, Saliba published an acknowledgement thanking Dr Peter Wilmschurst, Consultant Cardiologist at the Royal Shrewsbury Hospital, United Kingdom, for his advice. Wilmschurst was the expert witness who spoke at the Brighton and Hove coroner's court. The same Brighton inquest that had heard that both deceased divers had suffered immersion pulmonary oedemas, one spontaneous, the other probably brought on by stress.

This raises several questions about this involuntary homicide prosecution:

- 1) Why did the Maltese authorities withhold information from the British Coroner and the UK police despite them formally requesting this data?
- 2) Why did the Maltese authorities take eight months to issue a European Arrest Warrant following their decision to prosecute?
- 3) Why didn't the Maltese authorities take into the account the Coroner's Report in February 2015?
- 4) Why is it alleged that Saliba represented himself as a BSAC representative when BSAC has confirmed that he is not?
- 5) Why is it alleged that Saliba pushed for this prosecution when he respected (in writing) the professional knowledge of Wilmschurst?
- 6) Why did Saliba feel that Martin had a case to answer when he (Saliba) had written a peer-reviewed paper about immersion pulmonary oedemas, and knew that there is no



accurate way to predict whether or not a diver is at risk of developing immersion pulmonary oedema?

### Why?

During the research of this story it was hoped that it was simply a case of misguided officials getting involved with something of which they had little or no knowledge. It is understandable how a non-diver hearing that someone had "failed to give first aid underwater" can think the resulting charge perfectly logical and reasonable. And the Gozo warrant stated this fact. However, divers everywhere understand that "failing to give first aid underwater" makes no sense as it is an impossibility.

### No further comment

The Maltese and Gozo court officials, not understanding scuba diving, naturally relied on the advice of a local expert, who really ought to have provided his country with professional, impartial, accurate advice. The result: a professional who has done his fellow countrymen a disservice, a complete over-reaction by the Maltese authorities, and a potential move to get unguided diving stamped out in Gozo and Malta, with Martin being used as a vehicle to make this happen.

Upon reaching out to Saliba for comment, he responded that he had nothing to add over and above the contents of the report he submitted to the inquiring magistrate. As this issue went to press, the report was not made available to this magazine *and it hasn't been*

*"Who is really responsible if an incident occurs during a guided dive with a group of people (either known or unknown to me)? The local divemaster or less experienced instructor from the local dive centre, or me—a staff instructor with 20-plus years of diving and a few thousand dives under my belt?"*

*possible to ascertain precisely what has been stated, recommended and acted upon - and by whom.*

It is apparent that antipathies against the hyperbaric doctor exist in the dive community but in the pursuit of the truth one must see past these and also question the role of the Magistrate.

However, on 21 September 2015, he was quoted by the Maltese website "Illum" as stating: "The statistics show that over the last 10 years, we had, at the most, three fatalities a year. [Last] year [we] had three in one day and two so far this year. Between 2009 and 2011, there were no fatalities. Most diving fatalities are independent [diving unguided] but this year [the diving fatalities] were diving with dive shops. Considering [there are] above 100,000 dives on Gozo a year, [it] shows that [the] sport is very safe, provided [you] obey the rules of nature."

Saliba also told Illum that in addition to divers diving under the protection of dive shops, there are others diving alone, amounting to about 5,000 a year. Saliba was then asked by Illum if enough was being done to keep divers safe.

### GUIDED VS UNGUIDED DIVING

Pete Bullen, a local Maltese dive guide, makes the following salient points about guided versus unguided or unaccompanied diving. His advice is excellent.

"Divers are taught from the word go that they need to seek local advice when diving somewhere new. Quite a lot of divers enjoy being guided, whilst many others prefer to organise and run their own diving plans.

"I see hundreds if not thousands of divers diving 'unaccompanied' every year, and in the main, they dive safely, have great holidays and many come back year after year. And it is that 'year after year' bit that makes the main difference.

"Reading local conditions, particularly during times of changeable weather, needs some local knowledge. Understanding that the dive site may be perfectly safe to dive now, but the weather conditions may well be less than optimal in 90 minutes, when the dive has finished, takes experience, as does knowing when to go ahead and dive where you are, when to call the dive, or change the dive site.

"I haven't done any deep statistical research on this subject, but living and working here, I'd suggest that if you are suitably qualified, familiar with the sites and local conditions, know how to read the weather forecast and understand the implications of a change in wind direction mid-morning, then hire a car, cylinders and lead weights, and go and have fun. Many of our 'unaccompanied' customers first came here as guided divers and only on subsequent visits did they go unguided.

"If, on the other hand, you are a recently qualified Advanced Open Water or Sport Diver and/or this is your first visit to the islands, then get someone local to show you around. The nice thing about diving Malta and Gozo is that it is small intimate groups. We don't herd divers about. Instead, we tailor the dive to your requirements. You'll see more, you'll visit sites you'd have never found on your own, and you stand a far greater chance of going home uninjured ... And if, during mid or high season, you turn up at a dive site and you are the only ones there, don't congratulate yourselves for finding a quiet site, ask yourself why aren't the locals diving it!" ■







# opinion

*This whole thing has done the Malta and Gozo diving industry a lot of damage. It is a wonderful place to dive.*

Divers in  
Xlendi  
Bay,  
Gozo

He said, "To ensure no death occurs, all independent persons must dive with someone qualified who is very familiar with the dive sites. Also all divers aged over 45 or 50 should possess a valid medical certificate from their doctor. Also there should be medically trained personnel with specialised equipment at popular dive sites for use by independent divers as dive centres already carry this equipment. An ambulance takes at least 15 minutes to arrive which can be 15 minutes too late." [sic]

## Pandora's box

Will bringing in legislation to make guided diving mandatory help diving safety on the Maltese archipelago? It might well prevent a couple of diving deaths. It will also probably alienate the 5,000 odd divers who enjoy being able to plan and conduct their own dive plans. And it should be noted, there is a world of difference between diving with a seasoned professional and one who has had less than six month's experience in the area. A green guide does not make for a safer dive.

## Rebuilding confidence

So what should the Maltese authorities do now to build confidence among visiting divers from other countries? Like it or not, Pandora's Box has been opened. The threat of being prosecuted for diving unguided needs to be removed and an appropriate announcement must be made by the Maltese authorities confirming this.

*"To ensure no death occurs, all independent persons must dive with someone qualified who is very familiar with the dive sites."*

— Dr. Saliba to 'Illium'

## Fear of arrest

British divers ask: "Why should I be locked up because I am the most experienced diver or dive professional on an unguided dive, when another diver has a fatal medical issue underwater, and despite doing everything possible to rescue them, they die?"

This is how unguided diving in Gozo and Malta is being perceived in the United Kingdom right now by many senior divers and BSAC Diving Officers. They are not looking for blanket protection here, just the assurance that common sense will prevail. Of course, if there is a case where a person is genuinely negligent, or if someone obviously sets out to kill another diver, then, naturally, they should be appropriately dealt with by the authorities.

## Who is responsible?

Secondly, the Maltese authorities need to confirm where the buck really stops when a diver opts for guided diving.

To apply the rationale of the "evidence" in the warrant, advanced divers could find themselves being held responsible for the dive guide as well as the rest of the group, when officially on holiday and not "diving at work". And British divers are not the only ones to apply this

thought process, several Maltese dive centres are also interpreting the warrant in this manner.

All dive professionals and instructors know they have a moral responsibility to assist other divers when they are in trouble. However, when they are on holiday, paying to dive for fun, they should not be



held legally responsible for everyone in the group.

The diving community needs to have timely, clear clarification issued by the Maltese authorities confirming that the responsibility rests with the local dive centre when the services of local guiding is taken up, and not with the most experienced diver or instructor on the dive.

Thirdly, the Maltese authorities need to appoint and announce a "court investigating expert" that is respected by the community. They must be professional, knowledgeable and have integrity. After speaking with a number of divers, there is the strong impression that Saliba is a good hyperbaric doctor, but he is not respected by the community. Regrettably, many see him as a tainted court investigating expert because of his conduct in the Martin case.

## The end game

On Friday, 8 January 2016, Martin's case had an initial court hearing in Gozo. The judge demanded an explanation from the Maltese Attorney General as to why standard disclosure procedures had not been followed, because key documentation had been withheld by the Maltese authorities. Neither Martin, nor his lawyer on Gozo had been given sight nor a copy of magisterial inquiry report and the "court experts" report, and no reason had been given for this action.

The Court moved to Chambers where it was discussed whether the proceedings should be suspended—and whether an expert should be appointed to report on Saliba's competence and qualifications. The case was re-rescheduled to be heard on Monday, 25 January 2016, five days after Martin's extradition appeal

hearing in London.

Meanwhile, four days later on Tuesday, 12 January 2016, the BSAC issued a statement:

"This morning BSAC's Chairman, Chief Executive and National Diving Officer met with the Attorney General of Malta to discuss the Stephen Martin case ... Following BSAC's last meeting in Malta in November regarding Stephen's case, we have continued to work with the Malta Tourism Authority to secure a meeting with the Maltese Attorney General.

"It was a very frank, open and direct meeting lasting 1 hour 40 minutes in which we questioned the strength of the case against Stephen Martin. We very firmly explained our dismay at this case ever being brought against Stephen. We believe there is a complete lack of evidence to support it and have questioned all aspects of this case.

G SYMES







## opinion

*"The support and advice I have received from divers of all agencies and all countries has been truly outstanding and we all deserve to learn from this sorry situation."*

— Stephen Martin

"While the Attorney General listened to our representations and views, he explained procedurally he is unable to withdraw the case at this time."

### Case dropped

A mere six days later, on Monday, 18 January 2016, Martin's lawyers were advised that all charges had been dropped by the Maltese authorities, bringing an end to a horrific nightmare for

Martin, who could have faced up to ten years in prison if he had been found guilty in Malta.

Later that day, BSAC Chief Executive Mary Tetley issued a statement: "First of all, I would like to extend our sympathies from all at the British Sub-Aqua Club to the families of Larissa Hooley and Nigel Haines. This was a tragic accident and Stephen is among the many who are still grieving their loss. I would like to

thank the Malta Tourism Authority for facilitating the crucial meeting with the Attorney General. The decision today brings to an end the horrendous ordeal which Stephen has suffered since he was charged, and we are both delighted and relieved for him."

### Charge bizarre

Martin's solicitor in the United Kingdom, Edward Elwyn Jones, described the charge as "bizarre"

BSAC clubs like using Malta and Gozo for club trips because it allows them to train, nurture and mentor divers in these useful skills in benign (-ish) conditions that are similar to UK waters

because it was not at all clear how the Maltese authorities proposed to prove that Martin had actually caused the deaths of Hooley and Haines. He said: "It is rare for an extradition request to be withdrawn. Often when they are, it is as a result of lobbying outside the courtroom, and BSAC are to be commended for the work they have done to highlight Stephen's plight at the highest level."

### Martin's statements

"I am overwhelmed," said Martin. "This has been an utter nightmare for me, and I am just so relieved it is over. I feel I can finally start grieving for Larissa and Nigel, I just can't keep back the tears. I would like to thank everyone who has supported me over the last 12 months. I have been overwhelmed by the support of divers in the UK and worldwide and for all the efforts that have been made on my behalf to get these charges overturned. BSAC have also been really been fantastic. It's a great example of how they look after their members, and I can't thank them enough.

"I am not bitter about this. Just very angry and very let down at being blamed for two people who died because of medical reasons. One of the divers that perished was my girlfriend of five years.

"I thought I could get some kind of closure after the inquest in Brighton, but it hasn't happened.



I don't think I'll ever forgive myself for what happened to two of my friends. Would I swap places with the perished? Yes. In a heartbeat. "I have not dived a great deal since the incident. The first time was in August 2014. Since then I have concentrated on teaching. I am spending my time training new divers, and taking them for their first dives in the sea.

"This is a hollow victory. This whole thing has done the Malta and Gozo diving industry a lot of damage. It is a wonderful place to dive. I must do something to try and help promote the islands. I plan to go back in the summer and do a memorial dive and lay a plaque in the water.

"I also want to put something back to thank all the divers who have supported me."

### Acknowledgements

Martin would like to thank his legal teams both here and in Malta for believing in him and vigorously pursuing justice for him. He is enormously grateful to Malta's PDSA and Britain's BSAC who have supported him and lobbied Maltese authorities on his behalf, and the support of the Facebook group "We stand with Stephen Martin".

Martin intends to return to Malta in the near future to show his support to the diving centres on Malta who have been adversely affected by the decision to charge Martin and the subsequent boycott by many British and Irish divers. More details will be made available in due course.

■



PETER SYMES





Edited by  
Peter Symes



PETER SYMES

(File photo) Jackson Reef in the Straits of Tiran, not far from Sharm el-Sheikh, used to be packed with dive boats

## Egyptian tourism in free fall

**The number of tourists visiting Egypt in November and December is down 41 percent from last year and is the lowest number during these peak months since at least 2005, according to data compiled by Bloomberg.**

Suspensions that a bomb planted by ISIS sent a Russian passenger plane crashing into the Sinai Peninsula are damaging Egyptian tourism far more than five years of political upheaval and toppling of presidents in 2011 and 2013.

Visitor numbers rose steadily in the years up to 2010, in which 14.7 million international tourists arrived and pumped US\$13.6 billion into the economy, according to UN figures. But the revolution set the trends in reverse, and continued aftershocks have choked off recovery. In 2013, tourism contributed just \$6.7 billion—less than half of the 2010 peak.

The nascent recovery, which was seen in 2015, was ultimately snuffed out

when Russia and a number of West European nations reacted to the crash, or downing, of the Russian jet by restricting flights to Egypt and issuing travel advisories against all but necessary travel to all of Sinai including the Red Sea resort of Sharm el-Sheikh, which is the base of many Red Sea dive operators.

“You cannot call what’s happening a drop, it’s a collapse,” Amani El-Torgoman, board member of the Egyptian Tourism Federation told Bloomberg News. “There is definitely an overreaction to the plane crash, and it is devastating.”

X-RAY MAG spoke to various Red Sea operators at the recent BOOT expo in Düsseldorf. On Sinai, the situation is bleak. Sharm el-Sheikh, once bustling with hundred of thousands of tourists, is now quiet and empty, and operators are either closing shop or trying to weather out the storm, without knowing when the situation is going to change.

On the mainland, from Hurghada and south, operators are also apprehensive but less affected. One operator, who spoke on the condition of

anonymity, related that they felt absolutely safe and that their entire staff, including western expats, continued to work as usual.

Operators running bases around Marsa Alam and further south stated that their repeat customers largely kept coming as usual and they were more affected by practical issues such as cancellations or restrictions of flights serving the nearby Marsa Alam airport forcing their guests on lengthier and roundabout trips via other airports to make it to their destination. This predominantly affected divers travelling with their families.

It is, however, clear that the ongoing, or perceived, threat of terrorism has created a new security situation that has also started to affect tourist areas that were perceived as secure—such as the resorts, which remained well-traveled even during previous turbulent times.

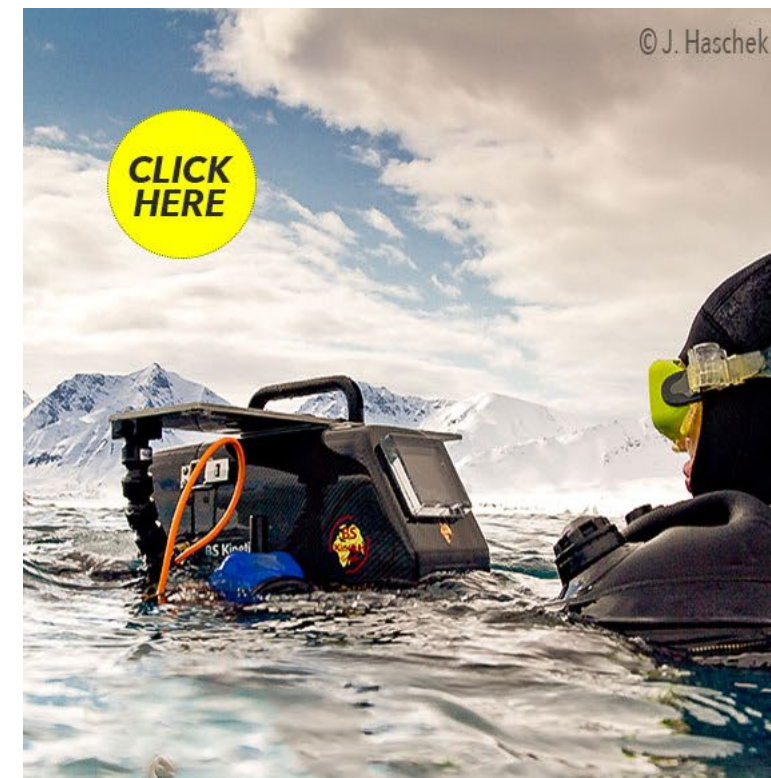
### Tourists defiant

Despite concerns over extremist attacks, the number of international tourists rose by 4.4 percent worldwide in

2015 to hit a record 1.18 billion, according to the United Nations World Tourism Organization. Global tourism figures were hard hit by the global financial crisis, declining four percent in 2009, as an outbreak of swine flu also contributed to cash-strapped people staying at home. But they have risen each year since—2015 was the sixth consecutive year of above-average growth in global tourism since the economic crisis.

The attacks carried out last year “will not have any medium and long-term impact” on the growth of travel, Taleb Rifa, the head of the UN body, told the *Guardian*. The organization predicts international tourism arrivals will increase by four percent in 2016. It forecasts the number of tourists who make an overnight trip abroad will hit 1.4 billion by 2020.

Whether these forecasted trends will also hold true for the Red Sea operators one can only hope. Dive sites from Dahab to Sharm el-Sheikh are empty or sparsely visited, and the hotels that are still open have closed restaurants, cut back on activities and laid off staff. ■



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## Light can hack the body's clock to prevent jet-lag, a new study finds.

Jet-lag getting you down? Try getting some sunlight. By tricking the body into thinking dawn is breaking sooner, you can get a head start on jet-lag before it occurs.

Using a flashing alarm clock, researchers at Stanford University found that the body's circadian rhythm can be shifted. Short flashes of light while people sleep prior to a trip helps speed up the process of switching to a new time zone.

"Most people can sleep through the flashing light just fine, and it could be a great method of helping to adjust the internal biological clock for all kinds of sleep cycle disruptions," Dr Jamie Zeitzer, assistant professor of psychiatry and behavioral sciences at Stanford University, told the *Telegraph*. "This could be a new way of adjusting much more quickly to time changes than other methods in use today."

In the study published in the *Journal of Clinical Investigation*,

scientists found that a sequence of two-millisecond flashes of light (similar to camera flashes) that were 10 seconds apart, brought about a change of nearly two hours in the start of sleepiness. When a traveler flies east to west, the "false dawn" that the therapy creates in the brain matches the sunrise in a new country more closely. If traveling west to east, Zeitzer said the flashing-light therapy at night could be employed to help travelers adapt to, say, a

five-hour time shift, such as from California to New York, or Britain to the Maldives.

"If you are flying to New York tomorrow, tonight you use the light therapy," said Zeitzer. "If you normally wake up at 8:00 a.m., you set the flashing light to go off at 5:00 a.m. When you get to New York, your biological system is already in the process of shifting to East Coast time." ■

SOURCE: THE TELEGRAPH

## New jet-lag solution

PETER SYMES

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Text by Pasi Laine,  
NAUI Representative, Finland

**Throughout Finland, you will find mine divers who are certified as cave or wreck divers, but the majority do not have any supporting training to manage mine dives. Most of the divers are either self-taught, or they simply follow dive and equipment instruction and hints from more experienced, non-mine certified divers.**

NAUI's motto has always been "Dive safety through education." When NAUI Finland began planning the Mine Diver Program, the goal was to create clear, relevant skill requirements, diving practices and procedures on how to manage underwater problems in a confined and technical environment.

At first inspection, many caves may resemble mine tunnels; however, NAUI recognized that there is no complete amount of cave diving skills that are 100 percent sufficient in managing all potential hazards and risks involved in this specialty diving.

### Scope

The basis for the NAUI Mine Diving Program is a combination of both

the cave and wreck diving programs, from which the best practices have been chosen and modified so that dives in mines may be conducted properly and safely.

NAUI's Mine Diver course provides divers with the skills and knowledge necessary to gain experience and minimize risk while conducting longer-penetration, more complex navigation mine dives that do not exceed 130 fsw (40 msw).

Upon completion of the NAUI course, graduates are considered competent to plan and execute limited-penetration as well as simple multiple navigation decisions on mine dives with staged cylinders without direct supervision, provided the diving activities and areas dived approximate those of training.

### Instruction

As a NAUI Finland Representative, I lead the course, assisted by NAUI Leaders Martti Lumikuru, Perry Suojoki and Marko Kauppinen; Tech Instructors Toni Finsk, Mikael Tyven, Pasi Lammi and Marcin Dobrucki; Instructor Sasu Koskelainen; and Dive Master

Tapio Helander. The first NAUI Mine Diver Instructor Trainer Course was held in October 2014. After the NAUI Board of Directors approved the first two levels of the program, the NAUI Technical Diving Division further revised and approved the most recent level program standards. The program has grown to incorporate several Mine Diver I and II-level instructors, along with an abundance of educated NAUI certified mine divers!

This unique NAUI program once again shows how NAUI continues to define diving throughout the world with a dedicated focus on leadership, innovation and

safety. NAUI Leaders in Finland and Europe are now working to develop the Mine Diver III program and continue its growth in this specialty.

### Skill requirements

The extensivity of the NAUI Mine Diver Program is dependent upon mandatory skill requirements to ensure the safety and quality education of the diver.

Divers in this course review substantial academic material, such as accident analysis, diving limitations—depth, time, distance, gas, and comfort, NAUI Technical Equipment Configuration (NTEC),

task loading, stress, perceptual narrowing, panic, problem solving and emergency planning.

Further coverage includes mine formation and terminology, hazards associated with mine diving, entanglement, anti-silting propulsion techniques, guidelines, communications, problem solving and emergency planning.

Complex skills such as decompression mine diving and emergency planning, communications, basic mine survey techniques, mine navigation with multiple guidelines and the use of maps for dive planning and dive planning based on data recorded on

previous dives are also practiced.

In addition, the program practices skill requirements with drills on land, in open water and in mines. The skill requirements are mandated to ensure proficiency in specialty equipment, placement and zero visibility. Divers in this program will be proficient in demonstrating guideline deployment and removal techniques, installation techniques, and team-mate drills. ■

*To learn more about this program, contact your local NAUI facility at [www.naui.org](http://www.naui.org) or call (813) 628-6284 or (800) 553-6284 TOLL FREE.*



# NAUI Mine Diver Program







# Great American Journey

— *Stewards for Local Waters*

Text and photos by Jennifer Idol





Diver Ben Castro checks out *Tubastrea* sun corals on OCSGG1665 oil rig, Louisiana



Oil rig emerging from fog (above), Canyon MS Area, Louisiana; Workers (right) collect oil from beach, Perdido Key State Park, Florida. PREVIOUS PAGE: American flag on Sikorsky H-37 helicopter, Dutch Springs, Pennsylvania

**Returning from the pristine reefs of Tobago, I flew over the Deepwater Horizon oil spill in 2010. Aghast, I set out on a journey that would help me illuminate waters of the United States to help people better understand their national treasure. I became the first woman to dive all 50 states at the end of last year.**

When I set out on my journey, I was already an experienced local diver that appreciated the diversity of my Texas diving. As an underwater photographer,

I thought people would learn to value and protect their waters if I created compelling imagery. Despite my experience, I didn't know what I would see and experience on my journey. In the United States, I had only previously dived Texas and Florida.

I did expect to see a lot of green water filled with rocks, but suspected I would discover much more. Though I found my share of sand and rocks, I encountered beautiful and strange life all across the country on a quest that would become a great American adventure.

The first states I visited were both



beautiful and sobering. From the shores of Florida and Louisiana, I was reminded of my purpose at the outset. I saw workers collecting oil remnants from the beach where I dived. They were protected by masks, gloves, hats and even booties, while my buddies and I wore only swimsuits and wetsuits as we





Looking at tannic water in the eye (above), Ginnie Springs, Florida; Leopard toadfish (left) at stern of Navy tug, Alabama; Polka-dot batfish in sand, Navy tug, Alabama (below)

beyond recognition. Louisiana waters are not an empty place for us to mistakenly introduce harmful chemicals. According to the Ocean Conservancy, more than 15,000 species inhabit the Gulf of Mexico.

I marveled at odd findings in Alabama at the stern of a Navy tug. Leopard toadfish and polka-dot batfish scowled at me from the sand. These small fish rely on camouflage as they hunt for food. On my ascent, I observed schools

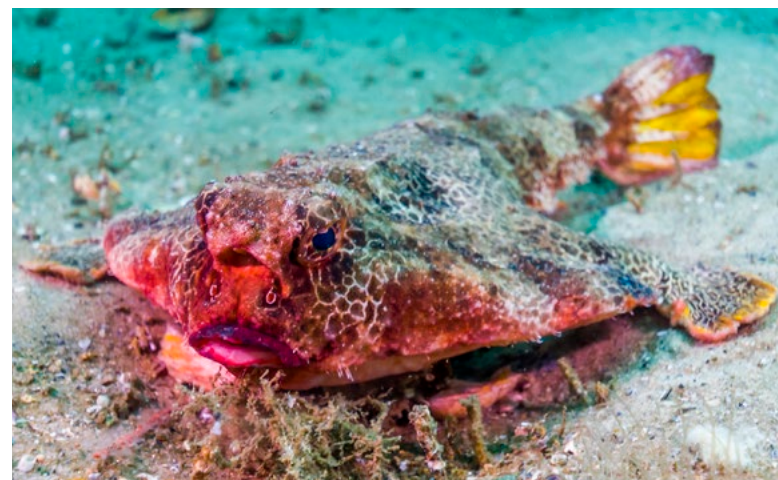
of red snapper swimming through the wreck.

Between dives, I experienced my first encounter with wild bottle-nose dolphins. Their curiosity and intelligence were readily apparent as they herded me away from the fish they were trying to catch. This



prepared to enter the water from which they protected themselves.

Shortly thereafter, I dived on oil rigs within a couple miles of the very site of destruction I witnessed. Underneath, sea life dominated the rig structures. Tropical fish swam circles around the structures, so full with *Tubastrea* sun corals that the metal structure was obscured



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Lake dive entrance at dawn, Yellowstone Lake, Wyoming; Diver Doug Harder (lower left) prepares to leave Yellowstone Lake; Open water class descending, Homestead Crater, Utah

greatest of our American landscapes. In Yellowstone Lake, I explored geothermic formations. Yellowstone National Park is a land of extremes, from 459°F (237°C) in springs that host thermophilic bacteria to 40°F (4°C) where bass live.

I witnessed the effects of natural events on the history of Glacier National Park. Uprooted trees likely slid into Lake McDonald near Sprague Creek during an historic mudslide, just as the trees found in Jenny Lake in Grand Teton National Park and in Fallen Leaf Lake in California. Historic tools lay at the bottom of the head of Lake McDonald, reminders of human activity during park construction 100 years ago.



ing groundwater and frozen water, according to the US Geological Survey (USGS). Therefore, much of my journey was spent driving across vast landscapes.

I observed the transformation in our country from wetlands, mountains and plains to tundra and purposely sought to reveal this diversity.

remarkable beginning influenced my five-year journey as I transformed from an underwater photographer into a conservation artist dedicated to our local waters.

### Truly diverse

Water only covers seven percent of the United States, includ-

I explored 2,500 feet (762m) into caves, dived in oceans, visited quarries, sought out ice diving and explored wrecks. I wanted to showcase unique underwater landscapes like the tannic water mixing with fresh water in Ginnie Springs.

Our national parks protect the



Historic tools remain from park construction, Lake McDonald, Glacier National Park, Montana



### Greatest sites of the journey

Traveling across 3,805,927 square miles (9,857,306 sq km) is no small feat. Simply covering the distance in itself could be great. I drove more than 72,000 miles (115,872km) and took 80 flights to complete the quest.

North Dakota would be the longest of the trips at nearly 3,800 miles (6,116km).

This challenging and quantifiable goal was defined by rich experiences. The richest of these included the warmest dive in Utah and the coldest in New Jersey and Ohio. While it snowed outside, I enjoyed 93°F (34°C) waters in Homestead Crater. Open Water students learned to dive in comfortable blue water.

The water bubbles through





Diver Patrix Heschel (left) inspects ice ceiling, White Star Quarry, Ohio; Kelp bass (below) at Casino Point, Catalina Island, California; Garibaldi (lower left) at Casino Point, Catalina Island, California



small vents in the bottom of the cavern and is kept warm all year-round by geothermic activity. The first divers in the crater lowered themselves

appear snowy but very blue. My first and coldest dive on the *Stolt Dagali* wreck in New Jersey taught me to wear sufficient thermal protection for

through the hole in the ceiling, but an easily accessible entrance has since been created in the side of the dome. I dived the crater in February wearing only a swimsuit, with two feet (0.6m) of snow accumulating during my dive. Calcite particles filled the water, making it too

my hands. Having the right equipment makes these dives enjoyable. I later purchased dry gloves to help even more. Swimming through this Norwegian tanker felt like floating through history, from when it sank in 1964 to the more recent history of divers who make this a destination.

Snow and ice were foreign to me at the start of my journey. As a Texan, I had little experience with either, so naturally sought out an ice diving certification. Ice diving in Ohio was also the coldest of my American diving experiences at 38°F (3°C), more so than even Alaska. It was such a fun experience that I also sought ice diving in Minnesota. This unique overhead environment is unlike any other kind of div-



Diver Ben Castro swims through the port side of the *Stolt Dagali* wreck, New Jersey

## 50 States

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Whitemouth moray eel (left) protrudes from hole, Kona, Hawaii; Thornback cowfish (lower left) looks for food along reef, Kona, Hawaii; Plumose anemones (right) cover a wreck, Puget Sound, Washington; Male horseshoe crab (lower right) attached to female, Beavertail State Park, Rhode Island

process. Despite appearances, they are not actually crustaceans. Instead, they are more closely related to arachnids.

I saw the strangest fish in Tennessee—a paddlefish. My buddy, Ben Castro, and I explored the Loch Low-Minn quarry where these fish lived. Paddlefish are a prehistoric filter feeder, little changed from their fossilized ancestors. I observed paddlefish each maintaining their own personal space and turning away when encountering another. In this dive site stocked with attractions, we also explored plaster sharks, buoyancy courses, and a statue of David.

Before I set out on this adven-



be like. I was often surprised by seeing animals that local divers thought were normal and abundant, but to me were remarkable and odd. Garibaldi and opalescent nudibranchs thrilled me on Catalina Island in California. In Hawaii, I learned about thornback cowfish and whitemouth moray eels.

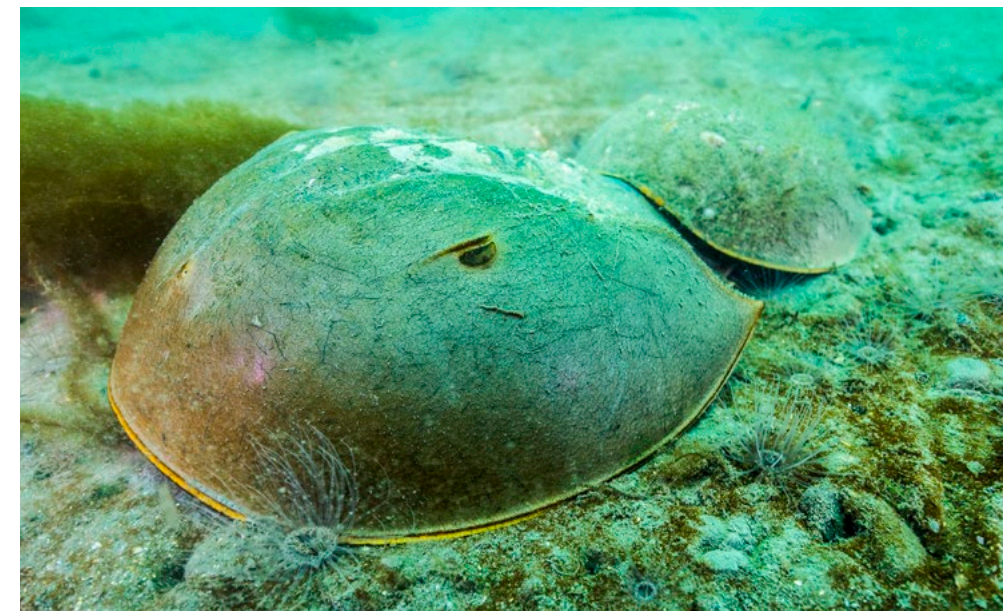
The most surprising locations were Puget Sound in Washington and Beavertail State Park in Rhode Island. Life in the north is unexpectedly prolific and large. In Seattle, giant plumose anemones seem to sprout from every hold they can find footing. While the water was green, the water became clearer after the first 20 feet (6m). In Rhode Island, I hoped to see a horseshoe crab. Not only did I get to see many of these living fossils, but I saw them in pairs as part of their mating

ing. I used sealed regulators so they would not free flow from freezing and dived with a side-mount configuration for redundancy.

So much of my experiences across the country was filled with surprises. Though I researched the logistics for the dive sites, I did not know what creatures I would see or what the conditions would



Orange plumose anemones group together, Puget Sound, Washington



ture, I wanted to define myself as a wreck diver. On this quest, I dived 21 notable wrecks, including the world's largest wreck sunk to create an artificial reef, the USS *Oriskany*,

at 888 feet (271m) in length. This dive to 220 feet (67m) was also my deepest dive of the journey. Though sunk in 2006, I saw only urchins, sea cucumbers and thorny oysters growing on the outside.





Diver Terry Mitchell (above) explores the *John J. Boland* wreck, Lake Erie, New York; Diver Ben Castro (left) kisses a plaster shark, Loch Low-Minn, Tennessee

is hard to identify because each of the outstanding destinations was so different from the next. From the remarkable historic diving equipment shared by the Northeast Diving Equipment Group (NEDEG) to America's last great wilderness in Alaska, it is nearly impossible to decide which is best.

In the northeast, I visited the USS *Arthur W. Radford*, 529 feet (161m) in length. This wreck was smothered by clams and decorated by anemones. So notable were the wrecks, that my 50th state featured wrecks of the Great Lakes. I explored the *William Young*, *Cedarville* and *Eber Ward* in Michigan. Most of the wrecks I visited were steel hull, but in the Great Lakes, I saw wooden ships preserved in the fresh water.

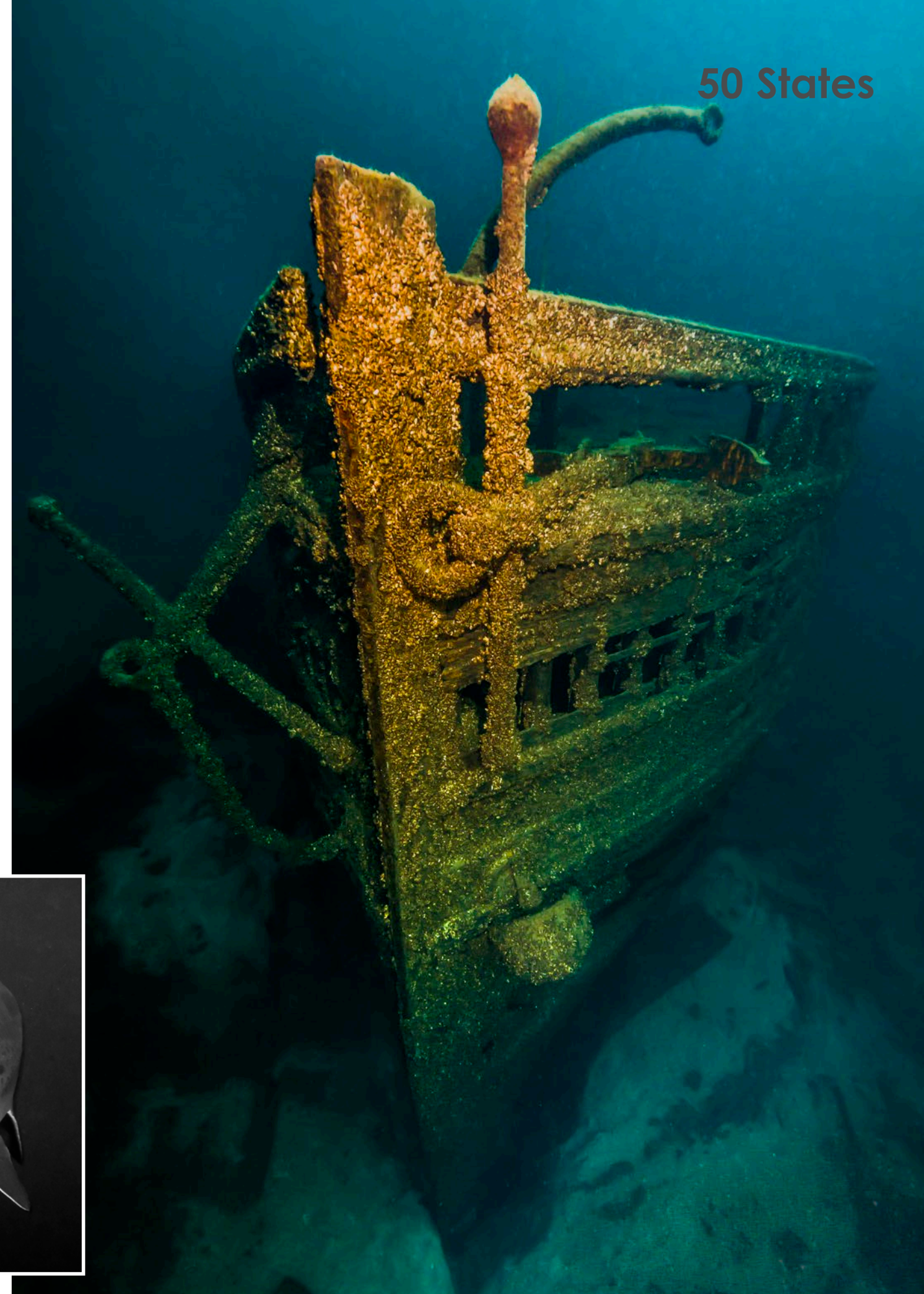
The greatest destination in my quest

glacier and waited while I watched it calve into the ocean. Standing near this activity, I felt nature's vastness.

I dived Alaska, the 49th state to become part of the United States, for my 49th state. There, I admired lion's mane jellyfish and fulfilled a dream to see salmon during their spawning season. These remarkable fish have been immortalized through stories of their reproductive journey. Unexpectedly, I also saw harbor seals, Steller sea lions, puffins and sea otters. On a tour, I visited a



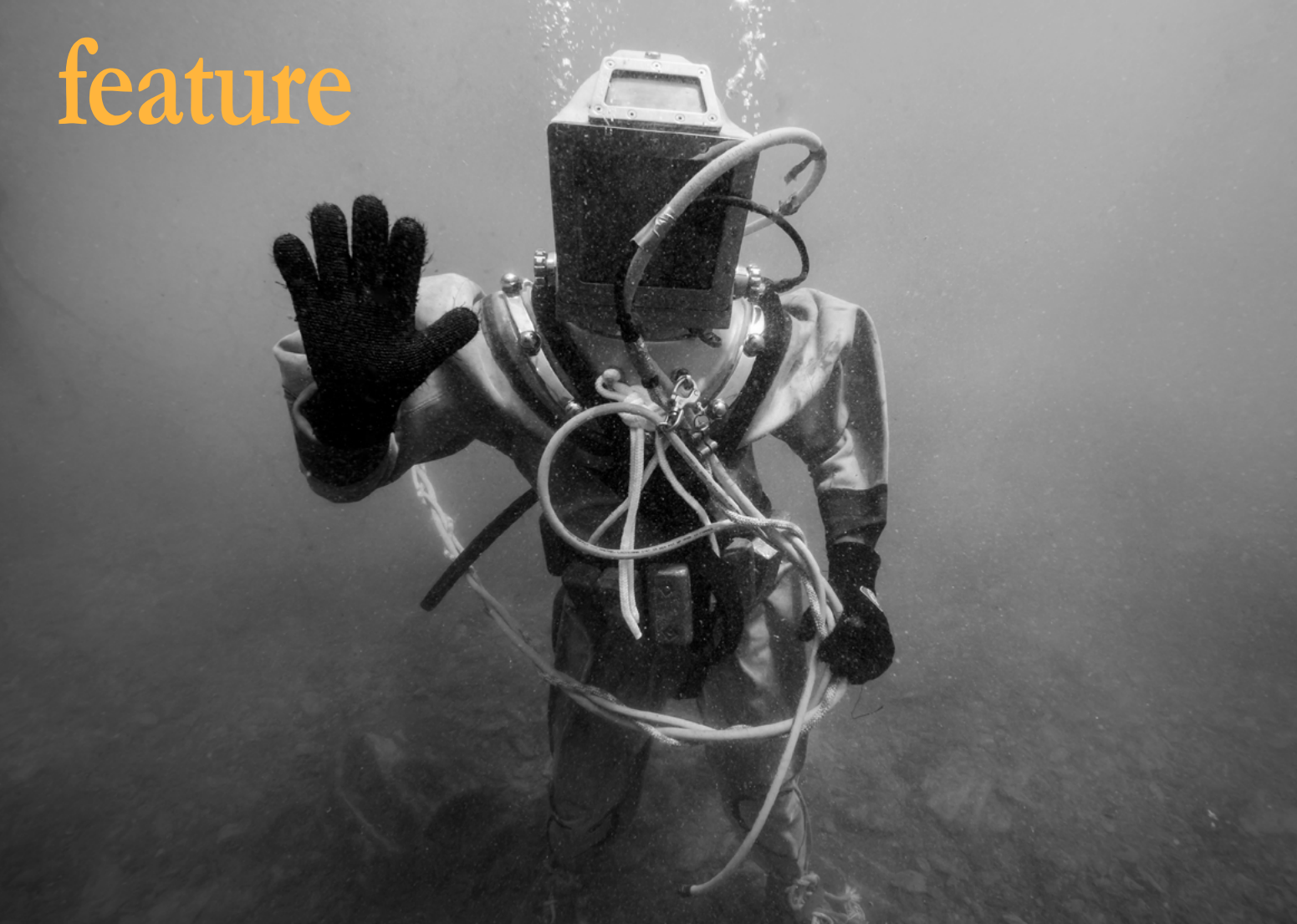
Paddlefish, Loch Low-Minn, Tennessee



*Eber Ward* wreck, a wooden cargo ship that sank in 1909, Michigan







Diver in a Swindell helmet from the 1960s, Dutch Springs, Pennsylvania

### Facing challenges

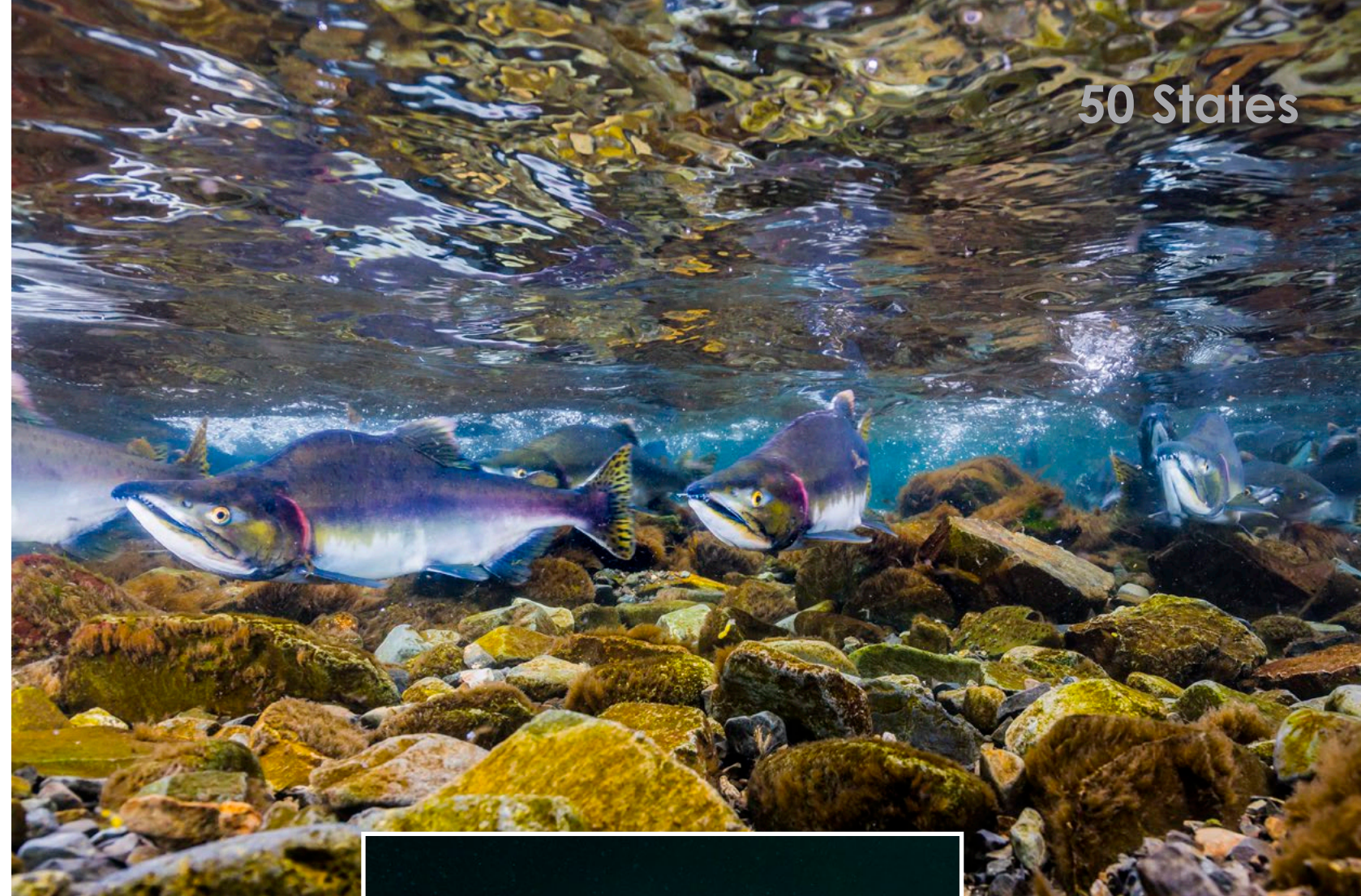
From hurricanes to limited visibility, nature challenged me every step of the journey. I rescheduled my trip to the U-352 due to Hurricane Irene, which made landfall in North Carolina the week of my trip and is cited by Weather Underground as the seventh-costliest hurricane in United States history. I detoured to Lake Mead in Nevada.

Another weather-driven detour, I was unable to dive my planned site in Lake Michigan due to extraordinary waves. I instead dived the deepest inland lake in Wisconsin, Lake Wazee. I brought a group of Texans on this dive, so we made the most of our trip and also visited the U-505 in Chicago's Museum of Science and Industry. We read in *Shadow*

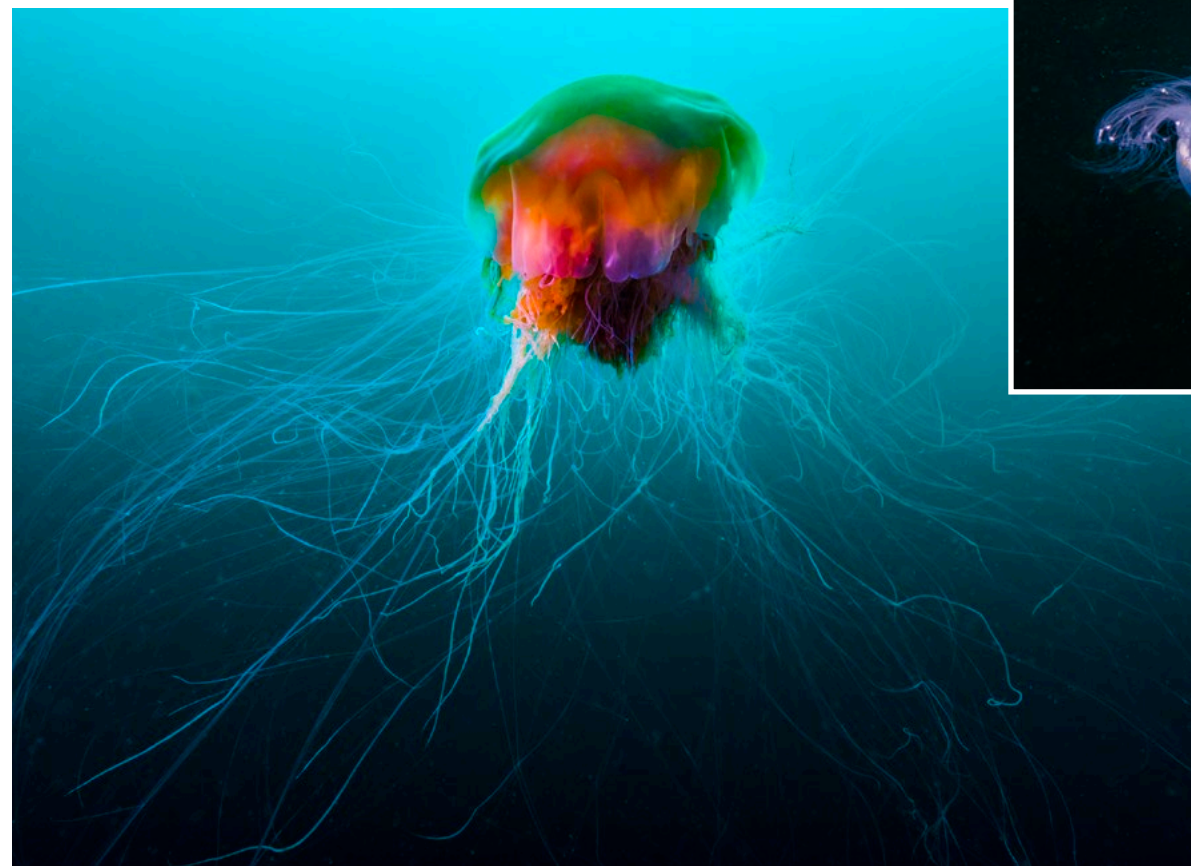
*Divers* by Robert Kurson that John Chatterton visited this U-boat, and also we were planning to dive the U-352. Having never seen a U-boat, this seemed a good way to familiarize ourselves with the wreck.

Limited time and financial resources constrained each of the trips. I visited 106 dive sites in five years. My photography was often limited to one or two dives set between days of travel. Yet, I succeeded in completing the quest and was enriched by all that I saw.

By the fourth year of my journey, I became tired from the work to create the best images in too few dives. At this time, I



Humpy salmon (above) return from migration, Resurrection Bay, Alaska



Lions mane (above) and moon jellyfish (right) proliferate, Resurrection Bay, Alaska



scheduled my next dive in Portland, where I was amazed at the clearest water of my quest in Little Crater Lake. The tall pine trees around and in the water beautifully decorated this spring-fed lake at the top of a mountain.

The Pacific Crest Trail intersects with this dive site. I observed hikers beginning their journey on this 2,663

mile (4,286km) long quest from British Columbia to the border of Mexico. They reminded me of when I set out on my quest to dive the 50 states. I left inspired by this dive and full of the sense of wonder I hoped

to bring others.

### Gatekeepers to the underwater world

Divers are stewards of local dive sites because we are experts of what lives underwater. We see a world hidden from most people. Without sharing our stories, others might not know to value these places.

Fortunately, divers across the country are eager to share local





Diver Micah Reese explores the springs, Little Crater Lake, Oregon



Giant kelp floats from the surface, Catalina Island, California

sites. This helped me dive with more than 74 buddies. Local divers across the country enriched my knowledge of American diving, helping me find the most notable areas of each site.

Detailed information about sites was surprisingly sparse. While I could find a site, it took research to determine when I could dive and by what rules I needed to follow. I now carry a dive flag to shore dives because this is the most common requirement. Now that I know what can be experienced, there are a number of sites I would like to return to.

### Sharing the story

For me to be a steward of the greatest diving in the United States, I share the story through my photography, articles,

and my book *An American Immersion*. To be released in March, my book showcases the photography and gives insight into how an oil spill inspired me to undertake this quest.

Through the story, I hope to inspire people to love and care for our waters across the country. Our natural resources are a treasure to protect. I intersperse big topics like invasive species, runoff from fertilizers into lakes and overfishing throughout the journey. Unfortunately, I encountered all these in my journey, especially the zebra and quagga mussels that overtake our fresh water.

### Five years of change

In the course of five years, more changed than my perspective on diving in America. A number of dive sites and stores I visited

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50

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Explorer Sam Meacham (left) swims through Cabomba, Spring Lake, Texas; American lobster (right) defends its domain, Ram Island, Maine

The ADM Exploration Foundation helped restore the spring to its original state.

Unusual in Utah, tropical fish inhabit Bonneville Seabase, where I saw two nurse sharks that have since died at 25 years of age. I revisit many of the dive sites, but each trip is a moment in its history. How we see the underwater world is like a still photo in a motion picture.

I am encouraged by the bigger story through the work of scientists like Dr Donna Shaver on North Padre Island. She has spent more than 30 years studying the endangered Kemp's Ridley turtles and successfully managed a hatchling program that is rebuilding their population in Texas. More opportunities like these abound for us to be stewards for our local waters.

### The next adventure

Diving all 50 states exceeded



my expectations. As I traveled across the country, I filled my dive list with dozens of new plac-

es I would like to dive but could not visit during this quest. When I share these moments in presentations at dive shows and events, I hope to inspire you to undertake your next diving adventure. I also plan to continue finding places full of the surprise and wonder I found in American waters. ■

*Jennifer Idol is the first woman to dive 50 states and author of An American Immersion. She's earned more than 26 certifications and has been diving for 20 years. Her underwater photography and articles are widely published. A native Texan, she creates design and photography for her company,*

*The Underwater Designer. To see more of her work, please visit: [uwDesigner.com](http://uwDesigner.com).*

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closed or changed ownership. Maine Divers Scuba Center took me to see the American lobsters crawling in the bay in Portland, Maine. They have since closed their store and operate seasonally as a charter.

I was fortunate to see bluegill sunfish nesting in Lake Rawlings in Virginia. While the Blackhawk helicopter is the premiere attraction, I was excited by these colorful

fish exhibiting their reproductive behavior. This too changed hands, and Lake Rawlings closed, reopening as Lake Phoenix.

Other businesses like Pennyroyal Scuba Center Blue Springs Resort expanded. Sites change in other ways, such as with Santa Rosa's Blue Hole in New Mexico. The sculptures I photographed were taken from this site, but wonderful changes are also taking place.



Male bluegill sunfish circle nests, Lake Rawlings, Virginia





*The French Riviera's*

# Golfe-Juan

Text and photos  
by Lawson Wood

— *A Diamond in the Blue*



If you are in Europe and like the idea of a short flight to Southern France and diving on the same day you arrive in the Mediterranean, then perhaps you may want to try the seaside resort town of Golfe-Juan—just a short ride west from Nice. Average journey time to Nice for flights from all over Europe is only two hours. My wife, Lesley, and I chose to fly EasyJet from Edinburgh.



On a rocky pinnacle midway between Cap d'Antibes and Les Îles de Lérins sits the automated lighthouse, La Furmieve

PREVIOUS PAGE: Pair of spotted doris nudibranch among cup coral

One small side street away from the old port in Golfe-Juan is Diamond Diving. Operating since 2006 and catering for holiday groups, local divers and running instruction courses, the centre's two dive RIBs take divers to sites primarily between Cap d'Antibes and Les Îles de Lérins—the islands to the south (Île Sainte-Marguerite and Île Saint-Honorat).

The dive centre's RIBs are kept in the marina directly in front of the shop where divers kit up and cross the street under the envious and watchful eye of the tourists who sit in the various restaurants overlooking the port—a great place for lunch between dives or for those après-dive drinks at the end of the diving day. We can recommend La Sirene on the prom, overlooking the dive

boat mooring, and La Stella di Gigi at the new port (Port Camille Rayon) where the lovely Stella di Gigi runs a superb restaurant and Pizzeria.

Depending on the schedule and the number of clients, the dive center offers either a single tank dive in the morning and another in the afternoon, or you may do a twin tank dive in the morning and get back into port around 1:30 in the afternoon, giving you plenty of time for lunch and exploring the nearby towns of Antibes, Juan-les-Pins and Valauris the rest of the day or just ogling the super-yachts.

### The diving

**La Furmieve.** Located midway between Cap d'Antibes and Les Îles de Lérins is an isolated series



of rocky pinnacles topped by an automated lighthouse called La Furmieve or "La Fourmigue". There are literally over ten different dives to be had here, and in the usual constant tidal stream, there are many filter feeders evident, such as sea squirts and small gorgonian sea fans.

Just off the lighthouse there is a pinnacle, which almost comes to the surface and features a huge swim-through between two massive boulder outcrops called La Grotte de Miro. There is a

Yellow cup coral; Cardinalfish (left inset)





statue at the base of the grotto, now well-encrusted with algae and small sponges.

In the shaded areas are superb congregations of yellow cup corals (*Parazoanthus axinellae* and *Leptosammia pruvoti*), small specimens of precious red coral and lots of cardinal fish. Chromis and several species of bream are all around, as are the ubiquitous wrasse.

**Le Dromadaire.** Further out is Le Dromadaire, which starts at 15m (50ft) and plunges down over 65m (220ft). The outer wall is riddled with narrow

clefts where purple gorgonians (*Paramuricea clavata*) proliferate. Look closely and you can usually find winged oysters on their outstretched fans. Rare long-spined sea urchins (*Centrosphanus longispinus*) and the Mediterranean anthias are also found here, and as long as you are prepared for a 30-35m (100 – 120ft) dive, you will have a great time.

The shallower rocky surfaces tend to

be covered in various algae, grazed on by saup (*Sarpa salpa*) and numerous varieties of wrasse and bream. Various nudibranchs are plentiful such as the leopard doris (*Discodoris atromaculata*) and the tricolour doris (*Hypselodoris tricolor*). Schools of barracuda are found here and the water column is filled with fish.

Precious red coral (above); Noble pen shell, or fan mussel, in neptune grass (top right); Peacock worm (top left); Black-headed blenny (left inset)

Tricolor doris nudibranch





Close-up detail of red sea fan (above); Close-up of tompot blenny (right)



**Miniature village.** To the north of La Fournie and back towards Golfe-Juan are the remains of an old film set. The tiny village, only 15cm (18inches) high, was supposedly the home of a mermaid in this rather unambitious and amateurish video. The small buildings are now very dilapidated and rather tumble down, covered in algae, encrusting sponges and small corals.

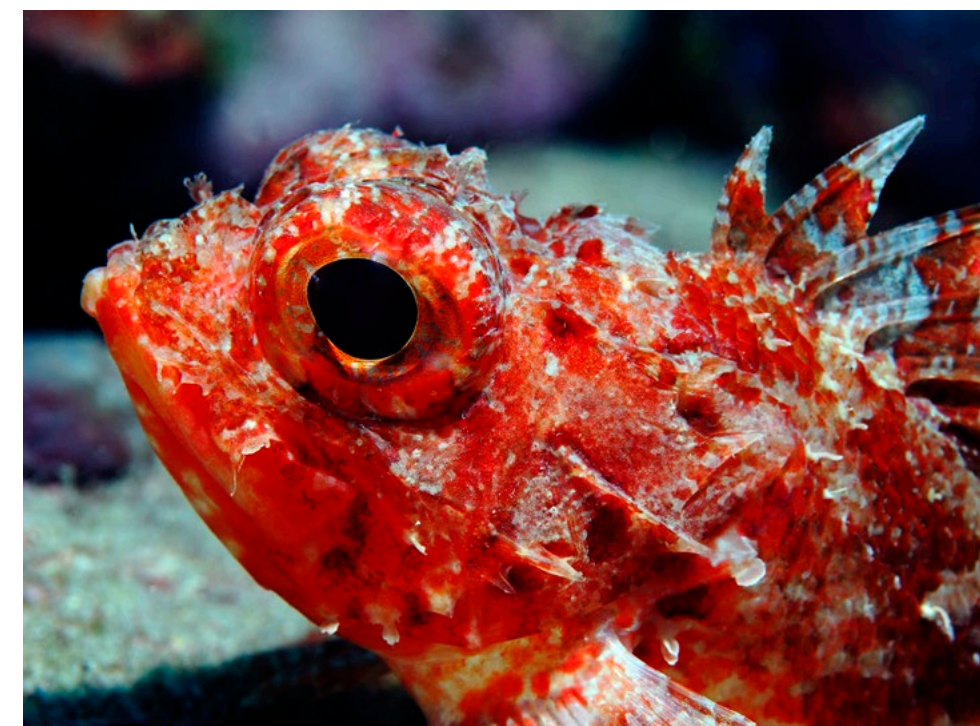
What are much more interesting are the rare giant sea pens (*Pinna nobilis*), which can be found amidst the sea grass beds. These fan-shaped shells are over 30cm (1ft 3 inches) tall and are indicative of good clean waters. The more common blennies found on all of the rocky overhangs are the black-headed blenny (*Trypterygion delaisi*) and the tompot blenny (*Parablennius gattorugine*).

**Cap d'Antibes.** To the northeast of the bay, Cap d'Antibes has a large plateau which

spreads out nearby the famous Eden Rock Hotel where the glitterati stay during the Cannes Film Festival. This ancient limestone plateau is a labyrinth of huge boulders topped with sea grass. With the water here being so clean, visibility is usually in the 20m range, but this also means that the sea grass does grow down to around the 21m (70ft) contour.

La Seiche Saint Pierre and Rascoui are two of the most popular sites and are largely undercut in many places, where there are conger eels, moray eels, spirograph tube worms (*Spirographis spallanzani*) and plenty of brilliant red cardinalfish (*Apogon imberbis*).

Much of the rocky substrate is dominated by an enveloping shroud of brown algae, but the rocky terraces are usually clear of this invasion and the gorgonians are thriving. Anthias are found only in deeper



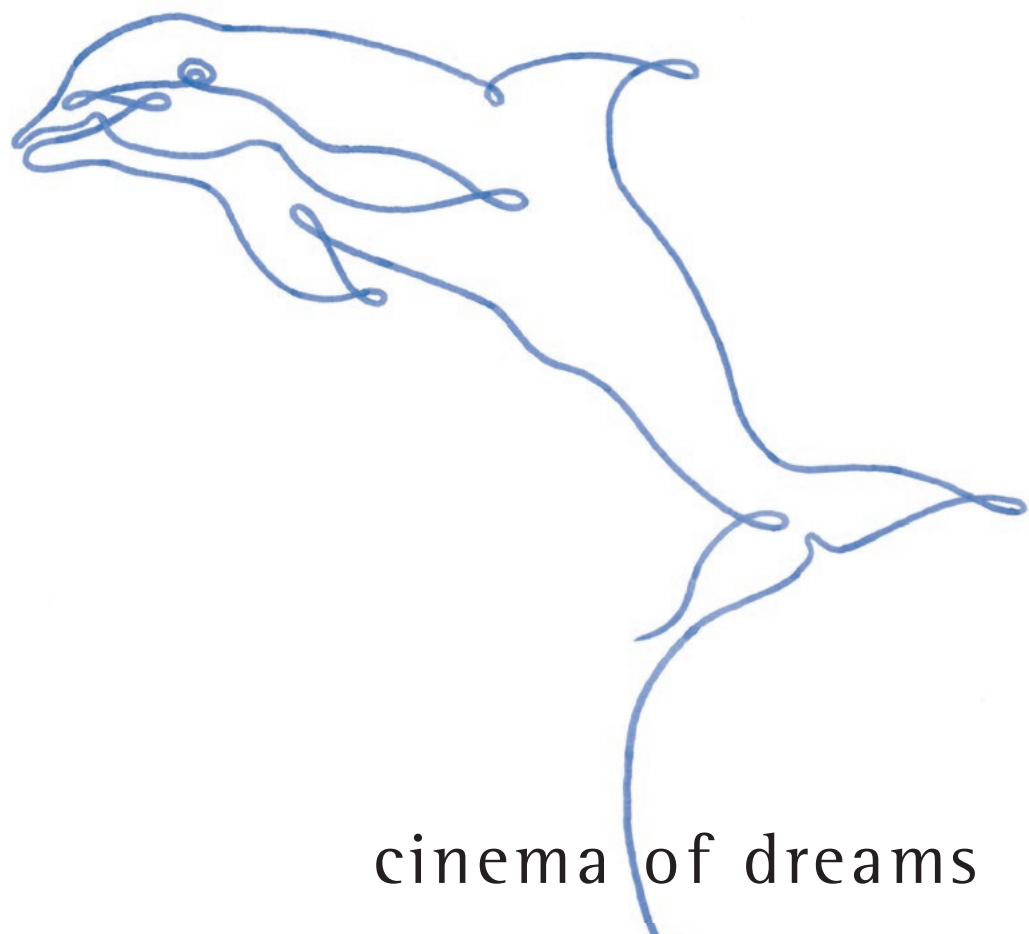
Venemous small red scorpionfish

Yellow gorgonian sea fans are plentiful at Île Sainte-Marguerite





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Diver Anna Ryan in the bay of Golfe-Juan; Brown flatworm (right)

waters, and in the further recesses of the caves, you can also find large grouper. Sadly, we found a staked fishing net, which had clearly been in the water for quite a few days, and encountered trapped scorpionfish (hardly a delicacy). Needless to say, we relieved them of their plight!

**Île Sainte-Marguerite.** To the southwest on the outer cliff off Île Sainte-Marguerite, the visibility was around 25m (83ft) and there was none of the enveloping brown algae evident. (Some of the shallower sites in the bay get smothered in the spring plankton bloom,

but this usually disperses quite quickly as the water warms up).

The pale gorgonian sea fans (*Eunicella cavolinii*) were everywhere, their branches extending out into the current. Large grouper were evident in a number of rocky overhangs as were small octopus, common shrimps and squat lobsters.

The deeper caverns had leopard spotted gobies (*Thorogobius ephippiatus*—just like home in Scotland) and there were plenty



of wrasse and bream. All of the shaded underhangs were covered in encrusting sponges, cup corals, bryozoans and hydroids—a superb dive.







Flabellina nudibranch

Diver Anna Ryan exploring bay of Golfe-Juan (above); Axillary wrasse (top right); Ornate wrasse (above)

**Le Robuste II.** There is one wreck known in the bay called *Le Robuste II*, which sank in the bay at the end of WWII and lies in 27m (90ft) of water at its deepest point at its propeller. This former cable barge is very well broken up now and her wooden structure is largely collapsed. She is over 30m (100ft) long and had a beam of around 7m (24ft).

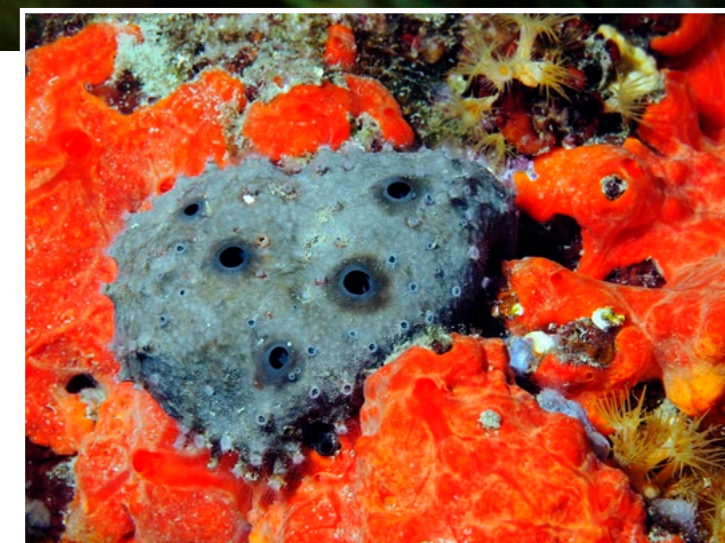
This wreck is not so popular with

non-photographers, but is a delight for finding small blennies, gobies and various crustaceans. The propeller, cable wheels, mooring gear, bollards and condenser are recognisable and virtually every surface is covered in encrusting sponges and small cup corals, hydroids and bryozoans.

### The dive operator

Diamond diving has two 6m RIBs

and is able to accommodate 16 divers, arranging up to three tours daily, depending on the schedule and experience of divers. The operator runs three IDC courses per year for a maximum of five candidates. Whilst introductory courses and advanced courses are available, students are encouraged to go down the e-learning curve and complete their theory courses online prior to travel, then com-



Greek bath sponge





Diver (left) investigates marine life in Golfe-Juan's bay; Antheas (center); Close-up of striped blenny (top right); Sculpin (above)



Golfe-Juan is near Nice, highlighted on map of France

plete their open water dives here in the Mediterranean.

Having plenty of new and well-serviced equipment, you actually do not need to bring any of your own gear if you are struggling with weight restrictions.

Similar to the services offered in many areas of the Caribbean, for those visiting in their own yacht(!) or have chartered a yacht, Diamond Diving has the full rendezvous diving set-up sorted out and will coordinate trips with you in mind. Those arriving on cruise ships also have plenty of time to reach the dive shop and have a dive before continuing on their tour.

## Getting there

There are flights from all of the major cities in Europe that fly directly into Nice, and even from our northern Edinburgh, the flight

was only two hours. Leaving with EasyJet at 7:00 am was early, but we got into Nice by 10:00 am local time (which is one hour ahead).

From Terminal 2, you can catch the free transfer bus to Terminal 1 and then a 10-minute walk (500m or so) will take you to the St Augustin railway station where both high speed (TGV) and regional trains (TER) are operated by the national state-owned railway, SCNF. Here, the train goes directly to Golfe-Juan and stops in the centre of town, very close to the port.

Just 200m to the left is the Hôtel le Provence where we stayed (rather impersonal and run down, but convenient), and 200m to the right and towards the port is where the dive operator, Diamond Diving, is located—so easy to find.

Alternatively, you can catch bus No. 250

from outside the arrivals hall at your terminal and this travels south through Antibes, Juan-les-Pins, and arrives in Golfe-Juan 45 minutes later. The bus stop is also just up from the railway station, so it is perfect all round and certainly saves you the expense of taxis or hiring a car and negotiating the sometimes confusing Côte d'Azur coastal road.

For larger groups, the dive shop owner, Alex Diamond, will arrange a mini-bus transfer and save you all of the hassle. ■

*The author thanks Alex Diamond of Diamond Diving ([www.diamonddiving.net](http://www.diamonddiving.net)), Noémie Broglio, Christof and Anna Ryan.*

*Lawson Wood is a widely published underwater photographer and author of many dive guides and books. For more information, visit: [www.lawsonwood.com](http://www.lawsonwood.com).*



Luminescent jellyfish



An underwater photograph of a vibrant coral reef. Large, delicate, yellowish-brown sea fans (Gorgonians) are the central focus, their intricate branching structures clearly visible. They are surrounded by various other coral species, including rounded, brain-like corals and smaller, more colorful polyps in shades of red, orange, and green. The background is a deep, clear blue, suggesting a healthy, deep-water environment. The lighting is bright, highlighting the textures and colors of the marine life.

# Honduras' Roatán

— *Simply Divine Diving*

Text and photos by  
Brandi Mueller





Queen angelfish on reef. PREVIOUS PAGE: Roatán's reefs are colorful and beautiful to photograph



Fire worm with basket star, unfolding in all its glory, found on a night dive

**It is 7:30 in the morning and I'm on my personal veranda on a small hill looking out over green trees and beyond them to blue water and a bright orange sun emerging from it. My feet are up on the rail and there's a cup of coffee in my hand. I snap a photo for Instagram—#itdoesntgetanybetterthanthis. And the day's diving hasn't even started yet.**

I am at Turquoise Bay Dive Resort and it embraces the meaning of tranquilo like no other. Sitting almost right at the center of the northern edge of Roatán, it's a

pleasure to escape the touristy hustle and bustle of the West End. I slowly sip my coffee and decide I should probably head to breakfast, there's no hurry though, the dive boat is scheduled to leave around 8:30 or 9:00 a.m., so I have plenty of time to relax and enjoy the view.

### Roatán

Roatán is a Honduran island part of Islas de la Bahía (the Bay Islands) which also includes Utila, Cayos Cochinos, Guanaja, and the Swan Islands. Roatán is the largest with rolling green hills 48km (30 miles) off the eastern coast of Honduras. Only 60km (37 miles) long and 5km (3 miles) wide, over 50 percent is covered in green including pine forests at higher altitudes and rainforest-like areas with ferns and palms in

the valleys. Reefs that are part of the Mesoamerican Reef System surround the island, part of the world's second largest barrier reef after the Great Barrier Reef. The Mesoamerican Reef is known for having the most marine biodiversity in the world and stretches from the Bay Islands to Mexico.

Easy to get to with flights arriving daily from several Central America and US cities, dive resorts and operations abound. If just diving isn't enough, it's a great location to continue diver education up through to becoming an instructor. PADI 5 Star Instructor Development Resorts seem to be found on every corner and many offer affordable work/study/stay programs. This is very obvious at the nightly gatherings at local watering holes such as Sundowner's Beach Bar where





Sunlight pierces the interior of Dolphin's Den

Spinner dolphins swim next to the dive boat

ting close to hurricane season, and although Roatán isn't in the hurricane belt, I was still feeling really lucky with the weather.

Leaving the resort, we found the ocean calm as glass. But then, the glass broke. Looking off into the blue, a pod of spinner dolphins was breaking the calm, rushing over to our boat. They played on the bow, darting back and forth, some spinning off in the distance. I couldn't help but think what a nice morning it had been so far.

**The Labyrinth.** Jumping in the warm water, our group of divers were

immediately greeted with pink, purple, and peach colored sea fans and sponges. A school of purple parrotfish swam past, stopping for a second for a bite to eat, and then continuing on their way. We followed the dive guide through maze-like channels of rock and coral until we reached the wall drop-off. As if on command, as we looked out into the blue, an eagle ray swam past. Returning to the boat, the captain pointed out about 200 yards to where the dolphins were still playing, and we spent our surface interval with them at the bow of the boat.

**Dolphin's Den.** Our second dive was at Dolphin's Den. This amazing site got its name from the skeleton of a dolphin found inside the cavern many years ago. No deeper than 12m (40ft),



Eagle ray swims by, off a reef ledge

almost everyone you meet is temporarily "living" on Roatán and about to become an instructor.

The island is pretty, with birds and butterflies, white sandy beaches and a generally laid-back attitude. What more could you ask for? How about amazing diving?

## The diving

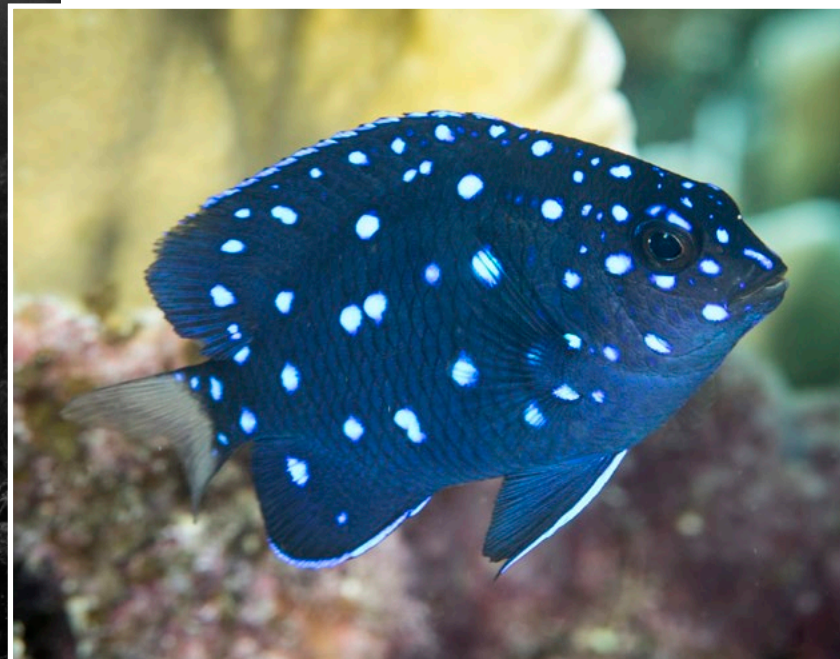
My leisurely morning continued with a fantastic huevos rancheros breakfast and I causally made my way down to the dive shop to get ready for my first dive of the day. With my gear and camera ready, we headed out to a dive site called The Labyrinth. It was get-

this dive site has a large cavern with tunnels throughout and plenty of natural light filtering through, sending light beams to the sea floor. Inside the cavern were schools of silversides and cardinalfish, and lobsters lived in the crevasses of the cavern. I could have spent hours inside, but the dive guide beckoned us back to the boat 70 minutes later. With

the first day's diving complete, we headed back to the resort for a relaxing evening.

**Rock Star.** The next morning, we headed to a dive site called Rock Star. This mini-wall was jam-packed with colorful sponges, sea fans and coral. After descending, a slight current moved us effortlessly along the wall, and we took in all the fish and marine life around us. In one area, the wall turned into a bit of a canyon with walls on both sides. Down in the sand was a huge green moray eel, completely out of the reef, looking almost as if it was standing, all six feet of it, waiting for us.





A pretty juvenile damselfish makes a perfect subject on which to practice macro photography (above); Diver swims through crevasse at the popular dive site, Mary's Place (left)

Marine Park has developed a Lionfish Control Program. Their aim is to cull the lionfish, and they have worked together with the Honduran government fishing agencies to educate and

He posed for photos until we'd gotten all the shots we could handle, and then we continued along the wall.

## Lionfish Control Program

Back on the boat we talked about this crazy eel, and our dive guide explained why it might have been exhibiting this behavior. As the lionfish plague continues throughout the Caribbean, Roatán has done an excellent job of trying to reduce the problem. Enlisting the local community and visiting divers, the Roatán

distribute spears to the community to aid in controlling populations. A lionfish license must be obtained, and local community members are further encouraged to hunt lionfish to sell to popular restaurants where lionfish is on the menu.

Green moray eels have adapted to these lionfish hunters and learned there is a tasty treat at the end of the spear, which is sometimes shared with the eels. On several sites through my week, we came across very friendly eels interacting with divers and com-

ing very close in hopes of a lionfish dinner. I'm always intrigued how every slight impact humans have on the ocean leads to behavioral changes we didn't expect.

While getting rid of the lionfish is a good thing, eels in close contact with divers may have mixed results. They make for fantastic photo subjects, but it's a good idea to be aware of where your fingers are, lest they become mistaken for eel food.

The impact of the Lionfish Control Program is very visible on the reefs compared to other Caribbean islands. It's almost difficult to find a lionfish, which is fantastic. However, it has been discussed that the lionfish population may unfortunately be adapting to this shallow-water hunting and are just moving to deeper waters.

## More diving

The next day, we drove around the island for a chance to dive the south shore. My first and only prior visit to Roatán was ten years ago, and when the dive guide told us he was taking us to his favorite site, Mary's Place, bells and whistles went through my head. I remembered this specific

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A moray eel poses for a diver's camera (left); Wreck of the El Aguila, an artificially sunk wreck on the northwest side of the island (right)

### Wreck dives

Roatán has several fantastic wrecks that were artificially sunk for divers. Near the northwestern side of the island is the El Aguila, a 64m (210ft) cargo vessel. It sits with the ship's hull in the sand at around 30m (100ft) and has attracted many large and friendly groupers. In the sand around the bow, we found turtles feasting on sea grass and an eagle ray. As we moved past the ship into the shallows, there was a beautiful reef with several green moray eels.

The largest wreck sunk in Roatán is the Odyssey, a 90m (300ft) multistory wreck that can be found in the sand from 12-35m (40-110ft) on the northern coast. Another Roatán wreck is the Prince Albert,



which is a 42m (140ft) tanker that was sunk on the southern shore. This wreck is covered in healthy coral growth and attracts plenty of marine life.

### Bottlenose dolphin dives

While I have mixed feelings about diving with captive animals, Anthony's Key Resort is home to the Roatán Institute for Marine Science (RIMS) and they offer diving and learning interactions with bottlenose dolphins. I decided it would be best to see what was going on before judging, so I participated in a dolphin dive.

RIMS' research includes dolphin behavior and health studies as well as an "open water program", which involves seven dolphins that are taken out of the enclosure daily and brought to a nearby reef where divers can

see the animals in open water.

The dive started on floating docks surrounding one of the two large lagoon enclosures that RIMS has for their dolphins. A trainer introduces divers to one of the dolphins, many of which have been born at RIMS, and the dolphin we met put on a little bit of a show letting us rub its back, and he showed off a bit with a few flips.

We then took a short, five-minute boat ride out of the lagoon area and jumped in the water for a dive. We descended to around 20m (60ft) and were told to stay in a circle sitting or kneeling on the sandy bottom. The anticipation built as we kept looking around and waiting for the two dolphins that were supposed to join us. None showed up for over ten minutes.

Just as I was starting to think maybe they didn't want to hang

dive site after all these years, and couldn't wait to get underwater and see it again.

**Mary's Place.** Deep cracks with marine life draping the walls go down past 100ft with canyon swim-throughs so skinny that only one diver at a time can fit in. We wound our way through the cracks, being sure not to run into any of the delicate marine life coating the wall. Back on the boat, I remember why I'd loved this site so much the last time I

was here.

Roatán's diving is diverse. There are wall dives, canyons, caverns, shallow reef dives, wrecks, sharks, dolphins and night dives. The reefs are healthy, with plenty of life, and you'd have to try really hard not to see sharks, turtles or rays on any given dive. Just when I thought I had seen all of Roatán's beauty in reef fish, large sea fans and huge barrel sponges, I realized there was plenty more to see than just reefs.



Banded coral shrimp in barrel sponge





Photographers capture images of bottlenose dolphins on the dolphin dive (left); Bottlenose dolphin at Anthony's Key Resort (below)

many large female grey Caribbean reef sharks showing up daily for the fish snacks the dive shop puts out for them.

Before I knew it, I was underwater at about 25m(80ft) kneeling in the sand in a sort of ocean-made auditorium with a coral-covered rock wall behind me and about 25 sharks putting on a show in front of me. And they were big! These ladies have clearly been taking advantage of the snacks provided, and they cruise around the divers ignoring everyone (and everything) but the food.

At the start of the dive, the food was left in a container with the sharks swimming about



out that day, like a lightening flash, one of the dolphins whizzed by us in a jet of exhaled bubbles from his blowhole. As quickly as he showed up, he was gone, leaving us looking up, down, and all around again. And then he came back and there was another dolphin with him.

With a maximum time set at 45 minutes for the dive, it seemed from then on that time just flew by. The dolphins swam up close to us, between us and all around us. Slowing down and speeding up, they looked like they were having a good old time showing off for the humans. When the dive guide told us it was time to come up, we slowly started to ascend, but very

slowly... so we could spend more time with the dolphins.

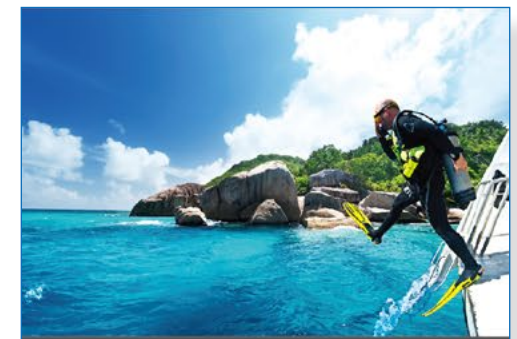
While I still would rather see all animals in their natural environments and not in captivity, I am torn, because I also believe programs like this can help to educate the masses, many of whom might never get the chance to come across a bottlenose in its wild habitat. For both children and adults to see these amazing animals up close can lead to more people loving them and caring about their welfare and their ocean habitat that is so greatly at risk right now. No one will try to save something they know nothing about.

For the rest of the day, you

couldn't wipe the smile off my face. You can't help but love dolphins, and I think that some good can come from programs such as this one where the animals are properly cared for and have adequate enclosures. Obviously, the animal's well-being is the most important thing, but I think (and truly hope) there is a right way to do things like this.

### Shark dive

All the pretty reefs and beautiful marine life was starting to get a bit too "tranquillo" for me, so the dive shop suggested I head over to Coxen Hole for a shark dive at the western tip of the island. The site is known for close encounters with



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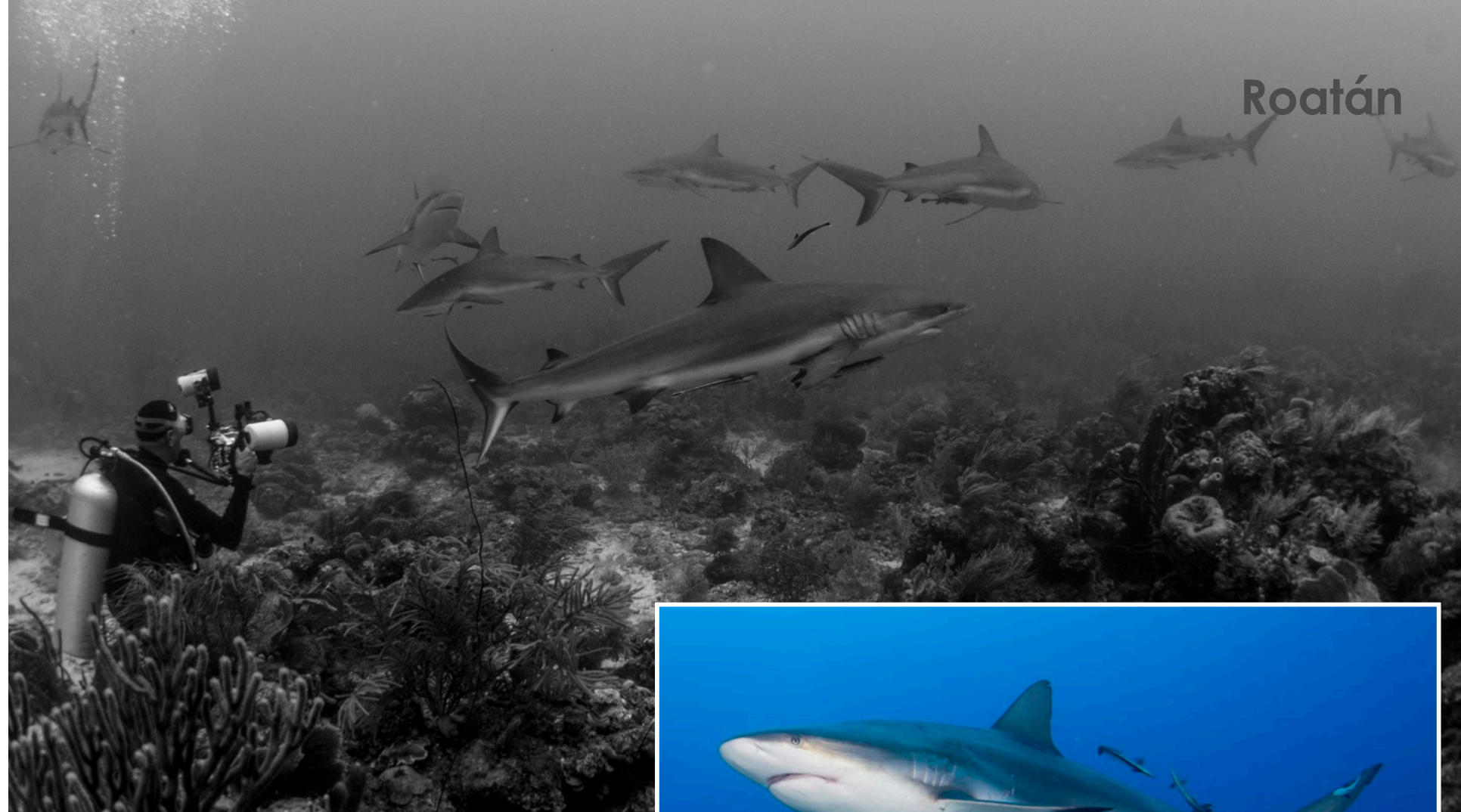
it. About 20 minutes in the dive, guides let us swim around to get better shots of the sharks before sending us back to our kneeling positions. Then they released the food, and after several seconds, it had been devoured, and the sharks disappeared.

### And more...

Night dives are not to be missed in Roatán, if you can hold off on that cerveza at sunset. As the sun sets, the nightly cast of characters emerges onto the reefs. We saw fireworms crawling through

the corals, basket stars unfolded in their full glory, lobsters and octopus feeding and even a rare toadfish made an appearance.

Roatán is a great place for underwater photography. Many resorts have their own in-house photo and video pros (many of them can be found with images gracing the pages of popular dive magazines such as this one). From beginner to advanced photography, not only does the island have fantastic teachers, it also has a huge diversity of marine life upon which to practice shooting.



Lots of grey Caribbean reef sharks showed up for the photographers (above); One of the dive's participants gets a great belly shot of a shark (left); The shark dive was a great place to practice wide-angle, large animal photography (right)

As my week on Roatán came to an end, I really started to realize that you can't ask for much more in a dive location. You can't go wrong with an island that has plenty of shallow reef dives, drifts on deep walls, caverns, wrecks, sharks, dolphins and night dives—all of which were rich with marine life. Visibility was always over 100ft (I was told it can be a bit less during the rainy season from October to January), and the water is warm all year round. The island has over 90 moored dive sites—which says a lot about Roatán's commitment to taking care of the environment and keeping divers happy. There is diving for all levels of divers and whatever types of diving you're looking for.

The healthy reefs, great marine life, diversity of diving and beautiful topside views make a trip to Roatán hard to

beat, especially since it is easy to get to and affordable. The laid-back atmosphere both above and below the surface is why so many divers return to Roatán and the Bay Islands over and over again. ■

*Brandi Mueller is a PADI IDC Staff Instructor and boat captain living in the Marshall Islands. When she's not teaching scuba or driving boats, she's most happy traveling and being underwater with*



*a camera. For more information, visit: **Brandiunderwater.com.***

REFERENCES:  
WWW.TURQUOISEBAYRESORT.COM  
WWW.ANTHONYSKEY.COM  
WWW.ROATANMARINEPARK.COM





# fact file

## Honduras



SOURCE: CIA.GOV WORLD FACTBOOK; XE.COM; HONDURAS.COM; WIKIPEDIA.COM; TURQUOISE-BAYRESORT.COM

**History** In 1821, Honduras became independent of Spain. Military rule followed for two and a half decades until 1982, when a freely elected civilian government came to power. The country proved a haven during the 1980s for anti-Sandinista contras fighting the Marxist Nicaraguan Government. Honduras was also an ally to Salvadoran Government forces, which were fighting leftist guerrillas. In 1998, the country was devastated by Hurricane Mitch, which killed around 5,600 people and caused about US\$2 billion in damage. The economy has slowly rebounded since then. Government: Democratic constitutional republic. Capital: Tegucigalpa

**Geography** Honduras is located in Central America and borders the Caribbean Sea, between Guatemala and Nicaragua. It also borders the Gulf of Fonseca (North Pacific Ocean),

between El Salvador and Nicaragua. Coastline: 820km. Terrain is mostly mountainous in the interior with narrow coastal plains. Lowest point: Caribbean Sea 0m. Highest point: Cerro Las Minas 2,870m. Note: While the country has a short Pacific coast, it has a long Caribbean shoreline, including the mostly uninhabited eastern Mosquito Coast.

**Climate** Lowlands are subtropical; Mountainous regions are temperate. Natural hazards include common but mild earthquakes as well as frequent damaging hurricanes and floods along the Caribbean coast.

**Environmental issues** Challenges include expanding urban population; deforestation due to logging and clearing of land for agriculture; soil erosion and further land degradation accelerated by uncontrolled development and farming of marginal lands; heavy metal contamination of freshwater sources by mining activities.

**Economy** Honduras is the second poorest country in Central America. It suffers from extremely unequal distribution of income, as well as high unemployment and underemployment. Heavily reliant on a narrow range of exports

such as apparel, bananas, and coffee, the nation's economy is vulnerable to changes in commodity prices and natural disasters; but, investments in the maquila and non-traditional export sectors are contributing to a gradual diversification of the economy. Almost half of the country's economic activity is directly tied to the United States. In 2006, the US Central America Free Trade Agreement (CAFTA) came into force. It has helped increase investment, however, security and political issues may be deterring potential investors. Marginal economic growth in 2010 will not improve living standards for those in poverty, which is almost 65 percent of the population. The fiscal deficit is growing, despite improvements in tax collections because of

RIGHT: Location of Honduras on global map  
BELOW: Location of Roatán on map of Honduras  
BOTTOM LEFT: Queen angelfish  
BOTTOM RIGHT: Tiny pufferfish peeks out of large sponge



increases in current expenditures to cover increasing public wages. In 2014, the country embarked on a three-year IMF stand-by arrangement to improve its poor fiscal situation. Further plans by the government address challenges in stimulating economic growth, increasing fiscal responsibility and transparency, modernizing the judicial system, improving infrastructure, reducing violence and promoting educational opportunities.

**Currency** Lempiras (HNL)  
Exchange rates: 1USD= 22 HNL; 1EUR= 24.85HNL; 1GBP= 33.69HNL; 1AUD= 15.83HNL; 1SGD= 15.58 HNL

**Population** 8,746,673 (2015 est.); Below poverty: 60% (2010 est.). Ethnic groups: Mestizo (mixed Amerindian and European) 90%, Amerindian 7%, black 2%, white 1%. Religions: Roman Catholic 97%, Protestant 3%. Internet users: 1.7 million

**Language** Spanish and Amerindian dialects

**Security** Generally, the tourist areas in

Roatán are safe, although there are reports of petty crime such as theft. Check with locals before venturing too far off the beaten path to make sure the area is safe. As with anywhere, do not carry large amounts of cash or display expensive electronics or fancy jewelry unless you are willing to lose them.

**Health** There is a high degree of risk for food or waterborne diseases such as bacterial diarrhea, hepatitis A and typhoid fever as well as vector-borne diseases such as dengue fever and malaria (2013).

### Hyperbaric Chambers

There is a hyperbaric chamber and clinic on the island at Anthony's Key Resort and at Utila Hyperbaric Chamber, Bay Islands College of Diving, Utila, Bay Islands of Honduras  
[www.dive-utila.com](http://www.dive-utila.com)

### Websites

Let's Go Honduras  
[www.letsghonduras.com](http://www.letsghonduras.com)







Edited by  
Rosemary 'Roz' E. Lunn

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ON BOLD LINKS



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# Equipment

## Heliodive Catamaran

Want to dive off a fuel-free, noise-free, smoke-free, vibration-free, odor-free, maintenance-free boat? This improbable dream was spotted at the 2016 Dusseldorf Boot expo, showcased by French manufacturer, Heliodive. The aluminium "electrosolar" powered catamaran is equipped with solar panels, lithium batteries and two Torpedo Deep Blue 345 volt 80 hp (65kW) engines, with a choice of four high power 50 kWh lithium batteries or eight high power 100 kWh lithium batteries. (It should be noted that the kilowatt-hour (kWh) is not a unit of power. It is a unit of energy.) With a top speed of 20 knots, the 11.7m (38ft) catamaran will run for two hours at 14 knots or 16 hours at 5 knots on eight batteries. According to the specifications, this boat will be licensed for 30 divers and two crew.



**Heliodive.com**

## Lavacore glove liners

Lavacore has blended Merino wool with Sorona to create a soft, warm, durable fabric for their new glove liners, which have three layers. The outer layer has been designed to be flexible, durable and water repellent. Apparently, this outer layer is quick drying and provides the diver with 50+ UV protection. The wind-proof, breathable, middle layer wicks moisture away from the body, while providing warmth. Meanwhile, the Marino fleece inner layer also provides the diver with warmth and minimizes odor. Lavacore states that its glove liners can be worn as gloves, or beneath any dry or neoprene glove for added warmth. They come in six sizes. **Lavacoreinternational.com**



## Nemo Underwater Screwdriver

When it comes to building or demolishing structures underwater, these works are best carried out by appropriately qualified civilian commercial or military divers. However, recreational and technical divers may want to use a power drill underwater in certain circumstances—for instance, tagging a shipwreck or a coral reef with reference points to aid survey or research work. Being able to access a salt water-ready tool that is capable of loosening or tightening wheel nuts in extreme weather, or indeed submerged in the sea, does make changing a flat tire on a trailer a quicker task. Enter the Nemo V2 DIVERS Edition battery-operated underwater drill/screwdriver. This has a primary working depth of 10m (32ft). The drill comes with a battery charger and two 18V 3Ah lithium ion batteries. The 10mm chuck is keyless, and the drill has two reversible speeds and six torque settings. **Nemopowertools.com**



## O'Three Extreme Semi Hood

British drysuit manufacturer O'Three has launched a 7mm "Extreme Semi" hood. Constructed from two thicknesses of material, the main hood utilises 7mm super supple neoprene, whilst the yoke is made from 5mm "Glide Skin". These stretchy materials are ergonomically cut, glued and blind-stitched together. The interior of the hood is then lined in a bright orange soft thermal plush material, with the contour-hugging face seal manufactured from 7mm Glide Skin. O'Three has constructed a "throat panel" from ultra soft stretchy neoprene designed so that breathing is not restricted. Built-in perforated ventilation system called Airprene releases any trapped air in the hood.

**Othree.co.uk**



## Perdix Dive Computer

Sleeker than previous Shearwater models, the dive computer's housing is manufactured by an injection molding process using a special nylon resin reinforced with glass fiber. The result is a light, strong, ergonomically-shaped unit that snugly fits on the arm. The Perdix benefits from Shearwater's intuitive two-button menu system, a user changeable battery, and has four modes: Open-Circuit Recreational, Open-Circuit Technical, Closed-Circuit fixed PPO and Gauge Mode. It uses the Buhlmann ZHL-16C as the primary decompression algorithm, and divers have the ability to change gradient factors. Finally, the Perdix has a three-axis, tilt-compensating, digital compass. The high resolution LCD display provides the diver with a digital heading while continuing to display depth, time, decompression and PPO<sub>2</sub> data. **Shearwater.com**







opinion



# Constructive Paranoia

## — A Safety Strategy

Text by Simon Pridmore

**A young ornithologist was on an expedition in the highlands of Papua New Guinea, leading a team of New Guineans. They climbed through the forest until they reached a level where they were to spend a few days studying birds. The young ornithologist selected a site for their camp beneath a huge forest tree, its bark covered in thick moss. He asked his companions to build a sleeping platform there but they refused. He asked "Why?" And they told him that the tree was dead and they were afraid it might fall on the camp during the night and kill them.**

He tried to reason with them but they were adamant and eventually they

all agreed on a different site far away from the tree. The young ornithologist was initially annoyed and thought the New Guineans were exaggerating the danger. However, over the following months, he noticed that at least once a day he would hear the noise of a tree falling in the forest, and at night, he would listen to his companions telling stories of people who had been killed by falling trees.

He calculated that, on average, New Guineans would spend about 100 nights a year camping in the forest. Even if the probability of a tree falling on them and killing them were low, the more time they spent in the forest the more likely it was that they would become a victim. The New Guineans could not completely avoid the risk of falling trees by not going into the forest. But they could certainly minimise the risk by not sleeping underneath a dead tree.

The ornithologist noted that tales around New Guinean campfires of how people had come to harm or just avoided disaster particularly fascinated the children, and he guessed that they constituted an important part

of their education. He concluded that the community's obsession with safety was an essential cultural survival tool that contributed significantly to keeping them safe and labelled it "constructive paranoia."

The young ornithologist was Jared Diamond, and today, he is a celebrated and much-published academic and author. I found the story about falling trees in his book, *The World Until Yesterday*, in which he looks at the few tribal societies remaining today and examines their behaviour, procedures and strategies.

### Technical divers

Any technical diver reading this will immediately get what Jared Diamond is writing about. Although they may not use the actual phrase, technical divers employ constructive paranoia as a survival technique. They address the real risks of diving up front. They know how the technical divers who went before them got hurt and have developed procedures and equipment to reduce the chances of this happening to them too.

Technical divers also talk constantly

about safety in scuba diving. They exchange stories and question techniques and equipment configurations in excruciating detail. When an accident takes place, they are hungry for information on how it happened—not out of some ghoulish fascination, but so that they can analyse what took place and compare it to what they do to see if the accident points up any deficiencies in their own procedures.

Debate is a significant feature of this branch of scuba diving and the technical divers are doing exactly what tribal societies do. The Internet dialogues are their campfire chats. There is a constructively paranoid safety culture that pervades technical diving that New Guineans would completely understand.

### Sport divers

Over the years, technical divers have passed onto the mainstream diving community many innovations including octopus hoses, BCDs and, more recently, sidemount diving. However, unfortunately, they have not passed on their constructive paranoia, and this sort of mindset is significantly lacking

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in mainstream scuba diving and diver training.

Here is a story that illustrates the point perfectly. One day, a friend of mine named Robert received a call from a woman who introduced herself as a friend of a friend. She asked him for advice on diving Nusa Penida, an island off the southern coast of Bali, famous for big fish, but also notorious for strong, unpredictable currents that make it an accident black spot.

Robert asked about her experience and the woman told him that she and her husband had only just learnt to dive. On hearing this, Robert pointed out that diving around Nusa Penida could be tricky and suggested instead that they try some of the wonderful diving in easier conditions at Tulamben on Bali's north-eastern coast. The woman was highly indignant at Robert's implication that she and her husband were "not excellent divers—which we are" and hung up on him.

Two days later, she called Robert back to tell him that she and her husband had gone to Nusa Penida and that they had had a great day's diving. "So there!

Everything you were telling me was wrong," she said. Robert just told her he was glad they had enjoyed their dives.

### Falling trees

When I heard this tale, I was of course immediately reminded of Jared Diamond's story of falling trees. The woman and her husband had evidently graduated from their initial diver training with no idea of their limitations as new divers. Nobody had told them that many popular dive sites around the world are genuinely dangerous for beginners. They were apparently also not aware that all new divers need to ease themselves gently into the sport, and that it actually takes a lot of practice to become an "excellent diver." Nobody had taught them to be at all "constructively paranoid" about their diving. Instead, all the high praise they had received during their training seemed to have encouraged them to believe that, having obtained their certification cards, they were now ready to dive anywhere.

Today's beginners' courses rarely incorporate concepts such as situational awareness and defensive diving. Yet,

these are crucial survival tools. In the hierarchy of diver training courses, such things are not addressed until divers begin training at technical or professional levels. This means people who never graduate to these levels remain ill-prepared for diving.

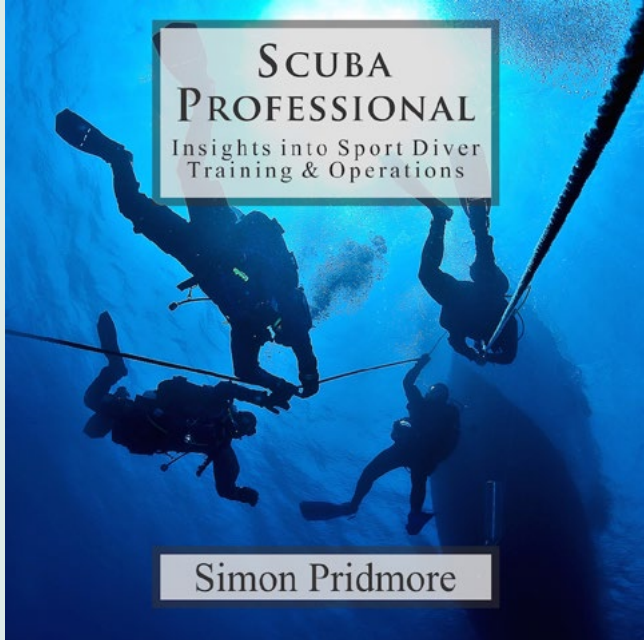
### What can we do?

What can we do about it? On a personal level, we as divers can read more widely about dive safety and think more about the way we dive, potential threats to our safety, and what we can do to anticipate and avoid risk. Those of us who work in diving can focus on developing a constructive paranoia culture within our own particular sphere of influence. We can counsel divers on how to spot which dive operators adopt a safety culture and which do not, tell them the right questions to ask and show them the tell-tale signs to look for.

We can work on developing a constructive paranoia amongst the divers we teach, guide a sense of self-preservation and show them how to take control of their own diving. We can also press training agencies to lay greater emphasis on a culture of dive safety in early diver training programmes. The Divers Alert Network has been campaigning on a similar line recently. We have to hope the agencies take note. ■

## Constructive Paranoia

*Simon Pridmore has been part of the scuba diving scene in Asia, Europe and the United States (well, Guam) for the past 20 years or so. He is the bestselling author of Scuba Confidential: An Insider's Guide to Becoming a Better Diver and has just published a new book entitled Scuba Professional: Insights into Scuba Diver Training and Operations. Both are available from Amazon in a variety of formats.*



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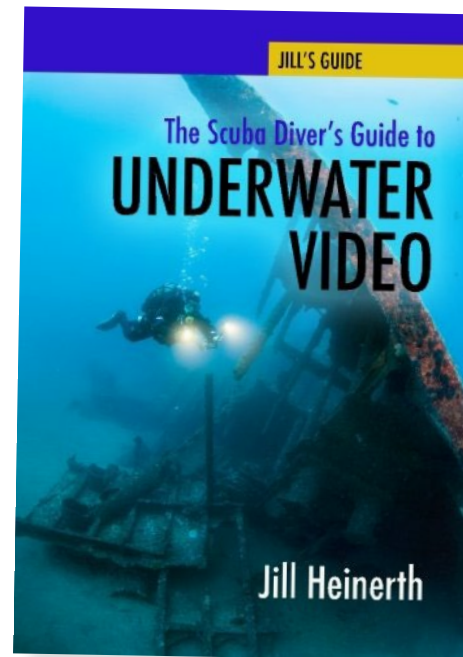
## Palau Wrecks

*Dive Palau: The Shipwrecks*,  
by Rod  
Macdonald.

The Japanese shipwrecks lying in the lagoons of Palau are the result of Operation Desecrate 1, the US military's attack

on Japanese bases, aircraft and ships in Palau in March 1944, during World War II. Written based on meticulous research and the author's intimate knowledge of shipwrecks, the book reveals the stories behind 20 of these Japanese wrecks, with accompanying photos and illustrations.

Hardcover: 288 pages  
Publisher: Whittles Publishing  
Date: 28 February 2016  
ISBN-10: 1849951705  
ISBN-13: 978-1849951708

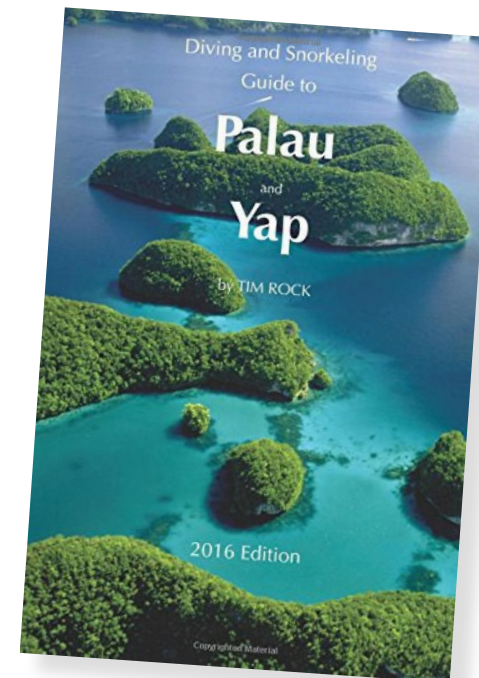


## UW Video

*The Scuba Diver's Guide to Underwater Video*, by Jill Heinerth.

Written by a professional underwater filmmaker and explorer, this book covers the fundamentals of underwater photography. Targeted at beginner and experienced photographers, it contains specific technical information and guidance on how one take better shots. In addition, the writer shares anecdotes from her own experiences, adding a personal touch to the book.

Paperback: 124 pages  
Publisher: Heinerth Productions Inc.  
Date: 24 January 2016  
ISBN-10: 194094421X  
ISBN-13: 978-1940944210

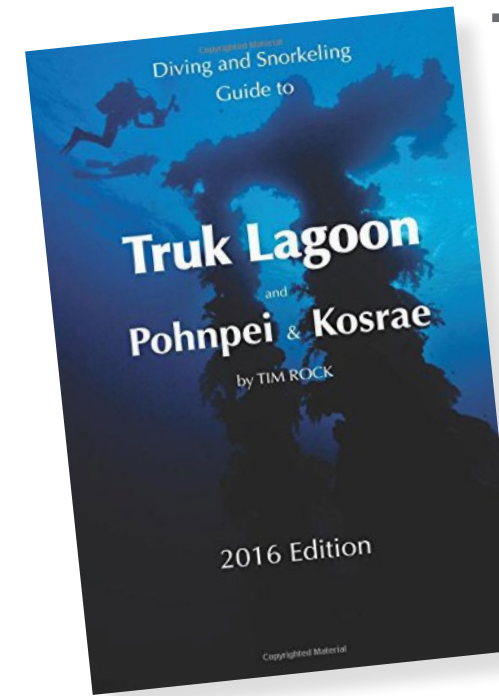


## Palau and Yap

*Diving and Snorkeling Guide to Palau and Yap*, by Tim Rock and Simon Pridmore.

Situated in the Western Pacific, Palau and Yap offer stunning natural beauty, spectacular coral gardens and encounters with large marine animals like sharks and manta rays. And not forgetting—fabulous dive experiences. This guide showcases the popular dive sites here, as well as some unique and remote sites that are seldom visited. Information about these sites are included, like the type of dive to expect, diving depths, dominant marine life, logistical details, etc. The book also contains some 130 photos and maps.

Paperback: 116 pages  
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Independent Publishing Platform  
Date: 21 January 2016  
ISBN-10: 1523490446  
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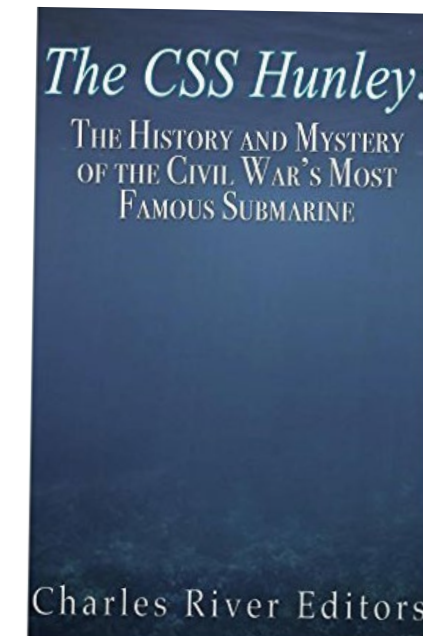


## Truk Lagoon

*Diving and Snorkeling Guide to Truk Lagoon and Pohnpei and Kosrae*, by Tim Rock and Simon Pridmore.

Divers planning to dive at Truk, Pohnpei and Kosrae (in the Federated States of Micronesia) should get hold of this book as part of their pre-dive research. Although each of the three sites have their own unique attractions, all offer superb wreck diving, amazing reefs, deep drop-offs and isolated atolls. This book contains relevant information about specific dive sites, dominant marine life and logistical details, alongside more than 130 photos and maps.

Paperback: 108 pages  
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Independent Publishing Platform  
Date: 17 January 2016  
ISBN-10: 1523438398  
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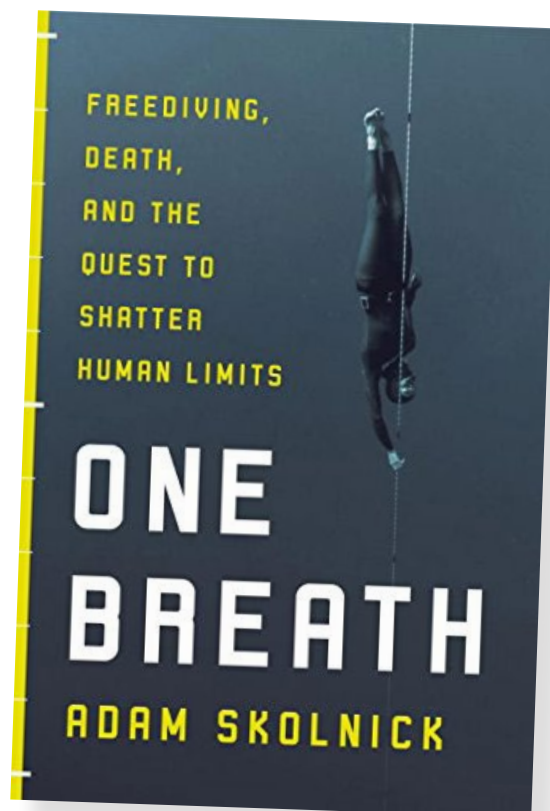
## The Hunley

*The CSS Hunley: The History and Mystery of the Civil War's Most Famous Submarine*, by Charles River Editors.

During the US Civil War, the CSS *H.L. Hunley* was the first submarine to sink an enemy vessel. Yet, it never returned from the mission, and it soon came to light that the submarine had sunk to the bottom of the sea. This book tells the story of the submarine, its obsessive inventor and brave crew, along with pictures and theories of what had caused its demise. Online resources and a bibliography for further reading are also included.

Paperback: 44 pages  
Publisher: CreateSpace  
Independent Publishing Platform  
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ISBN-13: 978-1523367740





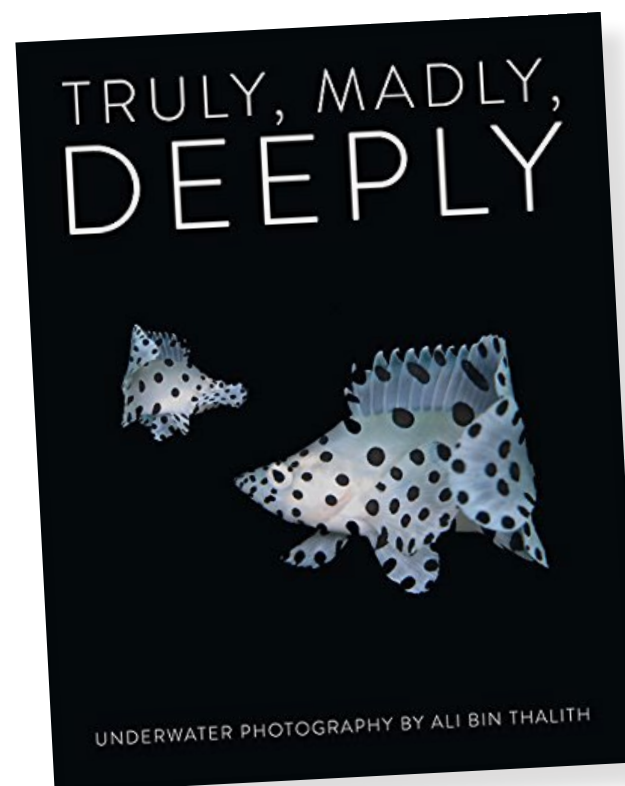
## Freediving

*One Breath: Freediving, Death, and the Quest to Shatter Human Limits*, by Adam Skolnick.

Freediving is a physically and mentally demanding sport that only a select few can excel in at a competitive level. This book tells their story, and that of Nicholas Mevoli, an extraordinary freediver with an unmatched talent for the sport but who died during an international

competition in 2013. It is a celebration of his life and spirit, that of other freediving athletes, as well as the sport itself.

Hardcover: 336 pages  
Publisher: Crown Archetype  
Date: 12 January 2016  
ISBN-10: 0553447483  
ISBN-13: 978-0553447484



## Underwater Photography

*Truly, Madly, Deeply: Underwater Photography*, by Ali Bin Thalith.

Ali bin Thalith's quest to photograph the rare and elusive crystal octopus spanned more than a decade. During this time, he captured a wide myriad of stunning underwater images shot in the Indian and Pacific Oceans (to name a couple). His subjects range from colorful coral gardens and tiny marine creatures to large predatory animals (including non-marine creatures like elephants and antelopes!). The photographer's attention to the colors, patterns and textures within the images is something to look out for.

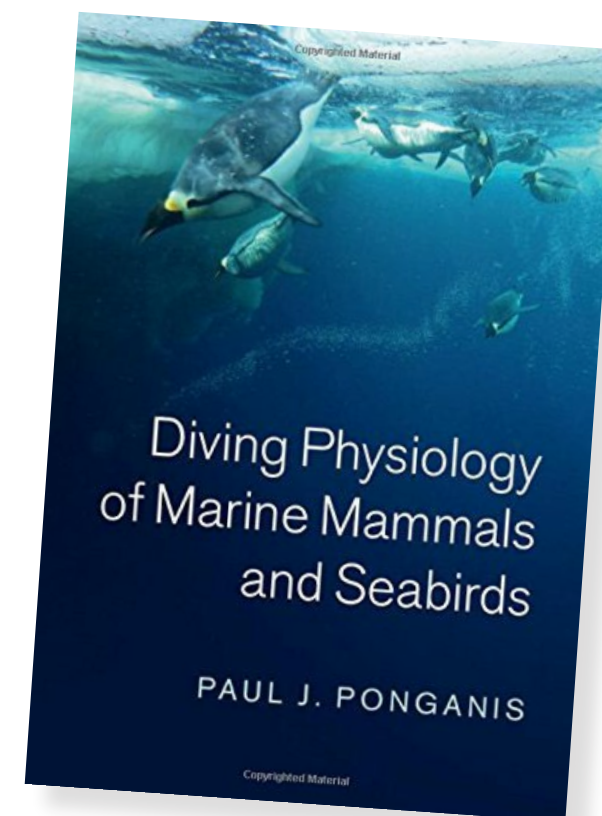
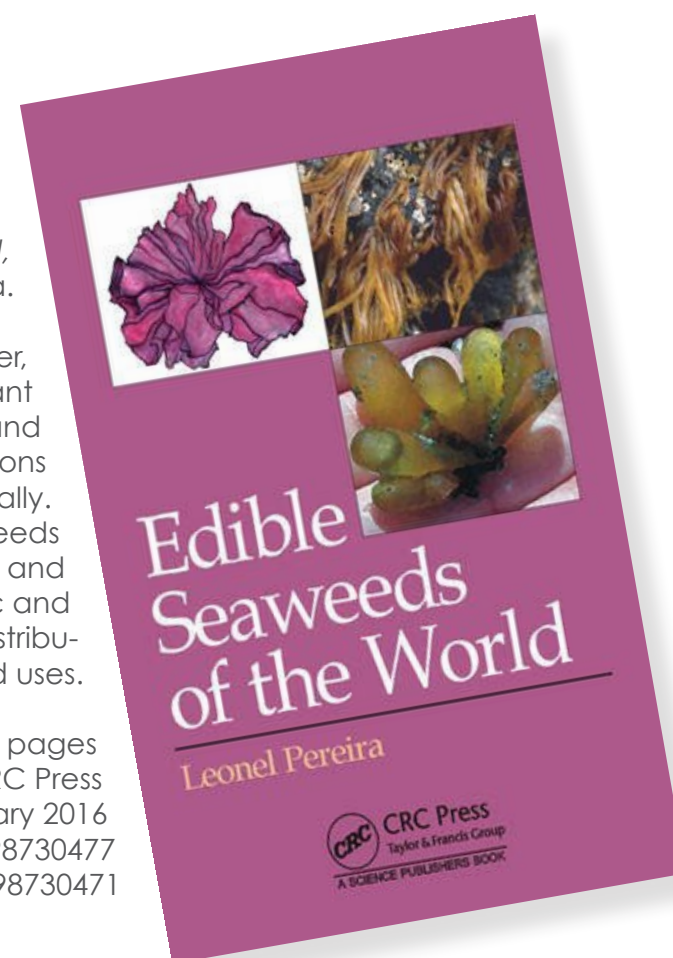
Hardcover: 180 pages  
Publisher: Clearview  
Date: 25 January 2016  
ISBN-10: 190833729X  
ISBN-13: 978-1908337290

## Seaweed

*Edible Seaweeds of the World*, by Leonel Pereira.

Behind its unassuming moniker, seaweed is an extraordinary plant that we use as food, medicine and biofertiliser. About four million tons of seaweed are harvested annually. This book covers 147 edible seaweeds worldwide, presenting illustrations and information about their scientific and common names, geographic distribution, nutritional composition and uses.

Hardcover: 463 pages  
Publisher: CRC Press  
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ISBN-13: 978-1498730471



## Wild Divers

*Diving Physiology of Marine Mammals and Seabirds*, by Paul J. Ponganis.

Ever wondered how some marine mammals and seabirds are able to dive into the depths of the ocean on a single breath? Well, this book presents comparative reviews of the texts on diving physiology and behavior from the last 75 years. In addition, the author shows how physiological processes to extreme hypoxia and pressure are relevant to the advancement of our understanding of basic cellular processes and human pathologies.

Hardcover: 346 pages  
Publisher: Cambridge University Press  
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ISBN-13: 978-0521765558





## opinion

Text and photos by Gareth Lock

**Two perfectly serviceable Boeing 747s crashed into each other on the runway killing 583 people in 1977. In another incident, the pilots shut down the wrong engine, and 47 people were killed when the aircraft crashed... But what has that got to do with diving?**

In 1977, two Boeing 747s were on the runway at Los Rodeos Airport, Tenerife. The plane from KLM was lined up, ready to take off, while the plane from Pan-Am was taxiing down the runway towards the first, to exit, turn around and await the former's departure. However, there was thick fog, and neither crew could see each other.

At 17:06 hrs, the captain of the KLM aircraft, the most senior captain in KLM at the time, decided that they had clearance to take off in the thick fog. The first officer and engineer were not sure about it but were unable to speak up because of social pressures. As they accelerated down the runway, they collided with the Pan-Am jet and 583 people were killed. There were 61 survivors, all from the Pan-Am aircraft. There was nothing techni-

cally wrong with either aircraft.

In 1972, Flight 401 was making a late-night approach to Miami International Airport, and as the crew were completing their pre-landing checks, they noticed the gear didn't indicate "down

and locked". They entered into a holding pattern and engaged the autopilot to resolve the issue. Both pilots and the flight engineer were then task-fixated in trying to determine if the fault was a blown bulb or a landing gear problem.

Neither noticed the plane's slow descent, which had commenced due to an incorrect autopilot selection. As they started another 180-degree turn, the captain noticed that something wasn't right and questioned the co-pilot in a noncom-

mittal manner. Less than 10 seconds later, they impacted the ground—less than half the time it took you to read this paragraph! Ninety-seven of the 163 passengers died. There was nothing technically wrong with the aircraft other than a



*Applying*

# Non-Technical Skills

*To Recreational & Technical Diving*







## opinion

blown bulb in the cockpit.

In 1989, a British Airways 737 crashed into an embankment on the M1 just short of East Midlands Airport. This was because the pilots had shut down the right engine due to task loading, cognitive biases, and poor training on the new 737 they were flying. The failure in the left engine was manageable as the aircraft was certified to fly on one engine at the heaviest weights. This time, 47 died and 74 were injured.

These crashes in the aviation world were seminal events, highlighting that the engineering

teams and aircraft manufacturers were making very high quality products and the failure points were primarily down to the human interaction with the system. Furthermore, providing more technical training (pure flying skills) was unlikely to make a difference. As such, the evolution of crew resource management (CRM) started as cockpit resource management, initially focussing on the pilots, as they were “the last to touch the controls, there-



## Non-Technical Skills

fore it must be their fault”. However, it was soon realised that the whole crew, including the cabin staff, needed to be involved, so it was renamed “crew resource management”. CRM is now in its fifth generation, having been in place for four decades, and anyone who is involved

in air operations must undergo some form of CRM training to remain certified, in line with the regulatory bodies. The training is not just a single course, but is part of every simulator exercise and flight they operate, with ground-based staff and maintenance engineers all having to undertake refresher courses.

### Research programmes

The world of healthcare recog-

nised, along with other domains such as Oil and Gas, that they were suffering from adverse events despite highly skilled and qualified professionals being involved. This led to the development of Non-Technical Skills (NTS or NOTECHS) research programmes which produced behavioural markers covering areas of decision-making, situational awareness, communications, leadership and followership,

teamwork and the effects of stress and fatigue—the same areas that CRM covers.

If we now consider recreational and technical diving, the equipment—e.g. rebreathers, BCDs, regulators, lights, computers and timers—have all become much more reliable and rarely fail in an undetectable manner. If we look at training, in the mainstream, this has become more widespread and accessible, although some







would argue that quality control can be lacking in some areas, leading to poor skills at the “sharp end”. But what about non-technical aspects? Communication skills, decision-making, situational awareness, teamwork...

How many accidents or incidents are actually down to the equipment technically failing in an undetected or uncontrollable manner? From my own research and that contained within the literature, the answer is “very few”, considering the hundreds of thousands or millions of dives which take place every year. The common factor is the “human” one. However, it is easy to use the phrases “diver error”, “the diver should have...”, “why didn’t the

diver...” or make use of the well-trodden “75 to 80 percent of all accidents are down to human error”, but there are issues with this frame of reference.

### Sources

There are three major pieces of work that I can think of that have had a major impact on the non-technical aspects of diving. These are Shek Exley’s *Blueprint for Survival* (1986), Michael Menduno’s and Billy Dean’s *Blueprint for Survival 2.0* in *aqua-CORPS* (June 1993) and the creation of the Technical Diver 1 and Cave Diver 1 classes by Global Underwater Explorers.

The first two considered what went wrong in cave diving and

technical diving respectively and provided “rules” for safe diving. These were determined by looking at cave diving and technical diving accidents, and worked out what should be done. Yes, there were still equipment and training needs, but there was a deliberate focus and consideration on teamwork, communication and attitude. The latter might be somewhat biased, but Global Underwater Explorers was the first agency to really hammer home the need to develop effective teamwork and problem-solving in their early courses, and use video and reflective debriefing techniques consistently across ALL their instructors.

However, these pieces of work

are not known by a significant number of divers; indeed, probably only those interested in cave diving are aware of them.

### Information flow chart

I am a Crew Resource Management instructor, and the diagram (below), which I use in my CRM and NTS training and coaching classes, highlights the key information flows and shows why non-technical skills are so important for anyone involved in high risk or reliability operations. While some will argue that not all diving is high risk (as it depends on the type of diving), ultimately, divers are in an environment that cannot sustain life without external technical sup-

port; and failure of that support, for whatever reason, may—or will—end in death.

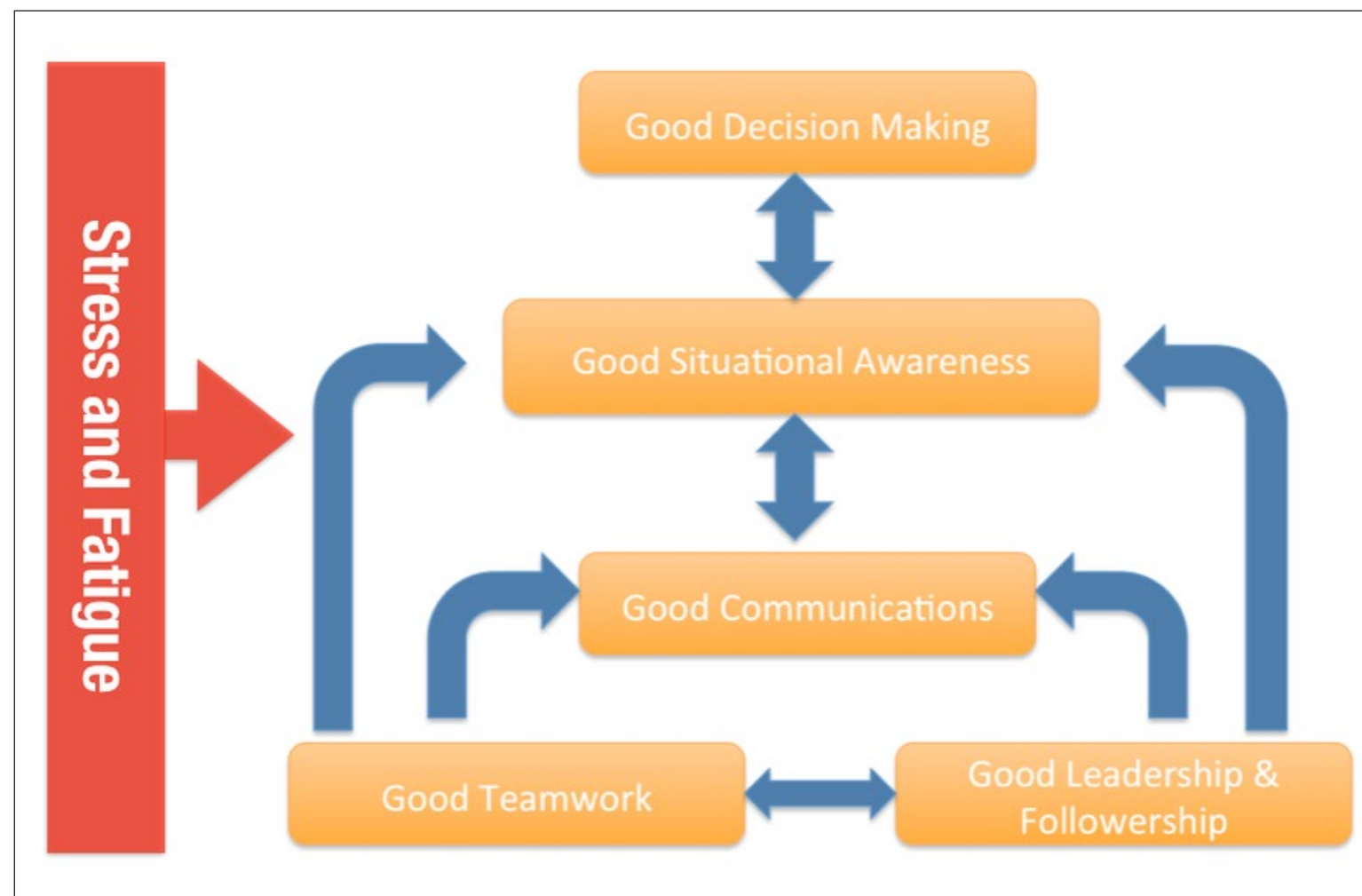
The flow is that ultimately we all want to make good decisions, but we can’t consistently and intentionally do that if we don’t have good situational awareness. Situational awareness is noticing (not just seeing) what is going on around you, thinking about what it means and anticipating what might happen in the future so you can actively plan your actions accordingly. (The ability to play the “what if?” game regularly and be creative about potential failures).

While good situational awareness requires experience to be

able to project into the future, it can really be helped by good communication with the rest of the dive team (skipper, instructor, divemaster, buddy and others) to help understand the plan or the baseline and then spot deviations. If you don’t know the plan, how do you know you’ve deviated?

Having good communications skills also provides the ability to be assertive when needed and speak up when something is not right. Good communication is assisted by good leadership (who is the “dive leader” or #1) and good followership (being a good buddy, supporting the “leader” and questioning when things are

## Non-Technical Skills



Information flow chart used in crew resource management and non-technical skills training and coaching classes





not right or need clarification).

When everyone works together with a coherent understanding of the common, achievable goal, we have effective teamwork, which helps support the communications process, and ultimately, good decision-making. However, we must recognise that these factors are all shaped or influenced by stress and fatigue—when we are tired, we are

more likely to make bad decisions, be curt with our communications or not necessarily act as a good team member.

## Prevention

You might think that such skills are not needed in a recreational environment, partly because it is a fun activity, but also because there are no social or



organisational structures present to require such skills. If you think this, consider all of the accidents and incidents that you know of and think through what the contributory factors were. How many of them could have been prevented by having (effective) non-technical skills, a clearly communicated plan before getting in the water, making and executing sound decisions when changes happened, noticing how things were changing, but no one wanted to (or could) say anything? Is it any wonder that “human factors” and “human error” rank so highly when it comes to diving incidents or accidents if non-technical skills are not taught?

With this in mind, I have devel-

oped a two-day training course that consists of theory, practical exercises and computer-based simulation, and lessons identified and learned using facilitated reflective debriefs. The benefit of this structure is that students are all operating in a new environment (the simulation is space-based) and therefore existing technical skills cannot be used to bolster non-technical skills which are required in this dynamic and uncertain environment.

The scenarios have been developed to introduce uncertainty within a time-bound environment in which there are multiple choices open to the operators. In addition, as the instructor is able to introduce additional tasks, already well-devel-

oped teams can be stretched, in terms of capability.

The first official class runs February 8-9 in London and more details can be found at **[www.humanfactors.academy](http://www.humanfactors.academy)**. □

*Gareth Lock is an accomplished technical diver based in the United Kingdom. Recently retired from the Royal Air Force, he is now teaching human factors in the oil and gas sector. Lock is also undertaking a part-time PhD examining the role of human factors in scuba diving incidents. For more information, visit the Cognitas Incident Research website at: **[cognitasresearch.wordpress.com](http://cognitasresearch.wordpress.com)**.*

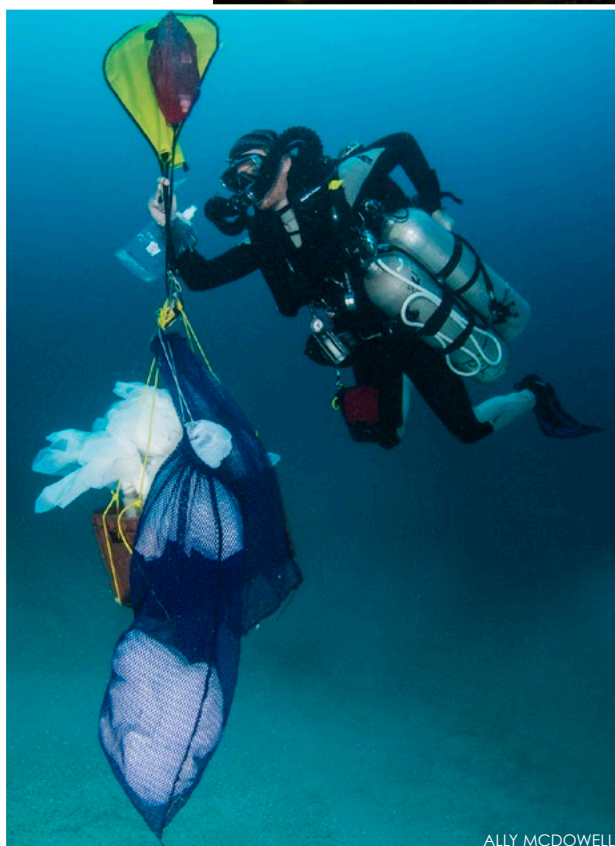


Thinking  
Deep  
research  
team on a  
mesophotic  
reef

Text by Jack Laverick  
Photos by Ally McDowell  
and Brian J. Sullivan

The pressure builds, causing ears to pop as they equalise. The temperature drops and the light starts to fade. However, bubbles are not an issue for the researchers from the University of Oxford, as they descend in the waters off the Honduran island of Utila. Researching efficiently in the twilight zone requires rebreathers, and the summer of 2015 saw the first-ever expedition led by doctoral students using this technology.

Severe task loading:  
managing buoyancy  
on a rebreather and  
decompression profiles  
while collecting water  
samples, sediment  
traps and light profile  
data single-handed



More formally known by scientists as the mesophotic zone, the twilight zone is the part of the world's tropical oceans at the limits of where corals can photosynthesise. Corals in this zone are hugely understudied, as they are beyond recreational dive limits

but too shallow for the use of submersibles or large ROVs. Sending technical divers onto these reefs seems the best way to get the data desired by scientists.

Though light penetration profiles vary from site to site, corals have been found with their sym-

biotic algae as deep as 150m. The team from Oxford is one of only a handful of scientists in the world trained to plunge to depths of 100m. Once they hit the bottom and shake off the narcosis, they get down to business, trying to understand the reefs in front

of them, which few people have ever seen.

### The twilight zone

The twilight zone is both familiar and alien to the average diver. The usual players still dominate the scene: hard corals, soft cor-

## Thinking Deep in the Twilight Zone

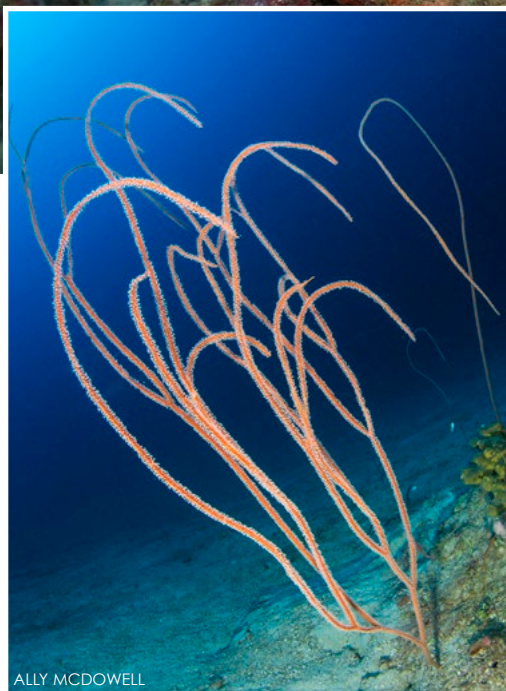
— Using Rebreathers for Coral Research

BRIAN J. SULLIVAN





## tech talk



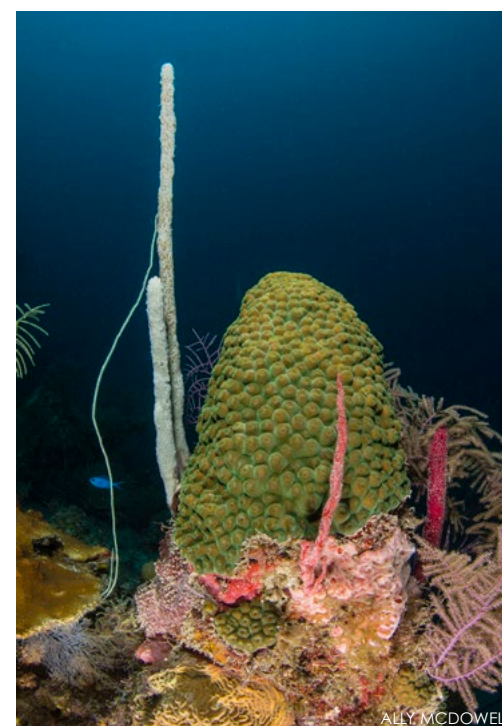
THIS PAGE. Rope sponges, sea plumes and plating corals in the twilight zone

the bottom in large numbers like grasping tendrils. The animals on the reef tend to get larger as they are further from fishing pressures. This ghostly scene, with giant fish, is rendered all the more eerie by the light.

Light drops exponentially with depth, meaning 100m may be surprisingly dark in comparison to 40m. Almost every colour is absorbed except blue. The deep waters are still, meaning little is suspended in the water, resulting in breath-taking visibility. These factors combine to create a scene framed in clear tones of midnight blue fading into an inky blackness, with rising stalks and scrolling sheets of coral casting unusual shadows.

Looking up, one sees a dazzling beam of sunlight stretching down

from the now inaccessible surface. Floating motionless and silently on a rebreather on these reefs is



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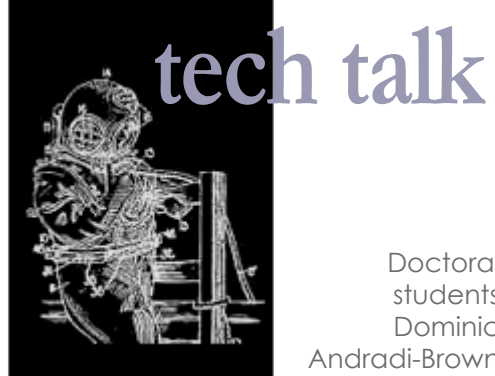
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Doctoral students Dominic Andradi-Brown (left) and Jack Laverick (right) simultaneously carrying out studies

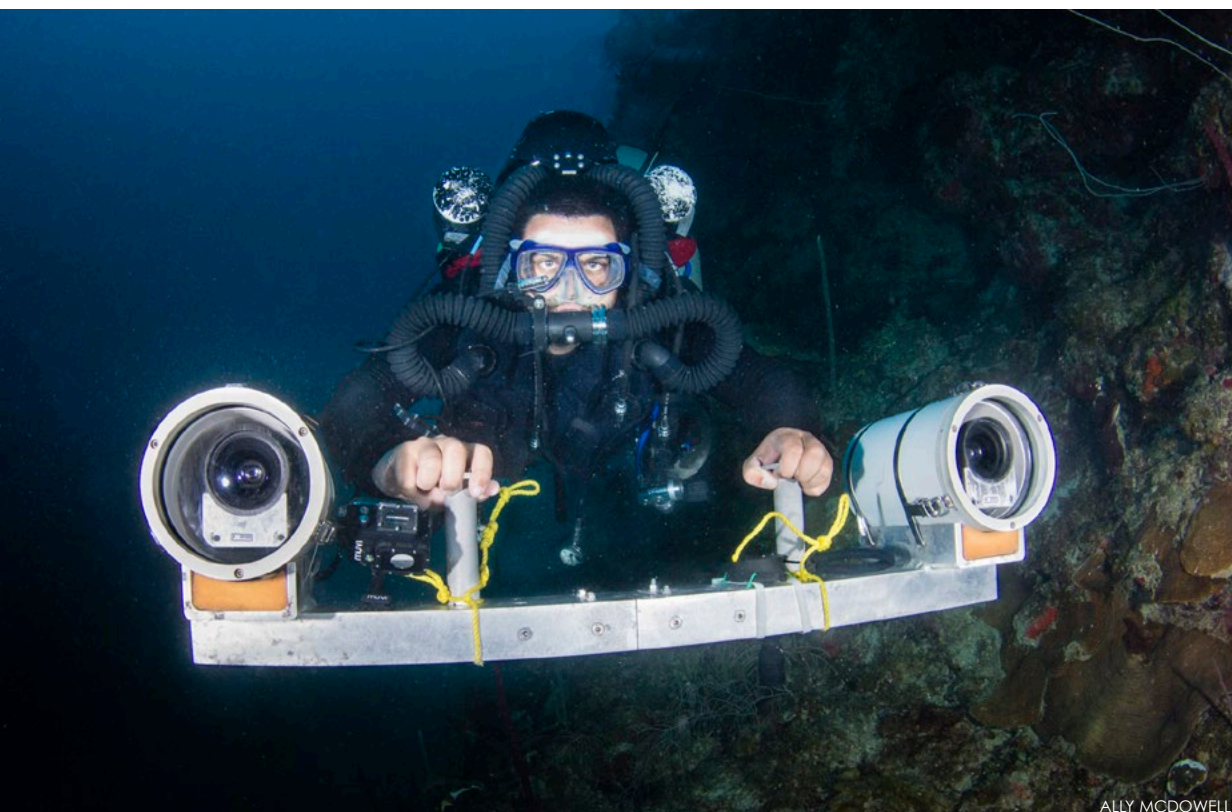
as close to a feeling of being on an alien planet as I can think of. These reefs are unexplored, and there is a sense of excitement as one starts viewing a reef no human eyes have ever seen.

### Scientific meets technical diving

Task loading refers to the number of things that may be swimming around the mind of a diver at any given moment. A good dive plan will try to manage this by setting appropriate targets and



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Dominic Andradi-Brown using the stereo video system



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preparing well on the surface. If you have ever been on a dive holiday with a divemaster and the whole experience felt effortless, then the dive staff managed this for you. All the little jobs needed to make diving happen were taken care of, and any worries were dispelled, leaving you free to watch that moray eel or hunt for nudibranchs.

Technical diving is a very different beast. Individuals must be responsible for their own dive planning and be

comfortable in the mission and the equipment they will take.

The reality of technical diving is an added level of risk. Tissue saturation levels rise to points requiring mandatory decompression stops. Avoiding a bend requires gold standard buoyancy control, excel-

lent gas management and a thorough knowledge of one's limits. On the dive, technical divers must be fully aware of their environment, decompression obligations and future time commitments, plus the welfare of the team. This is diving to the next level.

Most marine scientists hold recreational dive qualifications, but this does not mean that task loading is alien to them. Though the depths and dive times are nothing to break headlines,

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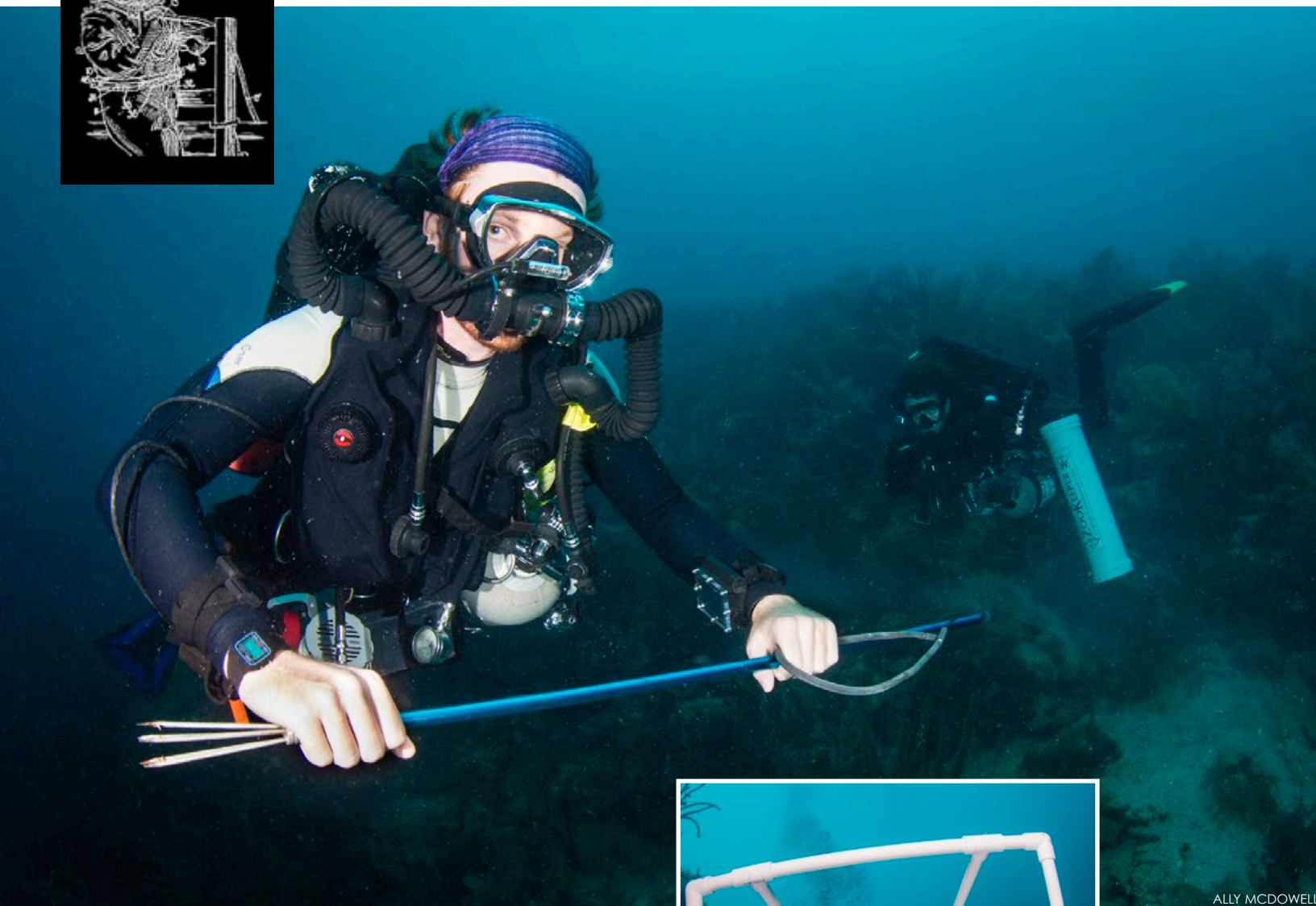
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Thinking Deep research team at work collecting data on lionfish in the twilight zone; Professor Alex Rogers maneuvers equipment (bottom inset)



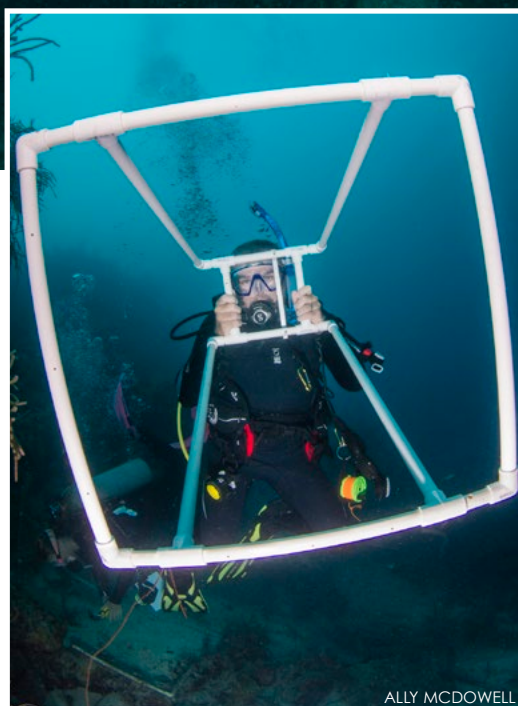
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the equipment and presence of mind required to conduct science under the sea can be extraordinary. Whether swimming behind a bulky camera rig increasing drag, or using a school of lift bags to manoeuvre heavy traps into place, the fitness and buoyancy control of a scientific diver is heavily tested. Often there is no rule book and methods are worked out by trial and error.

While managing the job at hand (and their dive profiles), scientists under the sea may also need to consider the samples already collected or the added cost in gas consumption of moving equipment and working instead of relaxing.

The bane of a marine biologist, however, is getting enough hours on the study system. Lab-based scientists, wishing to make quick progress, could pull a 60-hour week if need be, and have results to show

for their hardship. Due to the rules of dive planning, marine biologists may be lucky to get six hours of bottom time with their system



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per week. Time management becomes critical.

### Thinking Deep team

Enter the "Thinking Deep" team of researchers from Oxford University, faced with an extreme task loading challenge. As if conducting science wasn't

enough to occupy a dive—collecting fragments of coral for physiology tests and video data for ecological analysis—they

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Dry lab work following diving (left); Close-up of corals found in the twilight zone (below); Researchers of the Thinking Deep team at work in the twilight zone (lower right); The coral, *Agaricia lamarcki*, is a focus species for the physiology work (lower left inset)



# Twilight Zone

## THE GEAR

### REBREATHERS

Rebreathers recycle the inert gases we breathe. This massively reduces cost and increases the time a diver can breathe from a cylinder. They also work as an on-diver-gas mix station, allowing for clever management of decompression obligations.

### SVS

Fixing two cameras a known distance apart, angled slightly in, allows filming in 3D. By processing these videos, we can measure the length of any recorded fish accurately without having to touch them. By swimming over the reef with this system, hundreds of fish lengths can be collected in minutes.

### PAM FLUOROMETER

The fluorometer emits light at the wavelengths needed to cause the chlorophyll in corals to fluoresce. The tool also comes with a sensor able to detect the strength of this fluorescence. By knowing the strength of the light emitted and the response recorded, photosynthetic efficiency can be calculated. In short, it's an expensive torch and light meter, able to tell us how well the coral uses light!

### LIGHT TRAPS

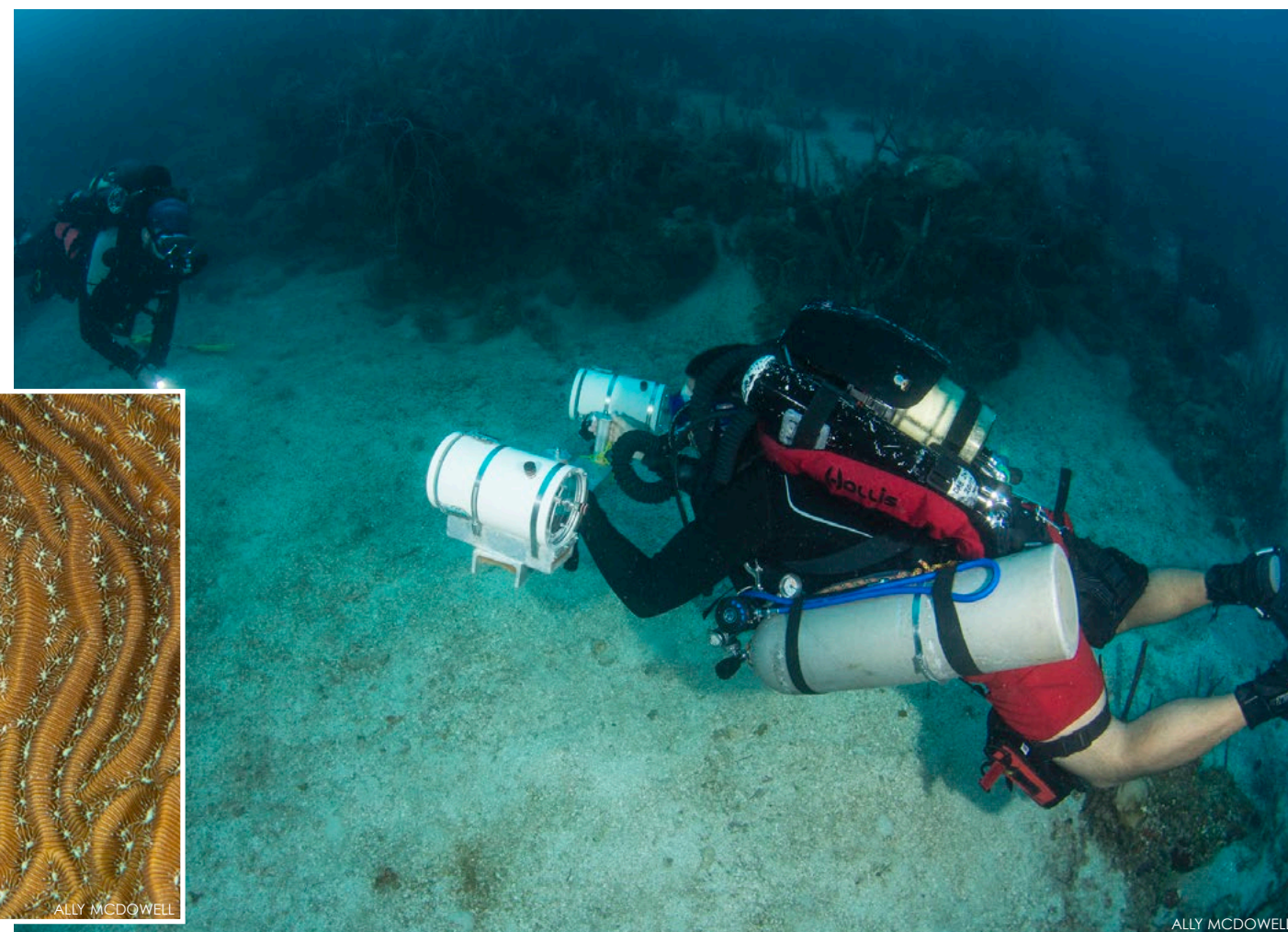
Divers can easily record large fish and corals on reef, but what about all the small invertebrates that make up larger predators' diets? These traps contain LED lights and battery packs and are left on the reef overnight. During darkness, they light up, attracting nocturnal invertebrates into the collector. Our researchers then use microscopes on the surface to reveal what's available for dinner. Knowing what is in the stomachs of fish can show dietary preferences. ■

opted to do this at depths of up to 95m on rebreathers this past summer, incurring dive times in excess of three hours.

Lots of jobs on the bottom translated to even more on the surface. The scientists also blended gases and performed maintenance and checks on equipment, on top of their lab schedules. Food was had on the go, and often, the only pause was

for sleep.

The level of dive training required to access 100m is understandably high. Similarly, to qualify for doctoral level research at the University of Oxford required the team's dedication and curiosity. This is the rare combination that has helped to open new access and insights into the reefs of the twilight zone.



## RESEARCH PROJECTS

- Documenting the fish and coral species down a depth transition
- The abiotic environment: Light, temperature, sediment and dissolved carbon
- Understanding life history and diet in invasive lionfish of the mesophotic zone
- How is coral reproduction affected by depth?
- Does coral physiology change as light levels fall?

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## Marine conservation

The team's interest in the twilight zone is largely focused on conservation. Research objectives are crafted to better understand how these deeper reefs affect those in the shallows we now know are threatened.

The International Society for Reef Studies released a consensus statement in 2015, ahead of the Paris climate talks, warning against the dangers of increasing temperatures and mass coral bleaching events. We are currently in the midst of a third global coral bleaching event. This is the loss of symbiotic algae from

the coral, and in the past, has caused as much as 16 percent of all corals globally to die. These events are set to become more common and may prove increasingly destructive as other human impacts like sedimentation and microplastics in the ocean become more pervasive.

Thinking Deep is working closely with groups, such as Operation Wallacea and the Bay Island Conservation Association, to see whether mesophotic reefs can help shallow reefs recover. If the same corals are found shallow and deep, the extra water above may block higher temperatures and light levels that cause

bleaching from reaching some populations.

In the future, the deep-living coral could provide offspring that settle and rebuild the reef in the shallows. Research is now looking at how many corals span both zones and how their reproduction and physiology differ with depth. Living deeper under lower light levels also means there is less energy for corals to use in order to survive.

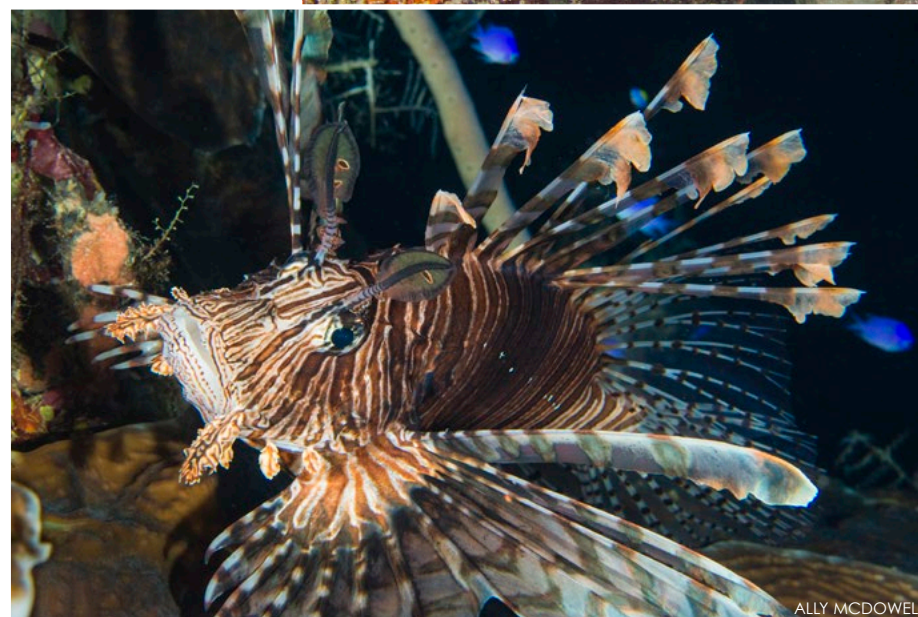
The Thinking Deep research team is investigating whether the invasive lionfish populations of the Caribbean are using the deep reefs in their life cycle, thereby hiding from the culling efforts of divers



Twilight Zone



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Other research is considering whether the invasive lionfish populations of the Caribbean are using the deep reefs in their life cycles. If so, lionfish could hide from the culling efforts of divers and continue to damage fish populations. Scientific studies have found

juvenile fish populations can drop by 79 percent in five weeks after the arrival of lionfish.

## Conclusion

The ever-improving safety record of rebreather technology and the adoption of these techniques by scientists are opening doors on a new era of marine discovery. Already, records are being broken with another recent expedition recording over 10 species new to science *per hour* in the Philippines. With the Oxford team now asking questions based

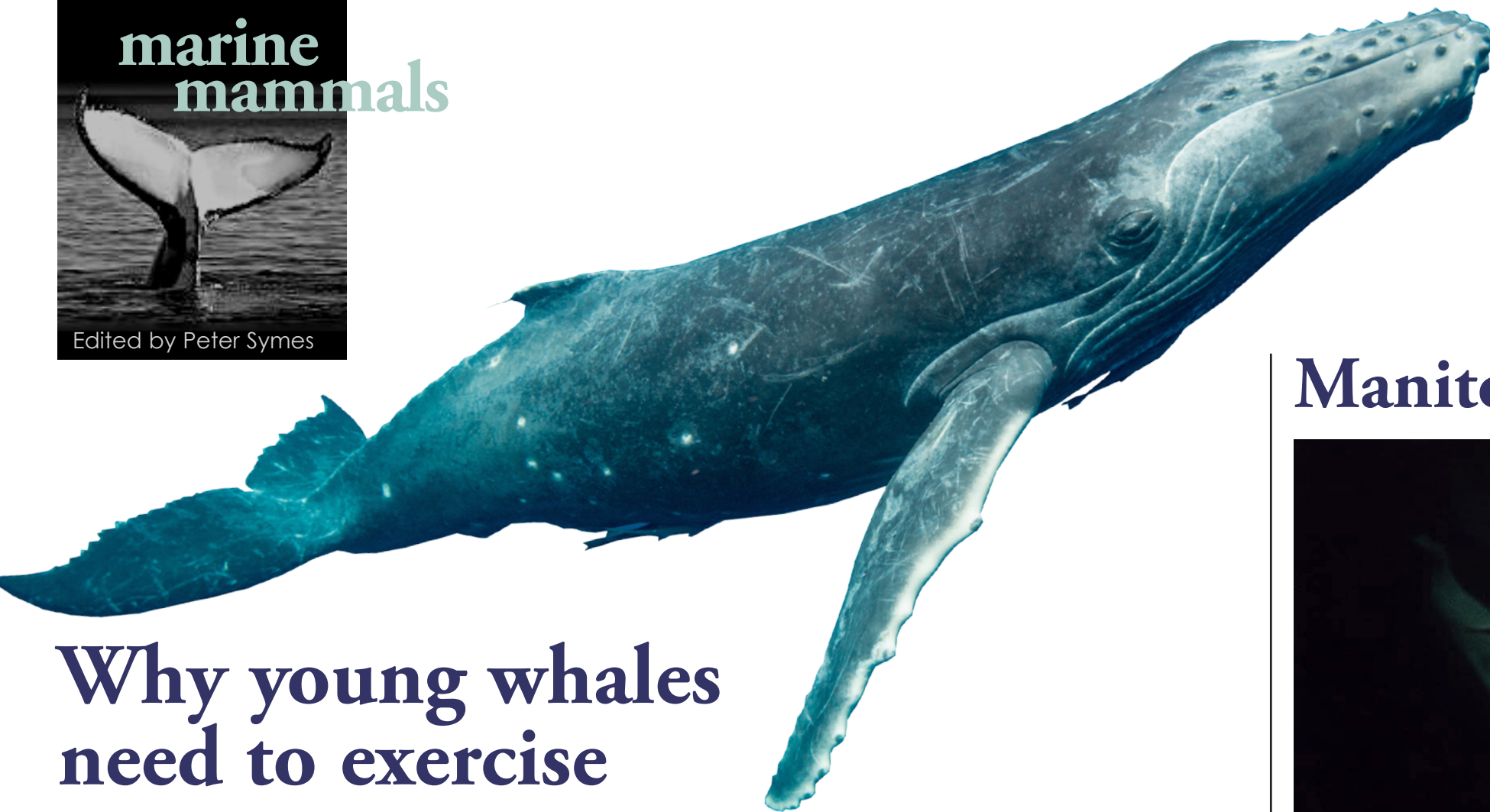
not just on *what* lives in the dark, but also *how*, we hope exciting new discoveries will continue to be made. What is clear is that we still know next to nothing about our oceans, at a time when they desperately need our help to survive. ■

*The author thanks ZSL, RGS, OUEC and Operation Wallacea for funding; and Gradient Technical and Scientific Diving for support. Thanks also go to Ally McDowell and Brian J. Sullivan for photos.*

*Jack Laverick is an IANTD Trimix CCR diver currently doing research on benthic communities found in mesophotic coral ecosystems. He is based in the Department of Zoology at Oxford University and is part of the Environmental Research Doctoral Training Partnership funded by the Natural Environment Research Council (NERC).*

Coral reef found in the twilight zone





## Why young whales need to exercise

Deep-diving marine mammals have elevated levels of myoglobin within their muscles. Myoglobin is structurally similar to hemoglobin—the primary functional constituent of red blood cells—but stores oxygen in muscles, allowing oxygen collected at the surface to be stored in the muscles to support extended dives. Typically, myoglobin levels in marine mammals are between 10 and 20 times greater than their terrestrial counterparts.

### Lacking myoglobin

By taking tissue samples from stranded baleen whales, researchers from California State University discovered calves possessed only 20 percent of the muscle myoglobin stores of the adult whales. They also learned baleen whales develop elevated myoglobin levels over the course of maturation.

Comparisons of myoglobin lev-

els between and within muscles, along with differences in myoglobin accumulation rate in very young whales, suggest exercise may influence the rate of development of myoglobin stores in young baleen whales.

This provides a potential explanation for bouts of energetically expensive exercise, such as breaching, during early development in some species. The authors believe the vulnerability of specific age cohorts to impending changes in the availability of foraging habitat and marine resources.

### Better be fit

Ecologically, the consequences of reduced dive capacity are far-reaching: Predation risks increase and increases in surfacing frequency and persistence raise the energetic costs of travel. Additionally, foraging success for maternal

females with dependent calves is impacted, due to the competing needs of offspring vigilance versus diving. These constraints persist through the juvenile phase, when constrained aerobic dive capacity would similarly increase travel costs and reduce foraging success.

In marine mammals, the costs of swimming scales inversely with body size. Despite the benefits of drafting alongside the mother during swimming, high fluke beat rates compared to adults are a distinct characteristic of young cetaceans and would potentially amplify differences in exertion. As the costs of swimming diminish with increasing body size, the difference may then become less pronounced as whales mature. ■

SOURCE: PLOS ONE

## Manitoba seeks to protect its belugas



LOUISE MURRAY

**Canada's western province of Manitoba wants the federal government to preserve vital habitat for the world's largest population of beluga whales along the western coast of Hudson Bay.**

The population of belugas in western Hudson Bay represents more than a quarter of the global beluga whale population, estimated at 200,000.

Every summer, nearly 60,000 belugas migrate south along the Hudson Bay coast and congregate near the estuaries of the Churchill, Nelson and Seal Rivers—preferred meeting places of the whales that remain unprotected. Whales travel to these regions to reproduce, tend to their young and eat. Shallow, warm water provides a sanctu-

ary from predators like orcas.

### Healthy population

Manitoba is asking Ottawa to extend the Arctic Waters Pollution Prevention Act—which would forbid the discharge of shipping waste—to cover the waters off the mouths of the three rivers. It also wants the Liberal government to consider the area for its National Marine Conservation Area program. The whales do not face the critical environmental implications their cousins do in the St.

Lawrence and Saguenay rivers.

The whales are in healthy condition, said Chris Debicki, Nunavut projects director for The Pew Charitable Trusts' Oceans North Canada. "One of our concerns is to make sure that the western Hudson's Bay belugas habitat and, in particular, the Manitoba estuaries and coastline is protected and that they're monitored," Debicki said. The belugas bring in about CA\$5.6 million in tourism dollars in about two months. ■





## marine mammals

Edited by  
Peter Symes



# New rules to protect captive whales and dolphins

The US Department of Agriculture has just released a proposed amendment to the Animal Welfare Act regulations concerning the humane handling, care, treatment and transportation of marine mammals in captivity. The Humane Society of the United States (HSUS) applaud the resumption of oversight of programs in which humans swim with captive dolphins because these interactive programs present sig-

nificant risk to the health and well-being of the animals as well as to humans.

But Sharon Young, HSUS' marine issues field director, cautions that although the change would lead to some improvements, she is disappointed in other aspects of the proposal. Another section of the proposed rule sets minimum tank lengths based on the animal's size. Young contends the tanks will still be too small and said, in any

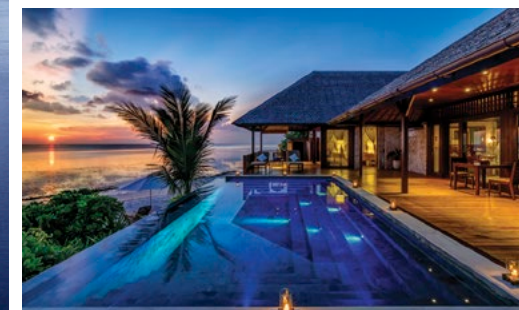
case, it is not possible to replicate conditions in the wild.

"We are strong advocates for doing away with these kinds of captive programs, particularly these interactive programs," she said. "But until we can make that happen, these animals deserve more than just a body length worth of depth and limited room to move." ■

# Manatees no longer endangered, only "threatened"

The US Fish and Wildlife Service has proposed to remove the West Indian manatee from the endangered species list and reclassify it as "threatened" after seeing "significant improvements" in its population and habitat conditions. Today, the rangewide population is estimated to be at least 13,000 manatees, with more than 6,500 in the southeastern United States and Puerto Rico. When aerial sur-

veys began in 1991, there were an estimated 1,267 manatees in Florida. Today, there are more than 6,300, representing a significant increase over the past 25 years. ■



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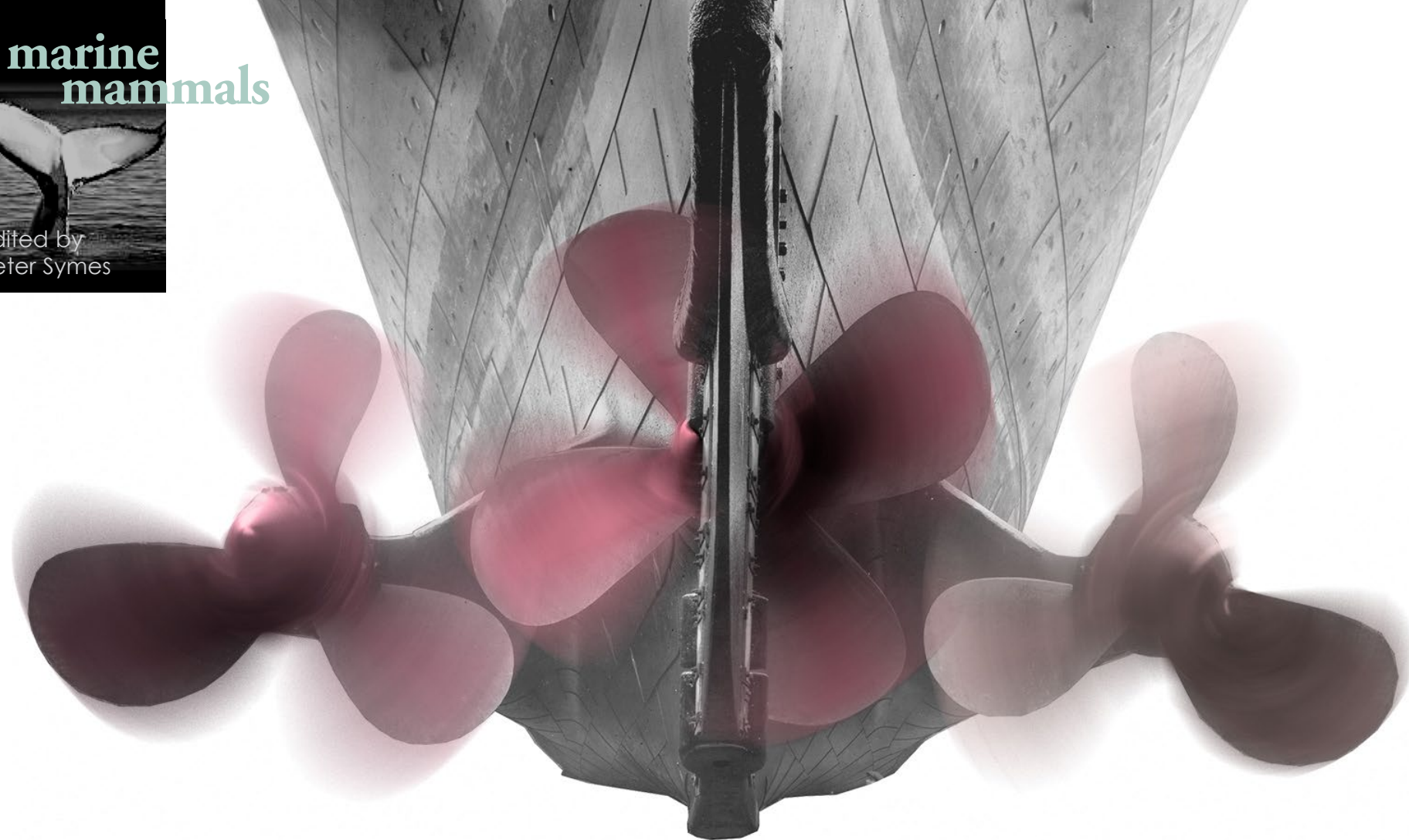
Steve and Cindy Moore, April 2015



www.wakatobi.com







# Whales need quiet Marine Protected Areas

**Ships' noise is a serious problem for killer whales and dolphins. Because whales use sound to communicate and navigate, interfering noises at specific frequencies can leave them distressed, lost or unable to hunt.**

The low rumble of passing ships has long been connected to the disturbance of large whales. When exposed to noise pollution, baleen whales tend to experience difficulties when communicating through vocalizations or when navigating through their surroundings. The intensity of low-frequency noise in the ocean has gone up almost tenfold since the 1960s, but the researchers led by Scott Veirs of the Beam Reach Marine Science and Sustainability School wanted to see if higher

frequencies had gotten noisier too. The US researchers found persistent noise is also occurring at medium and higher frequencies, including at 20,000Hz where orcas hear best. These noise disturbances could be hindering the ability of the whales to communicate and echolocate.

The findings, published in *PeerJ*, suggest that the noise could well affect the endangered population of killer whales that are found near the shipping lanes. As a

result, the orcas are finding it more and more difficult to identify prey or to keep away from the shore. A population of just 84 killer whales forage up the US west coast and into Puget Sound.

## Slowing down

Study authors believe that a solution may be at hand, however, since apparently not all ship noises have the same impact, with some being much more damaging than others. Most noise came from container ships. The researchers

estimate that slowing down by one knot—just over one mile per hour—could lower a ship's noise by one decibel. "Decreasing speed by six knots could decrease noise intensity by half," Veirs told the *Guardian*.

## Better technology helps

It may also be possible to reduce the amplitude of sounds made by container vessels by adopting military technology, in order to

# Why do humpbacks make low-frequency pulse sounds?

**Long thought silent, females may have their own, low-frequency songs, a new study suggests.**

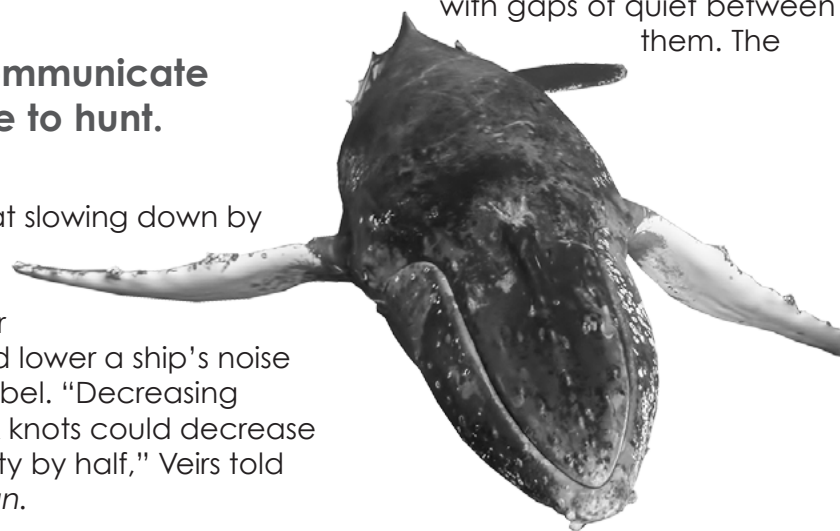
Whale song recordings off Hawaii have revealed a strange series of deep beats near the lower limit of human hearing. According to Jim Darling, a research biologist with the Whale Trust Maui in Hawaii, the so-called "pulse trains" are deeper than any confirmed humpback vocalization and with such a low beat they are scarcely audible.

Easily masked by such background ocean noise, it is a sound "it took me years to convince myself I was hearing," Darling told *National Geographic*. The source of these sounds was not verified, although all were recorded in the close presence of humpback whales.

The collection of these sounds was coincidental to recording songs and social sounds. The sounds are produced in bouts or pulse trains of variable length, with gaps of quiet between them. The

simplest explanation is that these were sounds generated by the humpback whales involved in breeding behavior. The strongest support for this view is that the whales were within tens of meters from the recording boat, and the patterns of changing intensity of sound in both examples matched the observed approach

or departure movements of the whales in relation to the stationary hydrophone. Other cetacean species were not known to be present during the recordings. ■



DON SILCOCK

limit the disturbances caused to toothed whales and dolphins. ■  
SOURCE: PEERJ





The indoor pool facilities at Falck Safety Services and the METS Model 30 simulator with its lifting system. The hoist trainer can be seen on the top left of the photo.

Text Konstantinos Alexiou  
Photos courtesy of Konstantinos Alexiou and Falck Safety Services

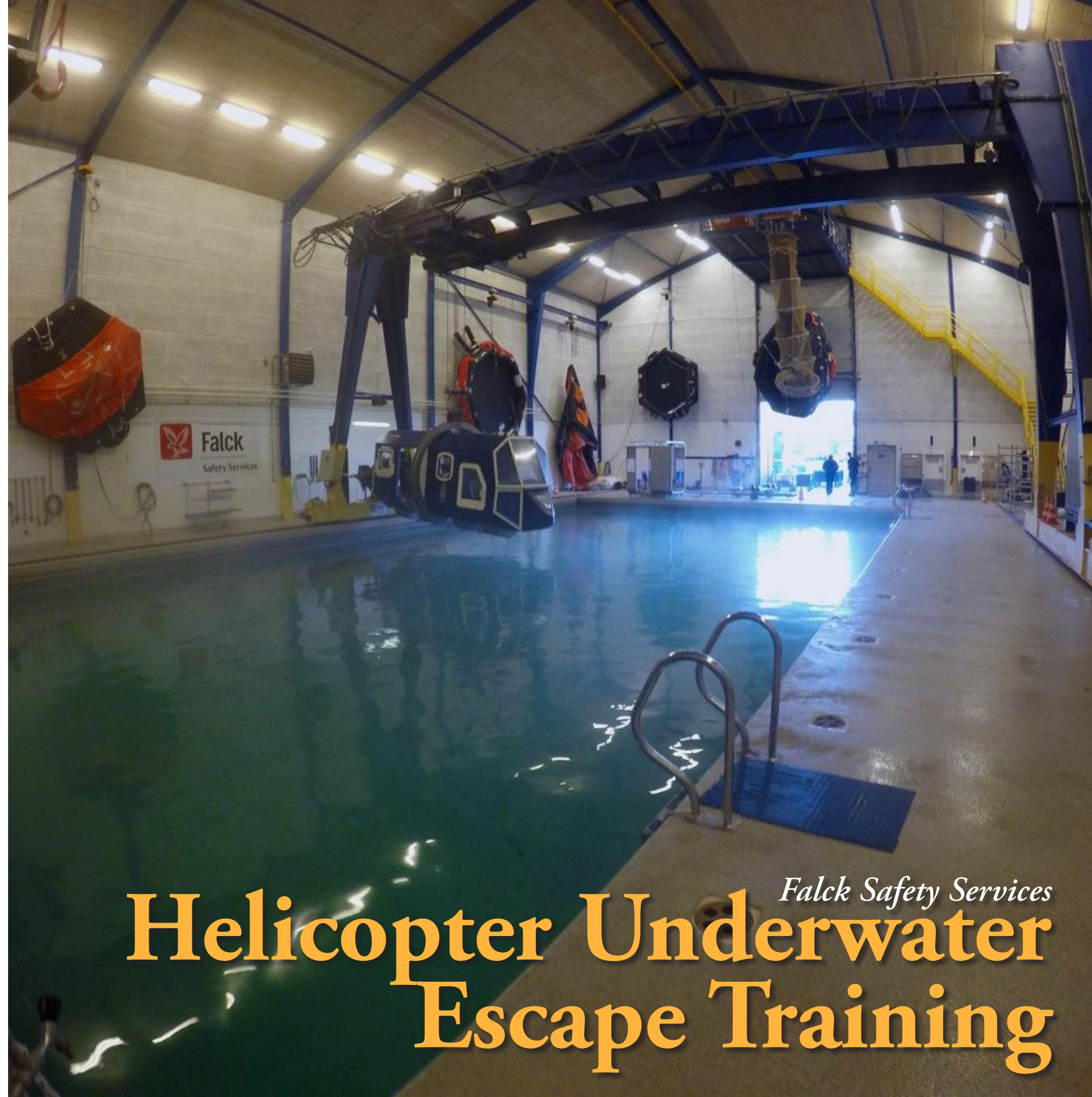
**Falck Safety Services has been providing high quality safety and emergency preparedness courses and consultancy services to the offshore, military and aviation industries worldwide for more than 30 years. It is a division of Falck—a Nordic-based organization, which provides emergency assistance in case of accident and disease. Falck Safety Services offers a variety of offshore courses all accredited by OPITO [7]. The training center is located in Denmark and based in Esbjerg, on the western coast of the Jutland Peninsula.**

Helicopters operating over water may experience emergencies, which require an immediate ditching. Ditching is a deliberately executed landing on water with the intent of abandoning the aircraft successfully. A helicopter that ditches onto a body of water is vulnerable to inversion and sinking due to its high center of gravity (engine, transmission and rotor) and its poor seakeeping performance

[4]. The helicopters, operating over water, are equipped with Emergency Flotation System (EFS) and life rafts. The flotation system, once deployed, provides increased buoyancy and stability to the helicopter, thereby enhancing occupant survival rates. This, however, is not always the case; the flotation system can be damaged due to the impact of the landing or due to a malfunction, so the floats may not open symmetrically on both sides.

The first reported helicopter ditching occurred on 1 November 1944. The pilot of an R-4 Sikorsky helicopter, Second Lieutenant Jack Zimmerman, while taking off, had to ditch in the Pacific Ocean. The helicopter soon flooded and started sinking. The escape of the aircrew was difficult and Private William K. Troche was trapped in his seat. Zimmerman made several dives to the helicopter to extract him. Finally, he managed to extricate Troche from the aircraft before he drowned. Later, he received the Soldier's Medal for his actions on that day [6].

In various studies, it has been reported that drowning is the primary hazard in this type of accident [1]. The discovery of oil sources in the North Sea in the mid-1970s sparked a huge demand of helicopter flights over water. Unfortunately, there was a sudden increase of helicopter ditching. The UK Civil Aviation Authority, in 1984, saw no other solution but to make the Helicopter Underwater Escape



# *Falck Safety Services* Helicopter Underwater Escape Training







# education

Training (HUET) training a requirement for crew and passengers that regularly fly over water. This training, they added, should be as realistic as possible [2].

Helicopter Underwater Escape Training in Europe and most of the countries, Helicopter Underwater Egress Training in the United States is training provided to helicopter flight crews or passengers who fly over water as part of their job. These individuals could be military

or law enforcement personnel, flight crews, as well as offshore and oil gas industry staff. We will refer to this training as HUET.

The HUET training is also delivered to pilots and aircrew members of small fixed-wing aircraft. As the name HUET implies, this training aims at providing the crew and passengers with the basic emergency response knowledge and skills to escape from the helicopter—or plane—suc-

cessfully, following an emergency landing over a body of water. The phrase, body of water, covers any offshore environment, but it could certainly refer to a river or lake.

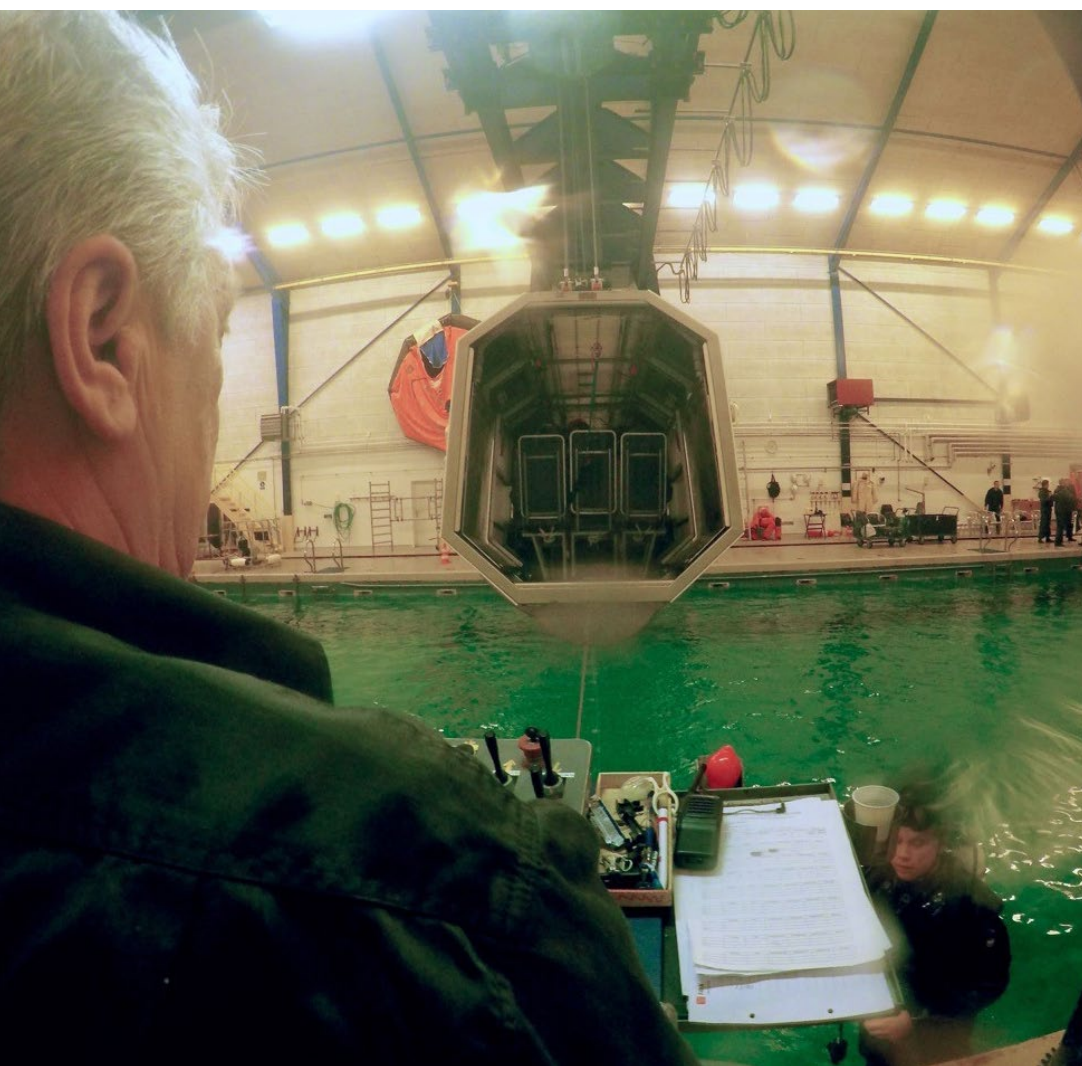
## Facilities and training simulators

The training takes place in a purpose-built indoor pool. The pool measures 25m by 10m, has a depth of four meters, and a water temperature of 20°C (68°F). Through sophisticated systems, the instructors can generate wave and current conditions. In addition, there is the ability of weather, sound and light simulation. Day and night lighting accompanied by various wind and rain strength conditions can be brought into the teaching process. The training incorporates real-life scenarios so participants get a better idea of what a real situation could feel like.

The area holds several Modular Egress Training Simulators (METS), which are designed and built in such a way to replicate different aircraft cabin types. The main training element is the helicopter simulator, which is also called a dunker.

The specific dunker model is the METS Model 30 by Survival Systems Limited. The METS™ Model 30 is the size of an S-61/Puma, Bell 212, UH-60, S-76, etc, and has eight interchangeable emergency exit panels. The Model 30 has become the international standard training simulator for use in

A safety diver is placing one of the removable exits (windows) back onto the dunker.



View from the dunker operator's location

delivering aircraft ditching training [8].

The dunker is held by a lifting system and operated by a crane operator. During the training, the dunker is sunk while being rotated. The simulator simulates the immersed cabin and can be turned left or right, up to 180 degrees in the horizontal plane. In one side of the pool, there is a static helicopter rescue hoist trainer with a replica of a helicopter door. The hoist system is equipped with a strong light, which simulates the search light of a SAR (Search and Rescue) helicopter and produces a rotor downwash. An additional training simulator at the facilities is the Shallow Water Egress/Escape Trainer (SWET). The SWET is a single-seat emer-

gency trainer consisting of a seat enclosed in a protective metallic frame on which several flotation aids (buoys) are mounted.

With this apparatus, the instructors can easily operate the trainer while inverting it underwater and bringing it back to the surface. The SWET is the ideal training tool for the students to build their confidence and awareness while inverted underwater and breathing via the Emergency Breathing System (EBS), before they proceed to the HUET training. Primarily, the military and law enforcement personnel use the specific simulator. However, civilian personnel perform similar training while inverted underwater in order to familiarize themselves with the underwater environment

and their life support gear.

Another simulator is a two-seated emergency trainer built similarly to the SWET trainer. It simulates the cabin of a fixed wing aircraft. The crews experience and practice simulated aircraft ditching and emergency procedures.

Since the HUET training can be a part of bigger offshore survival courses, there are several different kinds of equipment in the indoor facilities, e.g., life rafts, ship evacuation systems and helicopter cabin simulators leading to a life raft.

## Going under and around

There is a group within the Falck Safety Services, assigned with the task of training military and law enforcement personnel, called







education



A safety diver prior to a drill

the Defense Group. Let us see how a typical training day looks like. After the students have completed the required theory lectures, they get their personal gear and prepare themselves for the practical module. Before the training commences, the head instructor presents the training objectives and addresses the hazards related to the specific training activities, both on land and underwater. The training staff (instructors, safety divers, dunker/crane operator, and surface support) has established strict and to-the-point emergency procedures.

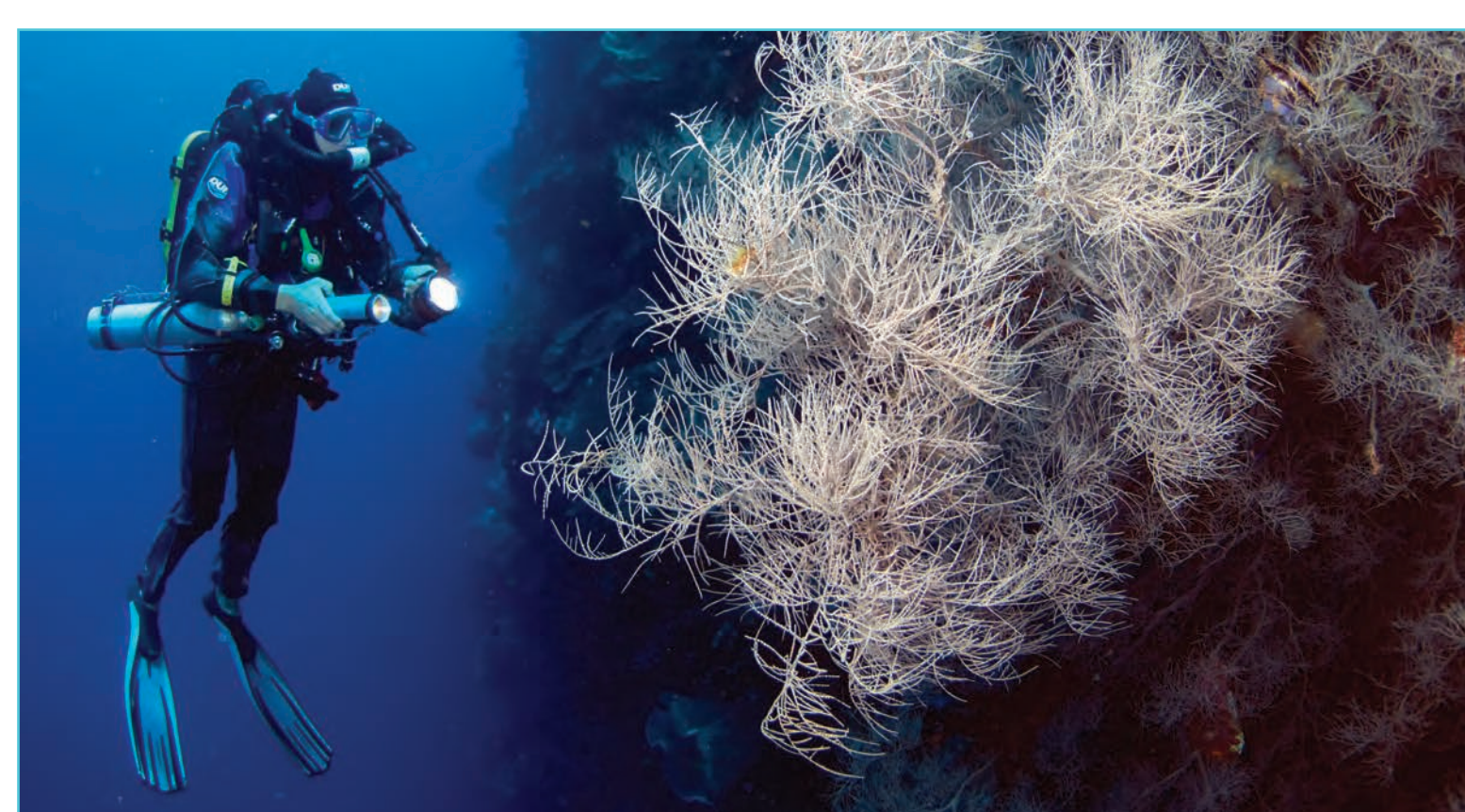
A short briefing is given each time the students go through a different training station. For instance,

once the individuals are fastened to their seats in the dunker, the instructors will take them through the safety features of the simulator, such as the emergency air supplies located in different areas of the dunker, the quick-release seat belt mechanism, as well as emergency alarms.

A typical day of the METS training for military personnel consists of the underwater obstacle course, the SWET, and finally the HUET. The obstacle course aims to increase the confidence of the individuals in the underwater environment. Based on the client, the trainees will practice the HUET training in day and night conditions in different weather and wave states, and

with a variety of personal gear. A drill may include the use of a life raft and the successful recovery by the static hoist trainer.

Before the trainees enter the water, the safety divers have already set everything up so there is no wasted time underwater. The safety divers will remain in the water for the duration of the training module. Apart from observing the crew and passengers during the training, they are responsible for placing the removable exits (windows) back to the helicopter at the end of each drill. The safety divers, in scuba gear, swim outside of the dunker monitoring the candidates at all times. The divers are trained to follow a specific emer-



## A CCR experience without equal

At Wakatobi, rebreather divers are not just accommodated, they are welcomed by a staff that understands the special requirements of the equipment, and in some cases, are CCR divers themselves. A supply of oxygen, diluent, and bail-out tanks are available on site, along with ample stocks of sorb with oxygen fills to 206 bar, with helium available by advanced request.

Rebreather groups may be provided with dedicated boats to accommodate their extended profiles. Equally attractive as the support system is Wakatobi's marine environment itself, which offers profiles that are ideally suited to rebreather diving, along with a wide range of marine subjects that become even more accessible to those who dive silently.

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

Craig Willemsen, owner, Silent World Diving



[www.wakatobi.com](http://www.wakatobi.com)

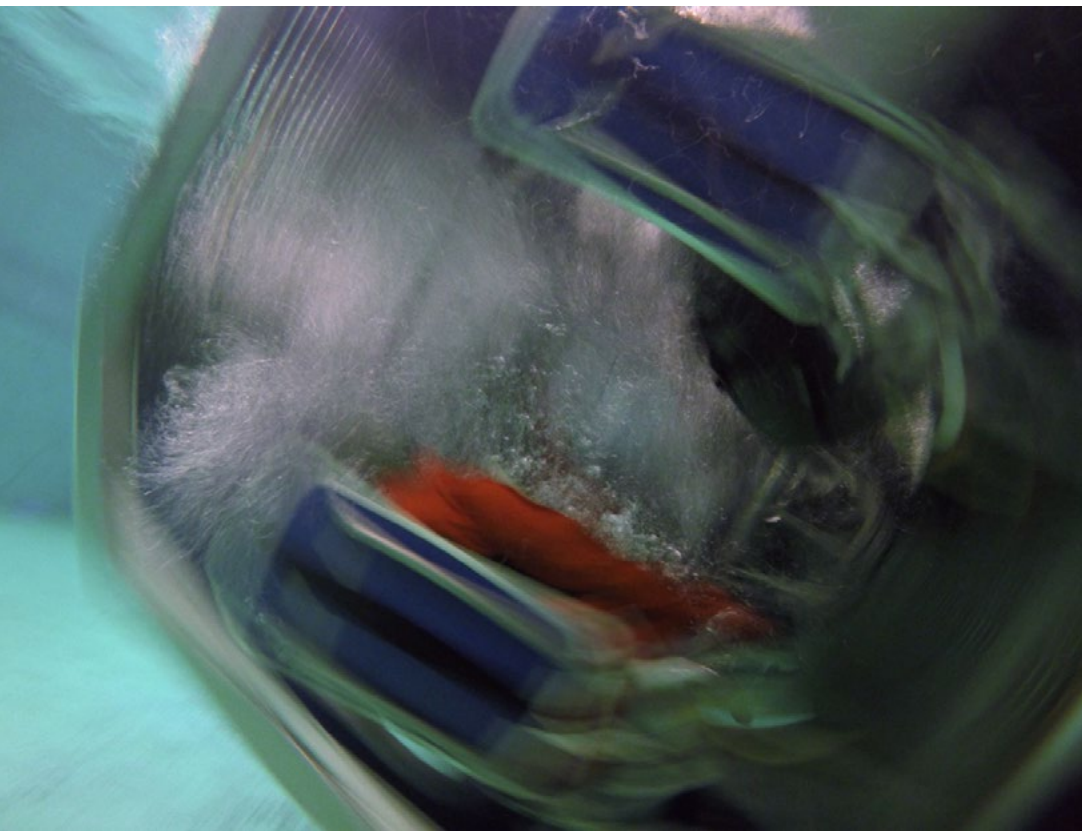






# education

THIS PAGE: Underwater training action shots. In these photos, it is clear just how dynamic and “violent” the action of immersion and rotation is. The instructor (in the red drysuit) is supervising the students while they egress from the dunker.



gency management protocol in case of an emergency. The same applies to the instructors and the dunker operator. The instructors stay in the dunker with the students. A typical number of trainees in the dunker is between five and six.

The dunker at the training center is also used for civilian training. A big number of students comes from the offshore and oil/gas industry. Those individuals are required to undergo the Basic Offshore Safety Induction Emergency Training (BOSIET) and Further Offshore Emergency Training (FOET), where the HUET is an essential module in both courses.

The trainees need to identify the emergency, brace for impact and properly use their EBS in order to escape the submerging cabin of the aircraft. Improperly operated lifesaving gear can lengthen or even prevent a successful escape from

prematurely, the excess buoyancy force caused by the safety suit can significantly affect one's escape from the cabin. Through the training, the needed situation awareness and effectiveness of the candidates is increased. The instructors bring in a variety of emergency scenarios while the degree of difficulty increases gradually towards the end of the course.

The defense personnel will also practice a range of more complex escapes in day or night, such as cross-cabin escape, in case there is one or more blocked exit points. Upon graduation, the instructors make sure that all the students have demonstrated the required competencies in theoretical and practical level.

## Training saves lives

“The impact was tremendous. The helo lost power and dropped 500 feet in five

the cabin.

For example, regardless if one knows the location of the exits and the window jettison mechanisms, if the seat belt is released

seconds.”[5] This is an excerpt from a report following a ditching experienced by a US Navy helicopter crew. From this statement, it is obvious that the human information system does not have enough time to process what is happen-

ing. This applies to both the crew and the passengers. However, the objective is to egress from the aircraft rapidly and safely.

Training is a powerful tool for improving the survival rate following a helicopter

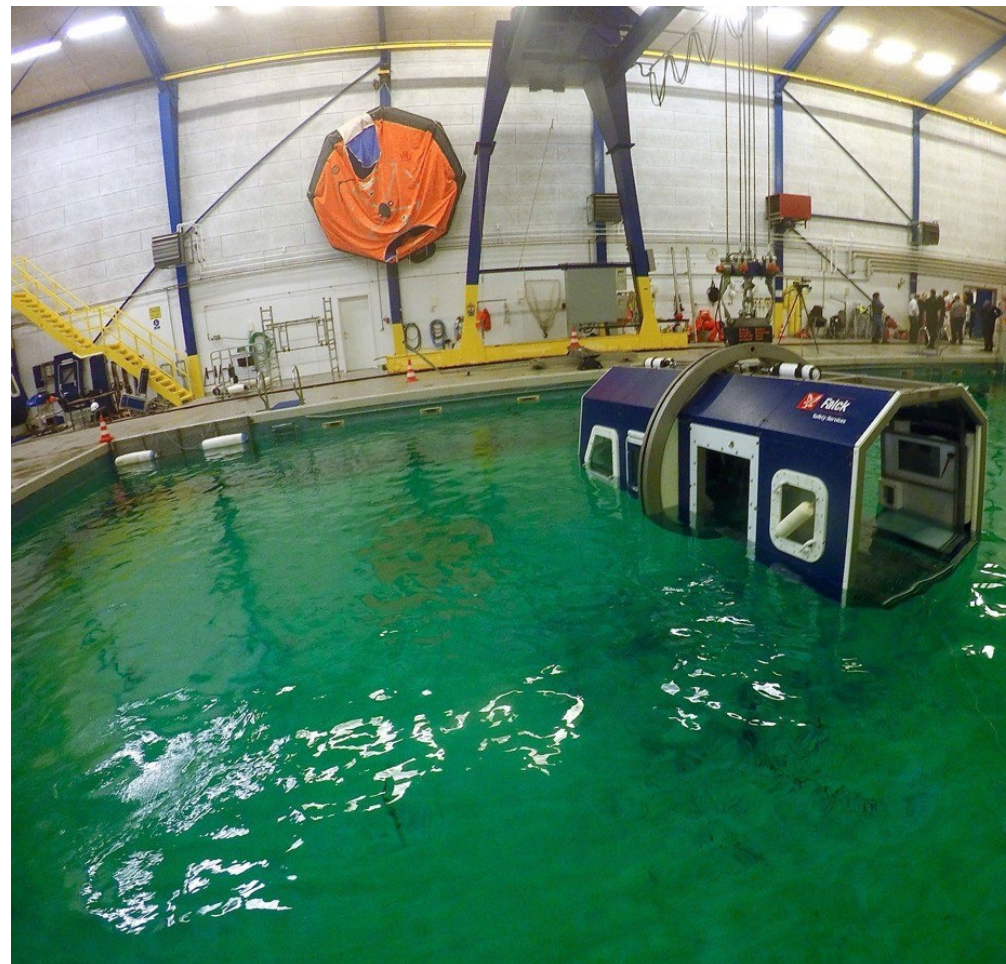
accident in water. The crew and passengers have to train in a creditable underwater escape training simulator and should be prepared to repeat it as required by the guidelines. Through the training, they will gain essential decision-making and muscle memory skills that will assist them in the unfor-

tunate event of an accident.

In an old study from 1978—still worth mentioning due to its significant findings—Cunningham reported on 234 US Navy helicopter accidents in water between 1963 and 1975. His findings were that the survival rate was 66 percent without HUET training and 91.5 percent with HUET training [3]. □

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The end of another day. Notice the two scuba tanks that provide air to the emergency dive regulators located in different areas of the dunker





*Papua New Guinea's*

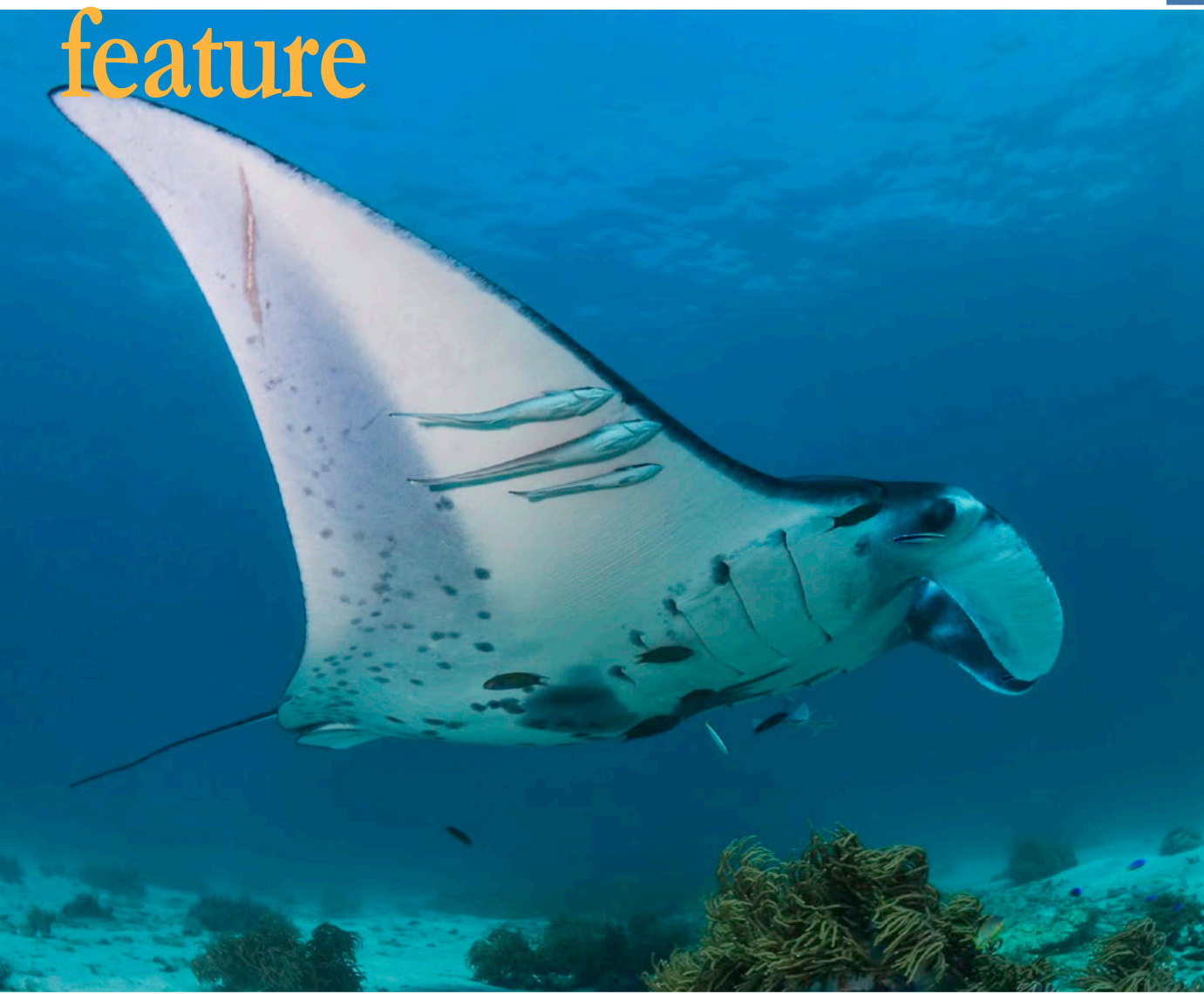
# Manta Rays

*of Milne Bay*

Text and photos by Don Silcock







Reef manta ray, or *Manta alfredi*, (above) at cleaning station off Gonu Bara Bara Island (right) in Milne Bay Province, Papua New Guinea

**From a distance, there is little to distinguish the small island of Gonu Bara Bara from the myriad of others in this part of southern Milne Bay Province; and few would guess that just off its northern beach is the best place in the whole of Papua New Guinea to see the magnificent reef manta ray—*Manta alfredi*.**

Reef mantas had been known to patrol that beach for many years, but all attempts to try and interact with them were random at best—maybe you would see one or more, maybe you wouldn't. Then, back in 2002, almost by accident,

Craig de Wit discovered why the mantas were there.

Craig is the skipper of the *Golden Dawn* liveaboard, which had been chartered to search for mantas. He had gone to all the best-known Milne Bay locations but did not find a single one. Finally, in an act of inspired desperation, he responded to the pleas of James, the boat's engineer, to check out his home island where there were "lots of mantas just off the beach".

Here is how Craig described finding them:

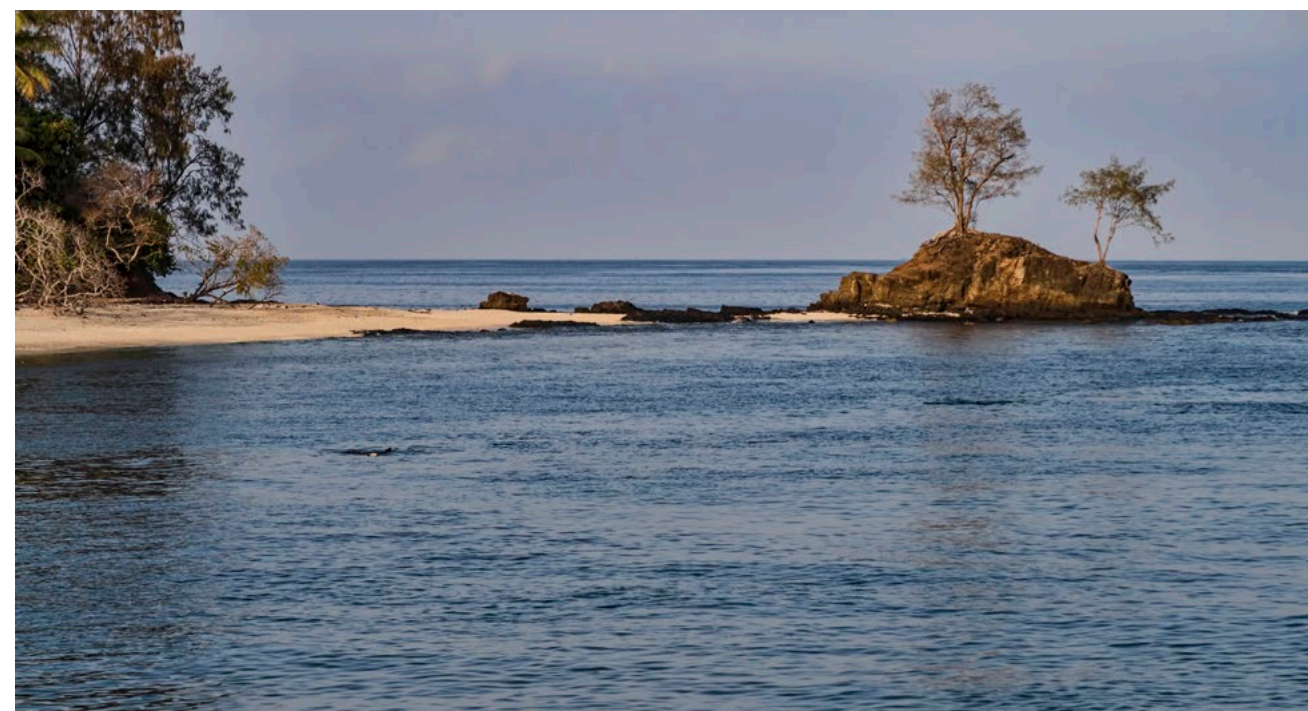
"I discovered the cleaning station when we went to Gonu Bara Bara, James my engineer kept insisting that there were lots of mantas at his island, so we went in search of them. On arriving, we saw them around the place on

the surface, so most of the group went for a snorkel in hopes of getting close to them. I decided to go for a dive along the beach, hoping to get close; and while drifting along in the current, I came across the cleaning station and I guess the rest is now history."

Craig christened the cleaning station "Giants@Home", and I was fortunate to experience it first-hand just two weeks after that discovery.

### Cleaning stations

Cleaning stations are a kind of underwater demilitarized zone where the normal Darwinian survival of the fittest rules of the reef are put on hold while matters of personal hygiene are attended to. Mantas, like most medium and large underwater creatures, suffer infestation



Location of manta ray cleaning station at newly named dive site, Giants@Home



THIS PAGE: Manta rays patrol the Giants@Home cleaning station, just off the beach at Gonu Bara Bara Island

## Manta Rays

The usual signal that the truce is over is a shudder from the fish, prompting the cleaners to quickly exit stage left!

### Manta cleaning stations

Manta rays are filter-feeding planktivores that use their mouths and modified gill plates to strain plankton and small fishes from the water. They have teeth, which are tiny, peg-like and about the size of a pinhead, but they are not used for feeding. Instead, they are utilized during breeding so that the mating mantas can hold on to each other. Basically, manta rays are harmless to both man and

to the cleaners, but they are nevertheless big animals, with the average wingspan of reef mantas reaching around 5.5m, while the larger oceanic mantas (*Manta birostris*) getting to at least 7m. They are truly intriguing creatures that are both intelligent and curious, having brains that are significantly larger in proportion to their body size than other fish. Being in their presence is, in my opinion, an absolute joy and cleaning stations are a great way to maximize that interaction time.

Open water encounters with reef mantas are typically fleeting in nature. They

will check you out, but that's usually it, and they move on. Whereas, at a cleaning station, there are more mantas and they stay longer as they take turns being serviced.

Usually, the cleaning station will be close to an area with a strong current that brings the rich plankton which mantas feed on, which explains the early reports of mantas near Gona Bara Bara as close by as the China Strait that connects the Coral Sea to the south with Milne Bay and the Solomon Sea to the north. Giants@Home is a particularly good station as it is shallow at about 9m, so bottom time



Scene at typical cleaning station, with cleaner shrimp in mouth of moray eel. Note identification stripe on cleaning shrimp

from tiny parasitic crustaceans and have no real way of removing them without some help. That help comes in the shape of small creatures like shrimps, gobies and wrasses who cohabit in specific locations known to both sides as places of mutual benefit—the larger creatures get rid of their unwanted guests and the small ones are allowed access to areas of their guest they would normally never venture, to feed on the rich pickings found there. Interestingly, most of the cleaning creatures have developed stripes, which are believed to identify them as

“cleaners” to their potential customers!

Cleaning stations in general are easy to recognize. They tend to be quite common and are great places to watch the interaction between the cleaners and their customers. Typically, when a large fish enters a station, it signals its needs by assuming a trance-like posture, often with its mouth wide open and gills extended outwards so that the cleaners can get access to the most difficult areas. It is quite normal to see the cleaners foraging in the deepest recesses of the fish's mouth.







is not an issue. It is literally just off the beach, which makes it very safe, and water clarity is usually (but not always) pretty good.

But the exceptional thing about its location at Gonu Bara Bara means it can only really be dived from a liveaboard and therefore the total number of divers in the area is the number on the boat and shifts can be organized to minimize the number of divers in the water at any point in time. At other locations, this is rarely the case, and your interaction can

often be spoiled by the sheer number of other divers.

Timing at Giants@Home does not seem to really matter, and I have seen mantas on the bommie throughout the day. They are not always there, but very rarely will you dive there and not see at least one (but often many more)!

### Manta ray protocol

We have all seen those old images of “intrepid divers” riding on the backs of manta rays by holding on to a couple of

## Manta Rays



THIS PAGE: Manta rays patrol the Giants@Home cleaning station, just off the beach at Gonu Bara Bara Island

resident remoras—so 1970s—but at least the offenders could claim ignorance. Today, we know much more about these wonderful creatures, and they truly are an incredible mix of grace and symmetry, combined with intelligence and curiosity.

Both oceanic and reef mantas are also listed on the IUCN Red List as “Vulnerable”, which means they are likely to become “Endangered” unless the circumstances threatening their survival and reproduction improve. There are many reasons for that status, which are far beyond the scope of this article; but as divers, we are privileged to experience such creatures, and therefore, it is our responsibility to behave properly when we do.

We should *never*, ever, try to ride a manta like those guys from the 1970s, and we should *never* chase or harass them in any way! What we should do, and in my personal experience this is by far the best way to get the best interactions, is to position ourselves around the cleaning station so that the mantas have







## Manta Rays



THIS PAGE: Manta rays at the Giants@Home cleaning station, Gonu Bara Bara Island

a clear entry and exit. Don't get too close as you will be in the way, and the mantas will not come in as they appear to feel vulnerable when hovering to be cleaned and are easily spooked.

Once they have made a few passes and gotten used to you, they will often come close to really check you out, which is the best type of encounter, as it is on the manta's terms and they are in control. Basically, behave and you will be amply rewarded!

### So, where is Gonu Bara Bara?

The island is located in southern Milne Bay Province, about 8km to the south-east of the former provincial capital of Samarai Island at the bottom of the







Gonu Bara Bara Island on map of Papua New Guinea (left)

View of China Strait (above); Manta ray at cleaning station (top left)

the China Strait group of islands. It connects the Coral Sea to the south with Milne Bay and the Solomon Sea to the north and was named by Captain John Moresby, who surveyed the region and claimed the south-eastern part of New Guinea for Britain in 1873.

Moresby wrote in his journal that he believed he had found "a new highway between Australia and China". This was a very big deal at the time as it seemed to provide a way to eliminate

the long and dangerous detour sailing ships of the day had to make around the Louisiade Archipelago as they made their way north from the eastern

coast of Australia to China.

Samarai Island is sadly run-down these days and a shadow of its former glory under the Australian colonial administration, when it was the second largest town in Papua New Guinea after Port Moresby. But its jetty is a treasure trove of critters that make a great alternative to Giants@Home!

### How to dive Gonu Bara Bara

The only way to dive at Gonu Bara Bara is from a liveaboard, and there are two that service the area. Top of the list is the MV *Chertan*, which is owned and operated by Rob van der Loos. *Chertan* is based in Alotau, the capital of Milne Bay Province and operates year-round in Milne Bay, with regular visits to the China Strait, Samarai Island and, of course, Gonu Bara Bara. Van der Loos has been running dive trips in Milne Bay since 1986 and, simply put, knows the area better than anybody else. MV *Golden Dawn* also dives Gonu Bara Bara but it is based from Madang and operates throughout Papua New Guinea depending on the seasons.



MV *Chertan* liveaboard docked in Milne Bay Province

March, June and October are when the boat visits Milne Bay and, as its skipper Craig de Wit discovered Giants@Home, he clearly owns the bragging rights about the site! ■

Asia correspondent Don Silcock is based from Bali in Indonesia. He has dived extensively in Papua New Guinea, Indonesia and many other countries in the Indo-Pacific region and his website [www.indopacificimages.com](http://www.indopacificimages.com) is full of information on those locations.

China Strait. Roughly 2km wide and 7km long, the China Strait is the passage between the southeastern tip of the Papua New Guinea mainland and



# fact file



## Papua New Guinea



SOURCES: US CIA WORLD FACTBOOK, XE.COM, PAPUANEWGUINEA.TRAVEL/DIVING

**History** Papua New Guinea is a developing country in the Southwest Pacific, located on the eastern half of New Guinea, which is the second largest island in the world. In 1885, it was divided between the United Kingdom (south) and Germany (north). In 1902, the United Kingdom transferred its half to Australia, which occupied the northern portion during World War I and continued to administer the combined areas until independence in 1975. After claiming some 20,000 lives, a nine-year secessionist revolt on the island of Bougainville ended in 1997. Today, Papua New Guinea relies on the assistance of Australia to keep out illegal cross-border activities from Indo-

nesia primarily, including illegal narcotics trafficking, goods smuggling, squatters and secessionists. Government: constitutional monarchy with parliamentary democracy. Capital: Port Moresby

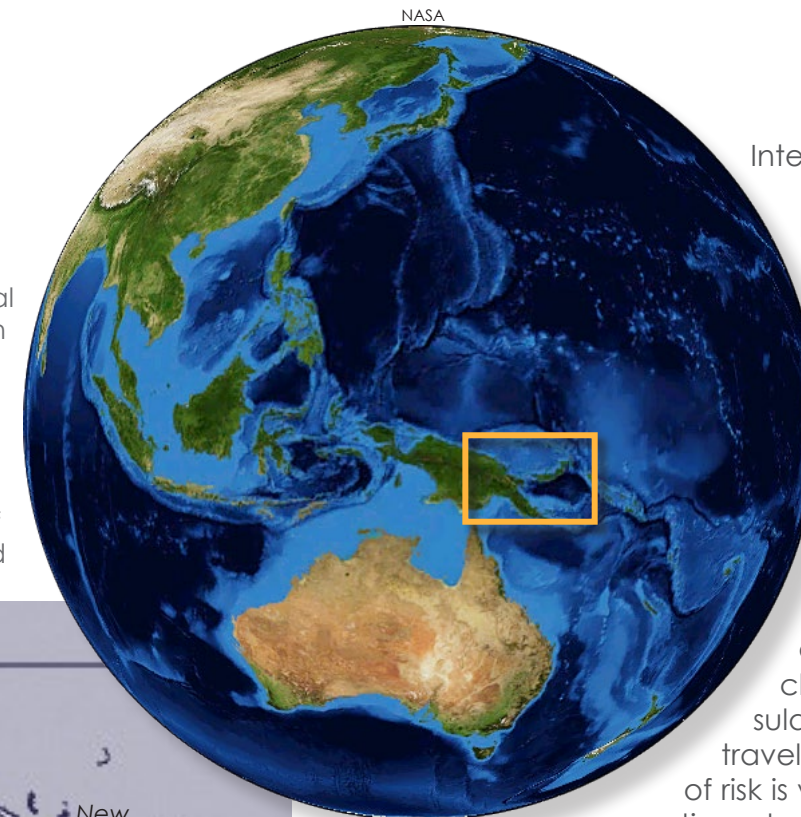
**Geography** Oceania, Papua New Guinea is a group of islands east of Indonesia including the eastern half of the island of New Guinea between the Coral Sea and the South Pacific Ocean; Along its southwestern coasts, it has one of the world's largest swamps. Coastline: 5,152km. Terrain: mostly mountainous with rolling foothills and coastal lowlands. Lowest point: Pacific Ocean 0m; Highest point: Mount Wilhelm 4,509m.

**Climate** Tropical climate with slight seasonal temperature variation; the northwest monsoon occurs December through March; the southeast monsoon occurs May through October. Natural hazards: active volcanism, as PNG is situated along the Pacific "Ring of Fire". The country experiences frequent and at times severe earthquakes, mudslides and tsunamis.

**Economy** Natural resources abound in PNG. However, getting to them has been difficult due to the rugged terrain, issues with land tenure as well as expensive infrastructure development. Around 85% of the population live on subsistence farming. Two-thirds of export income comes from mineral deposits such as copper, gold and oil. Estimates of natural gas reserves come to about 227 billion cubic meters. Construction of a liquefied natural gas (LNG) production facility planned by a consortium led by a major

American oil company could develop export of the resource in 2014. It is the largest project of its kind in the history of the country and could help the nation double its GDP. Transparency will be a challenge for the government for this and other investment projects planned. Other areas of development by the government include more affordable telecommunications and air transport. Prime Minister Peter O'Neill and his administration face challenges

RIGHT: Global map with location of Papua New Guinea  
BELOW: Location of Milne Bay on map of Papua New Guinea  
BOTTOM LEFT: Manta ray at cleaning station off Gonu Bara Bara Island



Internet users: 125,000 (2009)

**Language** Melanesian Pidgin serves as the lingua franca, English is spoken by 1%-2%, Motu is spoken in the Papua region; there are 715 indigenous languages—many unrelated.

### Health & Safety

Papua New Guinea has a high crime rate. Please check state advisory consular information before travelling to PNG. The degree of risk is very high for major infectious diseases; food or water-borne diseases include bacterial and protozoal diarrhea, hepatitis A and typhoid fever; vectorborne diseases including dengue fever and malaria are high risks in some locations (2004)

### Currency

Kina (PGK). Exchange rates: 1USD=3.03PGK; 1EUR=3.32PGK; 1GBP= 4.37PGK; 1AUD=2.15PGK; 1SGD=2.13PGK

### Decompression Chambers

Melanesian Hyperbaric Services Jacksons Airport, Port Moresby, Papua New Guinea  
Tel: +675 693 0305 or +675 693 1202  
Port Moresby Medical Service  
Tel: +675 325 6633 or +675 693 4444

EVACUATION INSURANCE is compulsory for some PNG dive operators, liveaboards and resorts. See DAN for information and travellers insurance: [www.diversalertnetwork.org](http://www.diversalertnetwork.org)

### Websites

Papua New Guinea Tourism  
[www.pngtourism.org.pg](http://www.pngtourism.org.pg)

that involve physical security for foreign investors, building investor confidence, increasing the integrity of state institutions, bettering economic efficiency through privatization of state institutions operating under par, and continuing good relations with Australia, which ruled PNG when it was a colony.

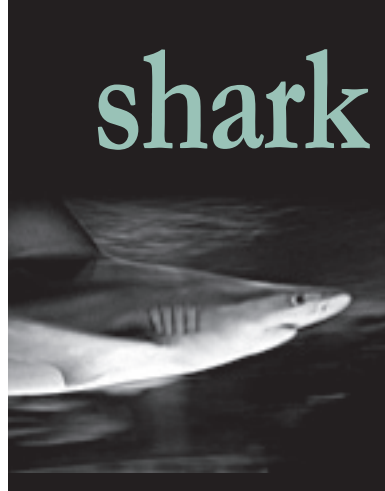
### Environment

Growing commercial demand for tropical timber is causing deforestation of the PNG rainforest. It also suffers pollution from mining projects and severe drought;

**Population** 6,552,730 (July 2014 est.) Ethnic groups: Melanesian, Papuan, Negrito, Micronesian, Polynesian. Religions: Roman Catholic 27%, Protestant 69.4%, Baha'i 0.3%, indigenous beliefs and other religions 3.3% (2000 census).







Text and photos  
by José Truda Palazzo, Jr.

## Brazil: “We want our sharks alive”

**Started in 2010 in Rio de Janeiro by a small group of volunteers, including dive industry operators and recreational divers, Divers for Sharks is a global coalition of more than 15,000 diving businesses, professional and recreational divers who are concerned about the conservation of sharks and rays, the protection of jobs and revenue generated by shark-and-ray-watching, and by these animals' role in maintaining a healthy marine ecosystem.**

Brazil is the proverbial paradise in the minds of many foreigners. It is blessed with the lion's share of the largest tropical rainforest on the planet, as well as vast expanses of other gorgeous landscapes comprising a rich variety of terrestrial ecosystems. Its coastline on the Atlantic Ocean is 8,000 kilometres long, and 3.6 million square kilometres of its waters fall under the country's jurisdiction. This natural richness is also reflected in its shark diversity. According to the last count, more than 150 different species of sharks and rays are found off its coastline.

### Overfishing still rampant

Most unfortunately, however, this unique natural wealth has been laid to waste during its more than 500 years of European settlement, and, more recently, by a succession of governments that could not care less about the future of our shared planet. The Amazon continues to be devastated by burning and logging at alarming rates despite the current regime's claims to the contrary. Other ecosystems, such as the Coastal Atlantic Forest and the once-majestic Highlands Araucaria forests, are down to vestigial remnants. The Brazilian oceanic

domains have been all but devastated by decades of rampant overfishing, and the continued refusal of authorities to establish a functioning network of marine protected areas. Since it is the fisheries mafias and the oil industry which traditionally finances political campaigns in Brazil, authorities let them do as they please.

### MPAs not implemented

Sharks and rays have suffered here as they did elsewhere in the world. Yet, while other countries have taken measures to reverse their decline, in Brazil,

the situation continues to worsen. The government is refusing to fulfill its promise to comply with the Aichi Targets of the Convention on Biological Diversity (to protect at least 10 percent of the marine environment under national jurisdictions), and therefore, new marine protected areas, which could safeguard important shark nursery areas, are not being implemented.

### Protections "suspended"

The industrial fishing tycoons continue to “mine” one species after another, though 22 sharks have already been classified as “Endangered” or “Critically Endangered” by the Ministry of the Environment. But the protection provided by this official list of threatened species has been “suspended” by order of these same tycoons.

The shark fin exports to Asia continue

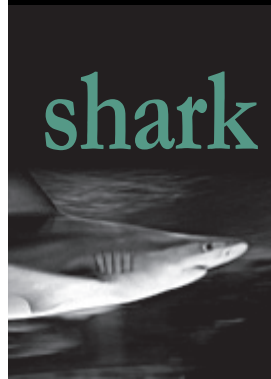
to be legal—they serve as a cover-up for a much larger, regular traffic of contraband which, whenever discovered, results in many tons of confiscated material.

### Militant campaign

Confronting this grim reality is Divers for Sharks—a vigorous campaign based in Brazil that is focused solely on seeking further protection for sharks and rays. Started in 2010 in Rio de Janeiro by a small group of volunteers, including dive industry operators and recreational divers, it has no formal structure, offices or budget, but has gained 112,000 followers on social media and a large capacity to publicize its initiatives.

These range from proposing new legislation and protected areas to stem the tide of shark and ray demise, to the publication of educational materials, and





# shark tales

school blitzes to educate children about sharks, to protesting the visit of the Chinese Prime Minister to Brazil.

## Lobby activities

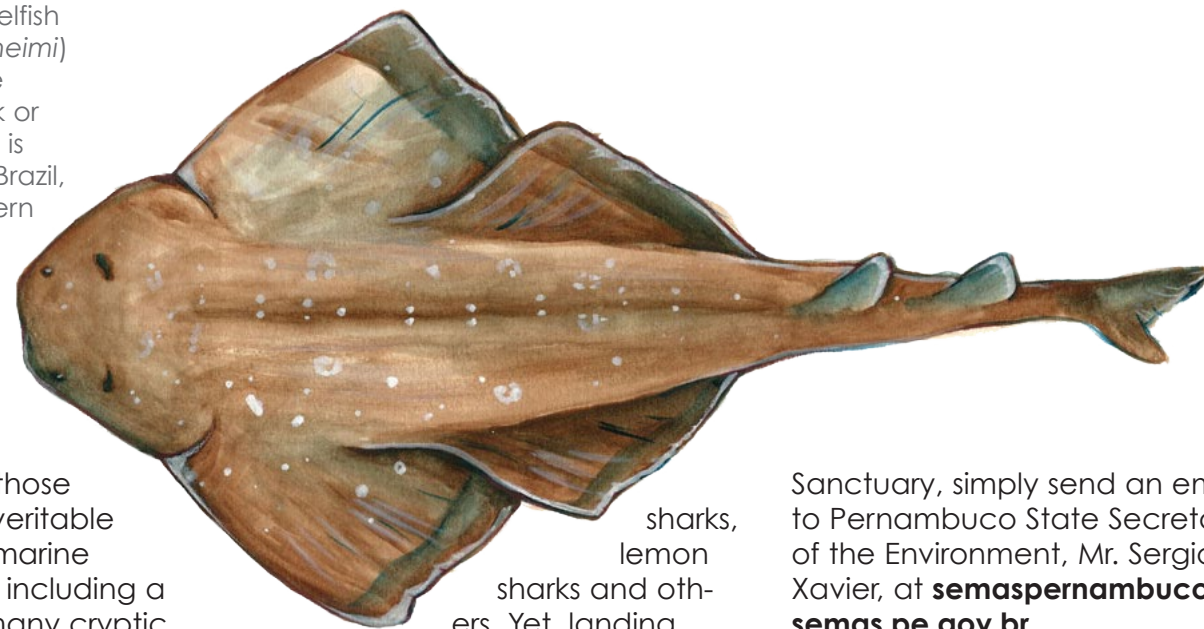
In the international arena, Divers for Sharks has tried to influence

the adoption of conservation measures from a dive industry perspective, through attending meetings of the CITES Convention on Endangered Species and the Convention on Biodiversity, and lobbying on behalf of the non-extractive uses of marine wildlife.

## New national park

Campaigns in which anyone from around the world can take part include two proposals to establish new protected areas for sharks and rays. One of these aims to create a new national park, called Albardão, in the extreme

Guggenheim's angelfish (*Squatina guiggenheimi*) is also known as the angular angel shark or spiny angel shark. It is found off southern Brazil, Uruguay and northern Argentina, where it breeds in shallow inshore regions



South of Brazil. In those stormy waters, a veritable treasure trove of marine species is hidden, including a nursery area for many cryptic shark and ray species. These include Guggenheim's angelfish (*Squatina guiggenheimi*), the spadefish (*Rhinobatus spp.*), plus better-known but still critically endangered ones such as hammerhead sharks.

Its protection as a national park would allow for the recovery of these and many other marine species, and its coastal stripe where migratory shorebirds rest could provide a new attraction for regional ecotourism, replacing with benefits, the meager revenue of dwindling fisheries.

## Paradox

The other proposal by Divers for Sharks aims at fixing a deadly paradox in the best-known offshore archipelago of Brazil—Fernando de Noronha. Declared a national park in 1988 and a World Heritage Site in 2001, this group of islands some 360km off Northeastern Brazil is the very last place in the country where you can still regularly dive with sharks—nurse

Landing and selling shark and ray meat is still allowed in the Fernando de Noronha archipelago which was declared a National Park in 1988 and a World Heritage Site in 2001.

sharks, lemon sharks and others. Yet, landing and selling shark and ray meat is still allowed there. Divers for Sharks is negotiating with the State Government of Pernambuco, which has authority over the islands, to declare the archipelago the first shark and ray sanctuary of the South Atlantic, thus banning these practices and making it possible to promote it as the shark diving destination in Brazil.

Other Brazilian activists are also supporting these initiatives, but, as often happens in developing countries, international opinion counts a lot, and therefore the campaign coordinators are asking for help from divers and ocean lovers worldwide in order to speed up the creation of both protected areas.

## Support the proposal

To learn more about the Albardão National Park proposal and to send your support message, you can go to [www.redeperouc.org.br](http://www.redeperouc.org.br). To state your support for the proposal of the Fernando de Noronha Shark and Ray

Sanctuary, simply send an email to Pernambuco State Secretary of the Environment, Mr. Sergio Xavier, at [semaspernambuco@semas.pe.gov.br](mailto:semaspernambuco@semas.pe.gov.br).

The dive industry, with its millions of customers and professionals around the world, are increasingly alarmed by the degree of ocean degradation that is being witnessed by divers, impacting the very basis of our activity and threatening to put entire coastal communities out of work. Dive sites with degraded coral reefs, devoid of sharks and other fish, are a disaster for our industry, and this is what overfishing and climate change are leaving behind. It is time for policy makers to act to protect them. ■

*José Truda Palazzo, Jr., is the CEO of the marine policy consulting firm Truda Palazzo & Associates and co-founder of Divers for Sharks.*



*Some of the documents distributed by Divers for Sharks at the aforementioned treaties are posted at: [Diversforsharks.com.br](http://Diversforsharks.com.br)*







## Sharks and longline fishers occupy the same hotspots

Catches of many highly migratory fishes, including oceanic sharks, remain largely unregulated with poor monitoring and data reporting, and it is largely unknown where they overlap with fishers. With the help of satellites, six shark species have now been tracked across the North Atlantic, showing that pelagic sharks occupy predictable habitat hotspots that had an 80 percent overlap with longline fishing vessels from Spain and Portugal.

### High overlap

Regions of high overlap between oceanic tagged sharks and longliners included the North Atlantic Current/Labrador Current convergence zone and the Mid-Atlantic Ridge southwest of the Azores. Areas of highest overlap between sharks and fishing vessels show persistence between years, suggesting current hotspots are at risk, and arguing for introduction of international catch limits. ■ SOURCE: PNAS [OPEN ACCESS]

## Do sharks sniff their way?

Many sharks are known to make epic journeys. Great sharks migrate from Australia to South Africa or up and down the US East Coast, and tiger sharks roam over big distances. But how do they go about navigating? It turns out they may follow their noses.

Sharks are known for their keen sense of smell, but mostly as it relates to feeding. But it has also been hypothesized that the primary function of olfaction is not the detection and discrimination of odors per se, but rather decoding and mapping odor distributions in space and time for the purpose of navigation.

To test this hypothesis, a team of scientists led by Andrew Nosal, a post-doctoral researcher at the Scripps Institution of Oceanography and the Birch Aquarium in La Jolla, California, captured several dozen leopard sharks—a small species found along

the coast from Washington State to northern Mexico. Leopard sharks are endemic to the western coast of North America, where they form seasonal aggregations in shallow, sheltered water, and feed mostly on benthic invertebrates and fishes. However, leopard sharks also make occasional forays into the pelagic environment, for example, crossing the San Pedro Channel between Santa Catalina Island and mainland California, which is 32km wide at its narrowest point and approximately 800m deep.

### Stuffed nostrils

After blocking some of the animals'

nostrils with cotton balls, the leopard sharks were transported from a near-shore aggregation site off La Jolla, California—up to 17km offshore where bottom depths exceeded 500m—released, and manually tracked using acoustic telemetry. It was hypothesized that these sharks would swim toward the nearest point on shore as their primary goal, so as to minimize their time in the hostile open ocean, which lacks their typical food and shelter from predators.

The study showed that the group of leopard sharks, which had their nostrils stuffed with cotton balls, "appeared

lost," meandering aimlessly and swimming more slowly than those in a control group that could smell freely.

Those with unplugged nostrils "took very straight paths" toward home. However, even the sharks with plugged nostrils made it partway back to shore before their tracking devices fell off, which leaves other scientists unconvinced. Animals that couldn't smell a thing still turned toward the beach, which "suggests something else is really guiding them," said Jayne Gardiner, a sensory biologist at the New College of Florida. ■ SOURCE: PLOS ONE

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SCOTT JOHNSON

(File photo) Sand tiger sharks are nocturnal feeders. During the day, they take shelter near rocks, overhangs, caves and reefs, often at relatively shallow depths where divers frequently can encounter them. Despite the sand tiger shark's fearsome appearance and strong swimming ability, it is a relatively placid and slow-moving shark, with no confirmed human fatalities.

## Sand tiger nursery discovered in New York

**Researchers from New York Aquarium discovered a nursery ground for the sand tiger shark in Great South Bay, an estuary on Long Island's south shore.**

The team received the first indications of a potential nursery ground in Great South Bay in 2011 when one of the scientists received a picture of a dead juvenile sand tiger shark from one of the marinas. Follow-up conversations with local anglers and boaters revealed that people had been catching these small sharks in the bay for years. The sand tiger shark can be found in the Atlantic, Pacific and Indian Oceans, and in the Mediterranean and Adriatic Seas, but only a handful of sand tiger shark nurseries have ever been identified.

In the Western Atlantic Ocean,

it is found in coastal waters from the Gulf of Maine to Florida. New York researchers spent four years collecting data on sharks in local waters using acoustic tags, which allowed them to monitor the sharks remotely. From that monitoring, they realized a number of sharks kept returning to the bay, showing "site fidelity".

The Great South Bay shark nursery provides juvenile sand tiger sharks ranging from several months to five years in age with a place to feed and grow. Data gathered from the sharks' movements are helping scientists learn more about the migratory behavior of sand ti-

ger sharks and their habitat needs.

The discovery of the Great South Bay shark nursery in particular is important because the sand tiger shark has been heavily depleted by fishing and is listed as a "Species of Concern" by the US National Marine Fisheries Service. Fishing for sand tiger sharks has been prohibited in state and federal waters since 1997.

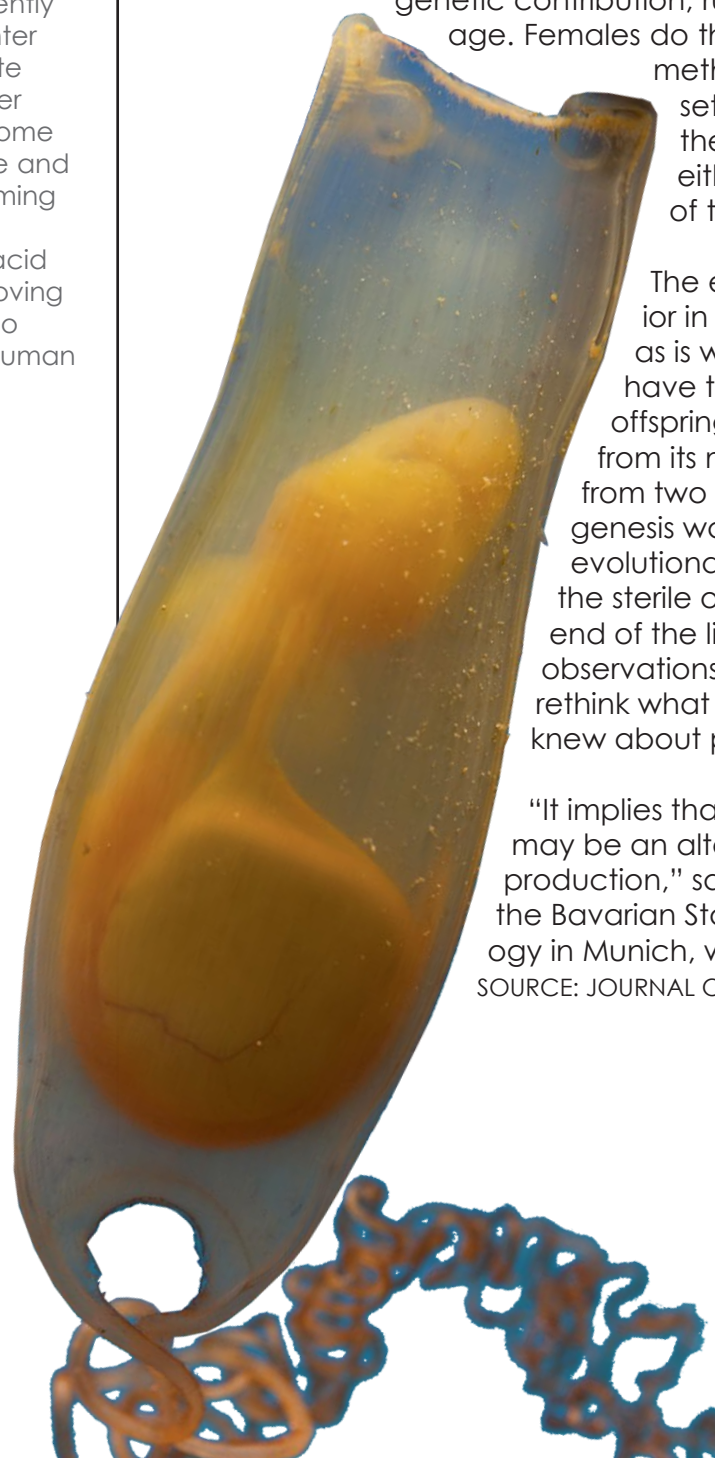
There are still many unknowns about the nursery. Scientists are not sure how much of the bay is used by these sharks, the number of young sharks in the bay each summer, or what the sharks are eating. ■

## Shark virgin births can go on for generations

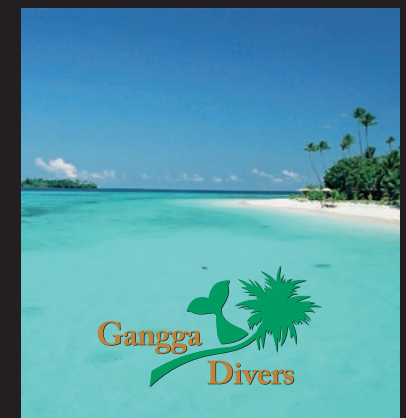
For the first time, second-generation facultative parthenogenesis—also known as virgin births—has been observed in a vertebrate species, the whitespotted bambooshark. In other words, a shark who was itself the result of virgin birth was also able to produce offspring without copulating with a male. The details of this process are not well understood, but genetic fingerprinting has shown that the pups had no paternal genetic contribution, ruling out sperm storage. Females do this by using one of two methods to add an extra set of chromosomes to their eggs, producing either full- or half-clones of themselves.

The extent of this behavior in the wild is unknown, as is whether other species have this capability. As the offspring only inherits its DNA from its mother, rather than from two parents, parthenogenesis was believed to be an evolutionary dead end, with the sterile offspring marking the end of the line. However, these observations are making scientists rethink what they thought they knew about parthenogenesis.

"It implies that parthenogenesis may be an alternative to sexual reproduction," said Nicolas Straube of the Bavarian State Collection for Zoology in Munich, who led the study. ■  
SOURCE: JOURNAL OF FISH BIOLOGY.



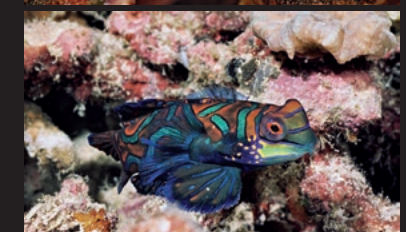
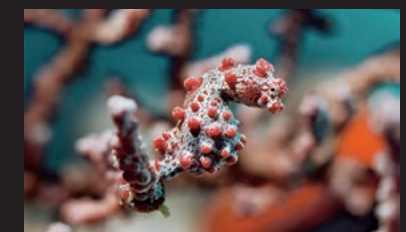
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Diver on the HTMS *Sattakut*.  
The deep black in this image was used to accentuate the mystery within the shipwreck. Exposures with silhouettes make for bold compositions.

Text and photos by Tony Myshlyaev

**Light is the most important thing for all photographers. It is easy to get excited about a critter and start firing away without much consideration for lighting. However, it is the little extra things that you juggle beyond pointing your camera and clicking the shutter that makes your style unique.**

When it comes to the discovery of photography, every individual's story is unique. It pulls every person in with a slightly different appeal. In the case of land photographers, the many styles will attract all walks of life. Landscape photography may be tailored to a photographer fonder of solitude and adventure whereas portraiture could be geared towards a socialite whose charisma may evoke the right moments from their subjects in front of the camera. There is a vast range of genres.

Underwater photographers share a special appreciation for marine life.



# The Science of Lighting

Often, that is the reason most of them pick up a camera: to begin capturing unique sightings and experiences. The focus of the underwater photographer is to get a nice clean shot in a finite moment of opportunity—simple enough.

Nevertheless, time and time again, common errors arise with underwater photography enthusiasts. With so much additional obligations underwater, it is easy to shift focus to buoyancy, depth, No-Decompression-Limits (NDLs), currents,

temperature and so on.

What about the most important thing in all types of photography? It is light, of course. Underwater photographers often take less notice of it because of the sheer number of distractions inherent in

the act of scuba diving.

As a photographer, light needs to be the primary focus. Without knowing how to utilize it to its full potential, one begins to use repetitive lighting techniques for no reason other than because “that







To complement the eerie feeling of the murky shipwreck (left), a low-key exposure was the best choice. Although most of the image is dark, there is a lot of detail, compared to the image on the previous page; Balancing natural light with strobes (right) can be difficult with calm seas and a bright sky above. Even at the lowest ISO and maximum power, the strobes may struggle to overpower the intensity of the natural light. This is when applying the inverse square law by getting the strobe as close as possible will help control the overexposed sun ball.

both the exposure of natural light and the strobe, whereas the shutter speed will only control the exposure of natural light. How bright the natural light is in relation to the strobe light will determine the ratios of the exposure.

### Expression and mood

Lighting can be an expressive language. A variety of moods can be achieved based on the characteristics of a light source. The language is prac-

tical in theory, but as always, putting theory to action tends to be more difficult. Like with all languages, the more one practices, the more fluent one becomes. This is a great way to diversify a portfolio because skillfulness will

subject needed more color and light."

Are the shadows meant to be pure black? Or was that an accident? Was the sun meant to make the whole top of the image pure white? Or is that to be darkened in Photoshop?

For photographers who are looking to excel, I recommend that they do as much of the work in-camera as possible. Correcting exposure in post-production software can degrade the quality of the image.

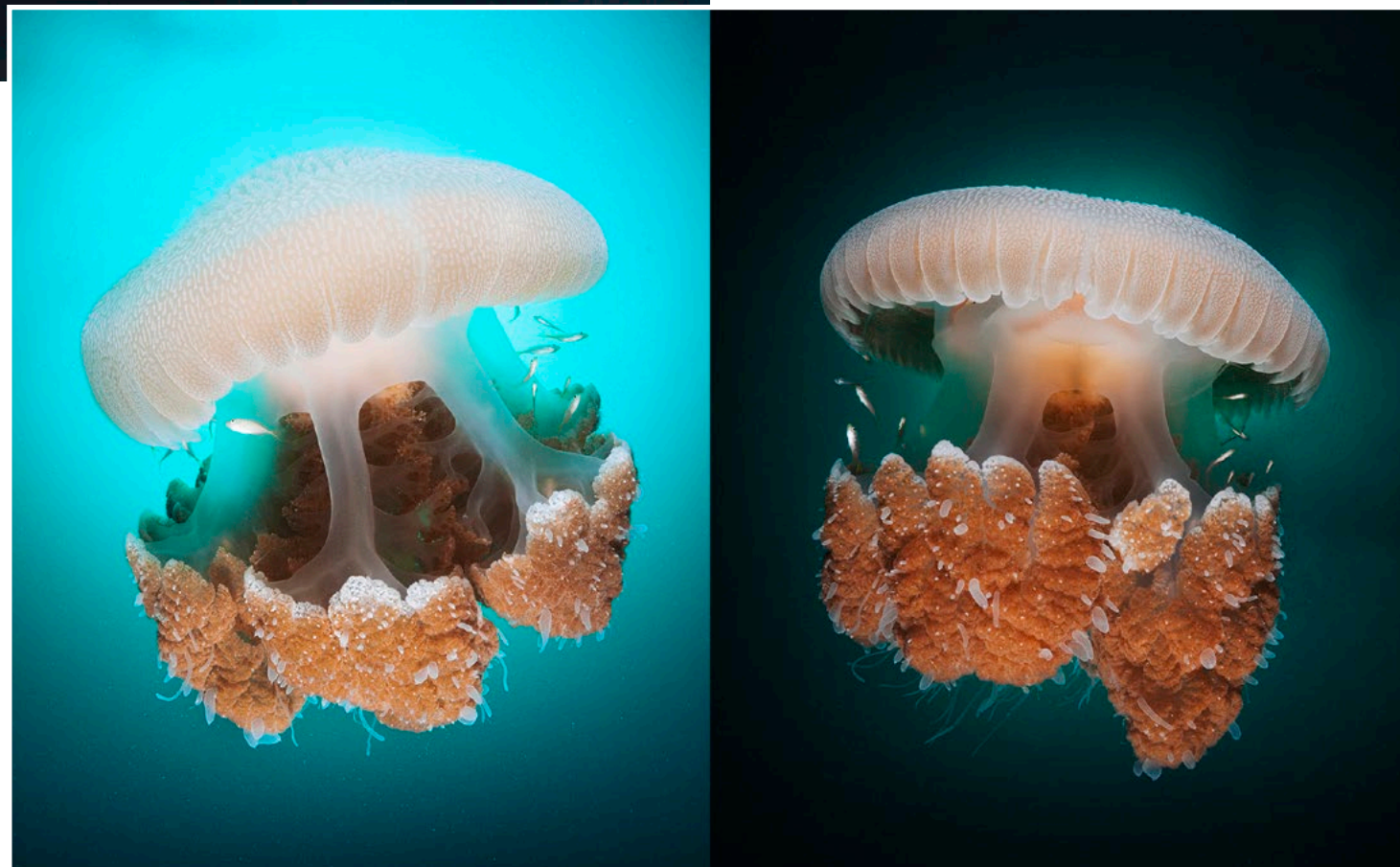
### Strobe techniques

When using strobes in the water, it is important to remember what the three camera settings affect. A low ISO is a best friend in keeping a high dynamic range. The dynamic range is the camera's ability to capture details in the darkest and brightest areas of

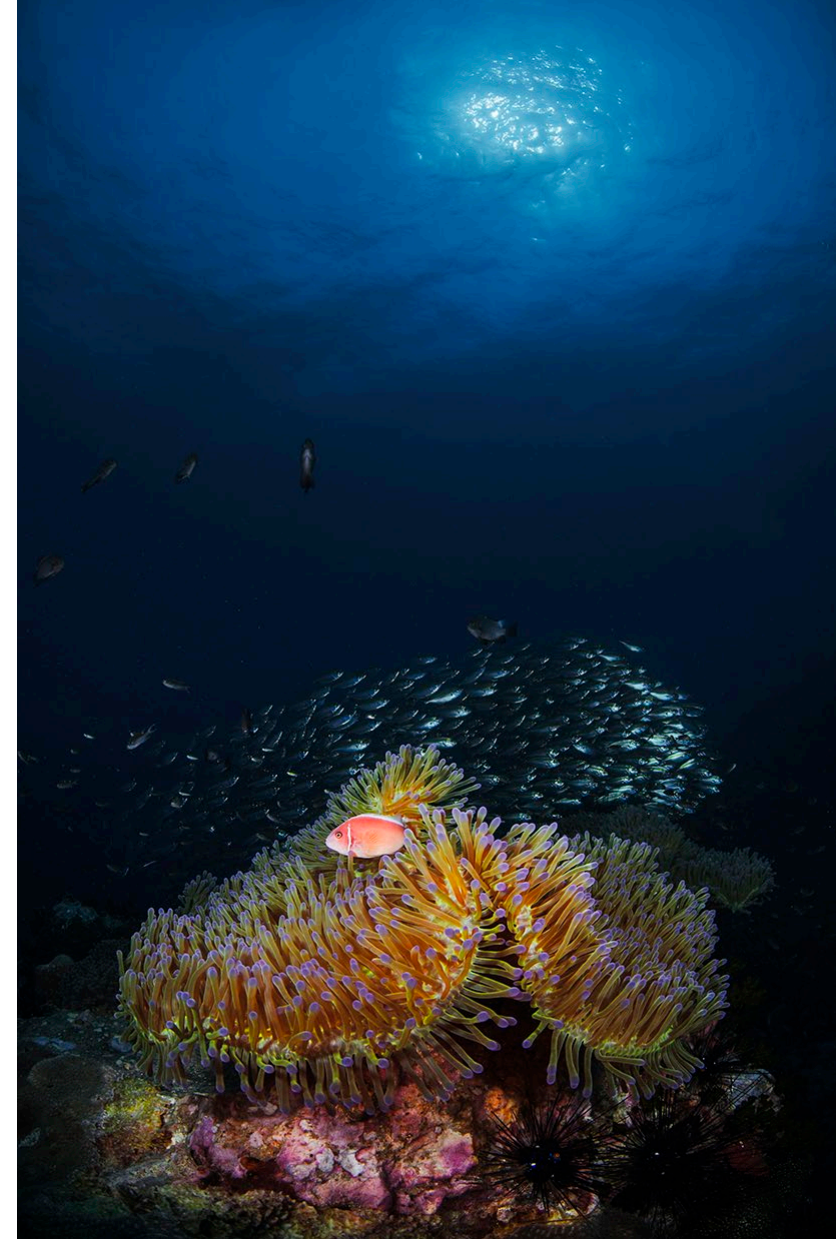
the exposure. Light below the surface falls off abruptly but it is important to retain as much information in the exposure as possible.

When shooting wide-angle, it is common to have an issue with the surface looking too bright or even going pure white in the image. It is best to avoid exposures with pure whites or pure blacks unless there is a specific aim.

The relationship of aperture to shutter is vital in helping understand strobe techniques. The aperture will control



High key versus low key. The above images were taken just moments apart, yet one is much brighter than the other. The light is much more dramatic in the image on the right. By controlling the ratios, it is possible to manipulate the mood.



always produce better images than expensive gear.

So what kind of mood should the image have? All lighting is broken down into two categories: high key and low key. High key refers to bright exposures that complement cheerful or light moments. Low key refers to

exposures that utilize more shadows and tend to be more dark and moody images. In real life, nothing is black and white, and thus, there are ways to control the degree to which the photograph is high key or low key.

### Five characteristics

There are five characteristics of a light source that affect the feeling of an image: intensity, quality, distance, angle and color. All of them push a photo in the direction of being a little more high key or low key.

**Intensity.** Firstly, intensity plays a major role. It is fundamental in getting the desired exposure and accurate colors. Whether





On a cloudy day (left), the natural light is less intense. Often without having to push the strobes to their limit, an even exposure can be easily achieved; The image (right) was shot with reverse ring macro. Having such a thin focal plain meant a wide aperture. Even at the lowest power and ISO, the strobe was overexposing the image. Applying the inverse square law and moving the strobe away from the subject doubles the distance and halves the intensity of the light.

it travels the more power is lost. This is exponentially important underwater where the density of water absorbs light at a profound rate.

There is another important reason to consider distance—a principle based on the inverse square law that states: double the distance, half the power. So a subject positioned one meter (3.2 feet) away from the light source is half as intense as it could be when positioned

the goal is balancing the lighting to be equal to that of the sun above, or to blacken everything in the background entirely, there will always be a need to adjust the power of the light source in order to attain optimal exposure.

**Quality.** The quality of light determines how hard or soft the light is. Hard light gives hard and defined shadows that complement a more dramatic and edgy look. Soft light has very soft shadows that do not have defined lines but rather transition by a gradient. Soft light is suitable for gentle moments. This is strictly controlled by the size of the light source.

The larger the light source in relation to the subject, the softer the light becomes. So a strobe would be soft light when used up close on a hairy shrimp that is a mere speck in comparison but

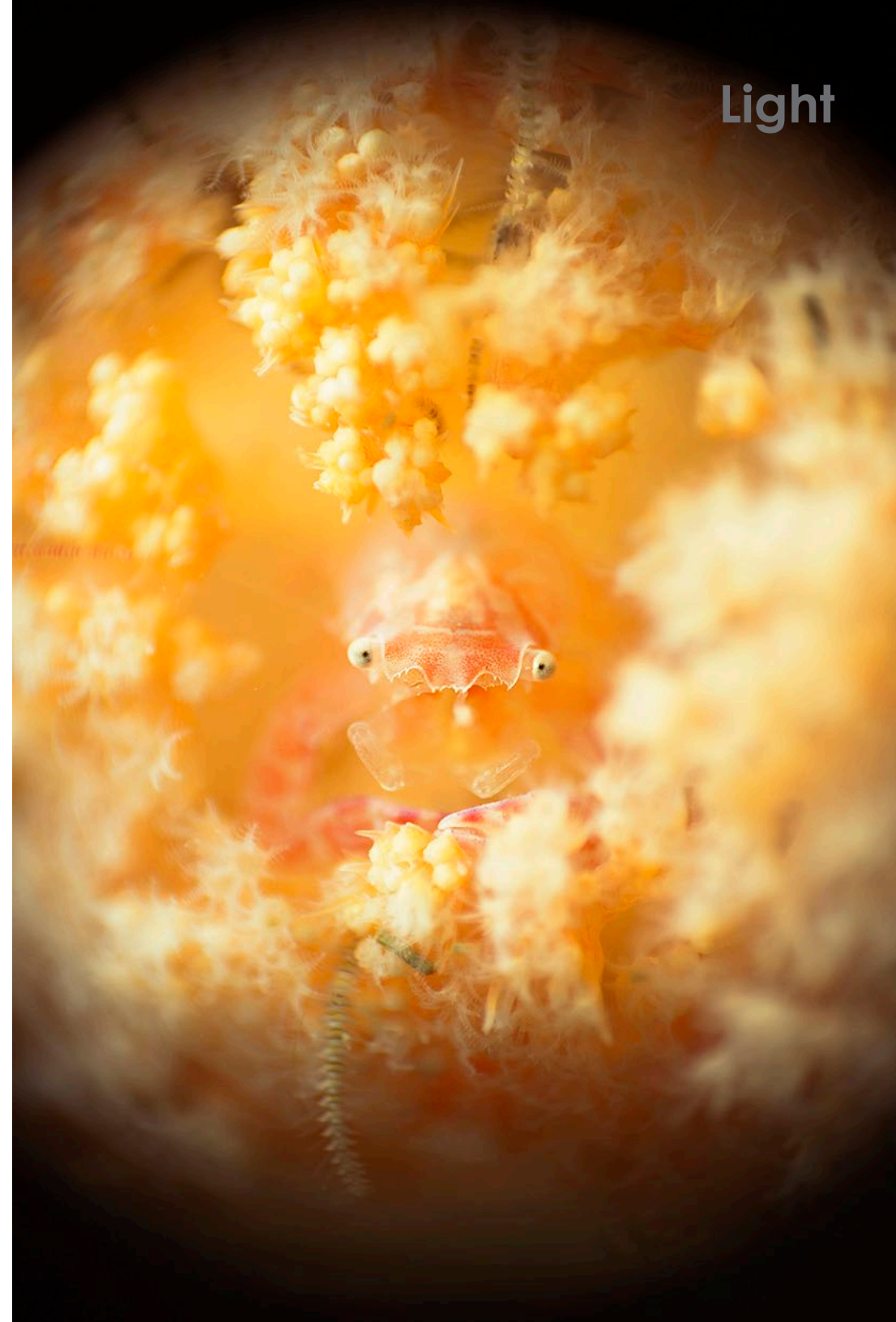
a hard light to a giant grouper that is larger than the light source itself.

**Distance.** The distance of the light source from the subject works hand in hand with both quality and intensity. The farther away the light source is, the smaller it becomes in relation to the subject, thus creating a side effect of hard light.

Of course, the intensity of the light is affected by how far it must travel; the farther



A cute five-lined coral goby hardly calls for dramatic lighting. A high key exposure such as this will resonate better with the chosen subject.



half a meter (1.6 feet) away and only half of that when positioned at a quarter of a meter (0.8 feet) away and so on.

When observed, the change in intensity of light becomes more gradual as the subject is placed farther from the light source. So if a photographer wanted to light a large scene evenly, it would

be prudent to put the light source farther away (and turn up the power to compensate for lost intensity). If it is a bright and sunny background that needs to be underexposed, the strobes should be brought as close as possible in order to take full advantage of the strobe's maximum intensity. It is up to the photographer to





The angle of the light source creates dramatic shadows giving a unique perspective to this golden goby on a clamshell.

decide what is the priority for their image.

**Angle.** Another important characteristic is the angle at which the light source is positioned. Shadows are important for creating a sense of depth in a two-dimensional image. As the angle

of the light, away from the lens, increases, the more apparent the shadows become. The more shadows there are, the more dramatic the lighting begins to look. This is why on-camera flashes tend to make images look flat: the light source is at the same angle as the lens, reducing the amount of



In relation to the catfish (above), the strobe is an enormous stadium light. Positioned at half a meter away, it lights the entire scene evenly; On a clear and calm day (right), when the sunlight can penetrate efficiently through the surface of the water, it is possible to get accurate colors with natural light while still maintaining a distance. However, colour deviation is inevitable and can be noticed taking place in the background.

shadows and making the image look flat.

**Color.** The last characteristic in the list is greatly emphasized in underwater photography. This one challenges underwater photographers on a whole other level

beyond what land photographers face, and it is, of course, color.

Lighting an image warmer (more yellow) or cooler (more blue) can also influence the mood in obvious ways. Whether working with natural light or strobes, it is important to remem-



Having the light source positioned so close to the subject retained most of the light intensity, underexposing the background and eliminating distractions.



ber that water acts as a color filter. The greater the depth, the more abruptly warmer colors are filtered out. This also applies to horizontal distance. That is why it is important to eliminate the water column between the lens and the subject—to get more accurate colors.

When using natural light, I rec-

ommend that you use Magic Filters to compensate for the color deviation that water creates. White balancing and natural light can allow retention of color to a greater distance than a strobe. However, a strobe gives more control.





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### Application

So what does all this mean? How does one apply this information? That is like asking, "What am I supposed to say next?" These are merely some of the rules of the language of light, but expression is up to the individual. This is the fun and creative part of being a photographer.

Everyone has their own bag of tricks—lighting techniques that are tried and true. Breaking out of a routine is hard. Humans are creatures of habit and will opt for

what they know rather than take a chance on something new. But it is important to ask: "Am I a diver with photography gear or a photographer with dive gear?"

Learning all of the information is quicker done on land than down below where nitrogen slows thought. Learning light theory does not happen overnight. It takes months and months of practicing every day to have the information sink in on a subconscious level. Often, adding such information can cause one to feel



like we become worse before we become better. This is a normal process of reconfiguring and applying a sophisticated level of understanding.

Once it all sinks in and begins to make sense, the added benefits are worth the effort. The ability of foresight is gained. Being able to picture an image in the mind's eye and figure out the lighting requirements before finding the subject in nature allows for efficient and accurate results.

Photography is about the subtleties, and it is much easier to observe these subtleties with a greater understanding of light. The characteristics of light can be observed in every image. By spotting and distinguishing each

This octopus was moving in and out of crevices making it difficult to set up a specific lighting technique. It was best to play it safe and light the whole scene evenly making it easier to capture the moment.

characteristic, a student is able to reaffirm his or her own knowledge.

Certainly, nobody is perfect, and there is no such thing as the perfect photograph. Applying what is learned is the only way to improve. However, the rules are merely a guideline. After learning and applying them, break them! For example, create a high key image with a dramatic or moody subject matter, or vice versa.

Anomalies exist and often pave the way for some of the most profound images, but everyone must begin with a good foundation. Having good gear, but no understanding of its potential, is unacceptable. ■

*Tony Myshlyaev is a formally trained Canadian underwater photographer based in Koh Tao, Thailand. More of his content and prints are available at [www.tony-myshlyaev.com](http://www.tony-myshlyaev.com).*

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## Seacam for Sony A7II series

At Boot, we got to handle Seacam's new housing for Sony's game-changing A7II series. Built to the same exacting standard as the existing range housing for DSLRs, this compact housing is Seacam's first foray into mirrorless cameras and the first to be made to house camera brands other than Nikon and Canon since a couple for Minoltas in the 1990s. Most notable was the absence of a viewfinder but most controls—and there are quite a few on the Sony bodies—are accessible. The housing weighs 1,600g (3.5 pounds) and is neutral in water depending on ports. It is depth-rated to 80m. More details will follow in an upcoming review. [Seacam.com](http://Seacam.com)

## Portable SSD

Samsung's Portable SSD T3 drive holds 2TB of data, and with 450 MBs read or write speeds, it is up to four times faster than traditional external hard drives. Yet, it only weighs 51 grams and its dimensions are roughly the size of a business card. A strong, shock-resistant metal case and internal support frame handles the daily wear of being moved from place to place. [Samsung.com](http://Samsung.com)



## Leica goes underwater ...ish

Branded as "a shockproof, dust and water sealed expedition camera", perhaps the rugged Leica X-U is not a dedicated underwater camera. Nonetheless, the specs state that the sealed body is not only shock and dustproof but also waterproof to 15m (60 ft) and good for dives up to 60 minutes. The fixed fast 23mm lens (35mm equivalent in 35mm format) is provided with an "underwater protection filter". [Us.leica-camera.com](http://Us.leica-camera.com)



## Strobe and light "symbiosis"

First seen at the recent DEMA, the SS-2 from I-Torch pairs a dive lamp, or focus or video light, with a strobe. Having a video light and strobe in one body carries the advantage of being able to use them both separately or together. The LED head can be used as a stand-alone video light and is upgradeable by the user anytime when newer LED heads become available. [itorch.ca](http://itorch.ca)

## Nikon Keymission 360

GoPro killer? In early January, Nikon announced its entry into the action camera market by introducing its Keymission 360. Labelled as a rugged camera capable of recording true 360-degree video in 4K UHD and designed to be easy to use and withstand the elements—and ready to stand up to dust, shock and low temperatures—divers will take note that the specs state a 30m (100ft) depth rating. [Nikonusa.com](http://Nikonusa.com)



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## Sealife Micro 2.0

Having no doors or openings that could possibly leak, what could go wrong? Sealife's aptly named Micro 2.0 camera is permanently sealed and comes with 64GB of onboard memory, high capacity internal battery and Wi-Fi, negating the need for memory cards, batteries, O-rings or maintenance. Charging the camera and transferring files is simple through the waterproof USB port. A full charge will run the camera for approximately three hours. Images are downloaded wirelessly using the free Sealife Micro Cam App available for Apple and Android devices. The 16MP CMOS image sensor is provided by Sony. The camera is capable of both high resolution stills and recording full HD video at 1080p / 60 frames per second and 1296p / 30 fps. [Sealife-cameras.com](http://Sealife-cameras.com)



## Wi-Fi Mobile Storage

Saving and backing up days of shooting while on the road is an issue most traveling underwater photographers have to contend with. Enter Western Digital's Passport Wireless external harddrive, which is portable, wireless and equipped with a SD card reader and USB 3.0 interface. The drive can be connected to up to eight devices at the same time, and its built-in, rechargeable battery provides up to six hours of continuous video streaming and up to 20 hours of standby time. In addition, the Passport Wireless doubles as a Wi-Fi hub to share an Internet connection with multiple devices. The drive is compatible with both Windows and Mac and comes in two models with 1TB and 2TB capacity. [Wdc.com](http://Wdc.com)



## Carbon arms from Inon

As airlines' luggage allowance keep getting tighter, every ounce saved counts. Inon's Carbon Telescopic Arm series, which was released in January 2016, is made of ultra light yet super durable carbon fiber, offering telescopic arm sections that can adjust to any desired length. The adjustable arm sections can be lengthened or shortened by loosening or tightening two lock dials. By collapsing the Carbon Telescopic arm when not in use, it makes the camera system more compact and comfortable to carry both on land and underwater. The arm comes in three different lengths weighing 211, 238 and 262 grams respectively.

[Inon.jp](http://Inon.jp)



## LenzO for iPhone

Putting an iPhone in an underwater housing is nothing new, but the LenzO for iPhone 6 plus/ 6S, which we got a closer look at, came across as sturdier and more finely machined than most of the lot. Perhaps unsurprising, as the founder of the manufacturer Valstech was also behind the renowned Aquatica range of underwater housings. The LenzO has interchangeable ports, although, at its debut at the BOOT expo in January, only the dome port (pictured) was available. The dome lens is designed for use both above and underwater and provided an antireflective coating and hood to prevent flares. The controls were accurate, easy to use and felt like a natural extension of one's digits. The housing is depth rated to 100m (330 ft). [Valstech.com](http://Valstech.com)





# Harriet Mead



## P O R T F O L I O







Top view of *Mole Grip Lobster*, by Harriet Mead

*X-RAY MAG:* Tell us about yourself, your background and how you became an artist.

HM: Since I was a child, I've always known I was going to be an artist—it's amazing that the naive child turned out to be right! My father was an ornithologist and my mother is artistic but also very interested in the natural world, so it was inevitable that I would be inspired by wildlife.

I studied sculpture at art college and have been making sculptures ever since.

*X-RAY MAG:* How did you develop your style of sculpture, working with found objects? How did you come to the theme of marine life in your work?

HM: I tried various techniques at art college and really enjoyed the

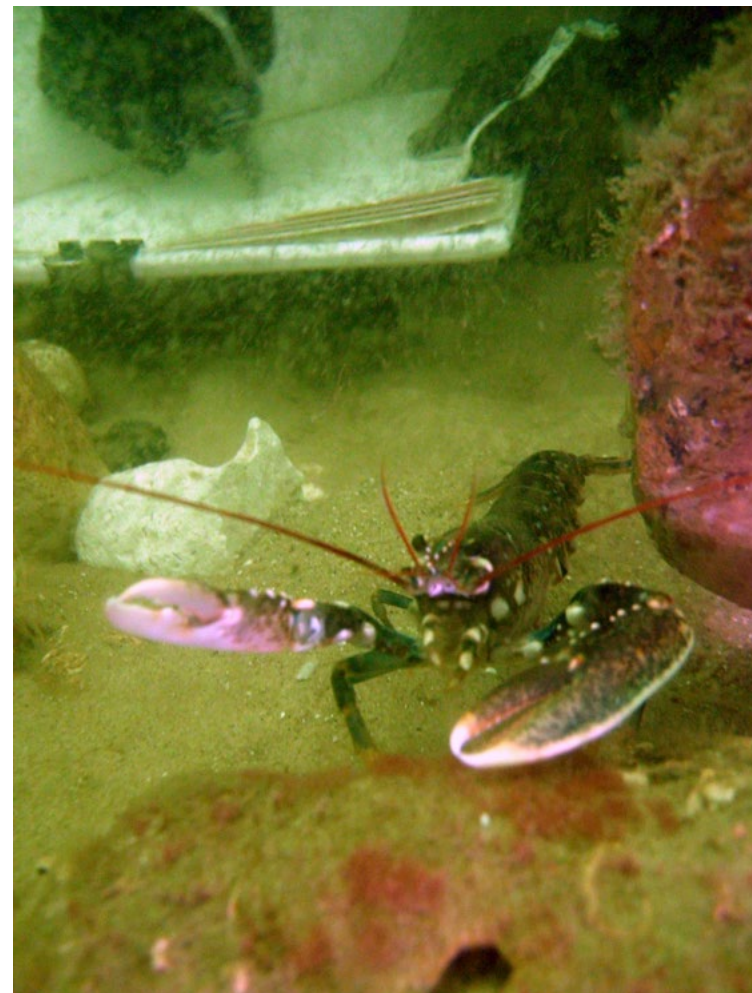
## Harriet Mead

freedom of expression that welding allowed. I could make very strong structures very quickly using steel. When I left college, I saved to buy a MIG welder and then started using scrap, as it was easy to get hold of. It was a natural progression to use more and more found objects in my work until they became the only source.

I love using steel, as it allows me to use the strength of welding to

Text edited by Gunild Symes  
Photos courtesy of Harriet Mead and Jody Lawrence. All artwork by Harriet Mead

**British artist Harriet Mead sculpts marine life out of found objects, capturing not only their curious forms but also a nearly life-like vitality pulled out of recycled metal parts we might recognize as common household objects we use in daily life or find in the tool shed out in the backyard. *X-RAY MAG* interviewed the artist to learn more about her work, insightful perspectives and creative process.**



The artist makes a sketch of a lobster while on a dive for the UK's Wildlife Trust.  
PREVIOUS PAGE: *Padlock Crab*, by Harriet Mead. Welded collage of found metal objects, 11.5 x 33 x 26cm



*Mole Grip Lobster*, by Harriet Mead. Welded collage of found metal objects, 55cm long







*Padlock Cuttlefish*, by Harriet Mead. Welded collage of found metal objects, 6.5 x 18 x 9cm

## Harriet Mead

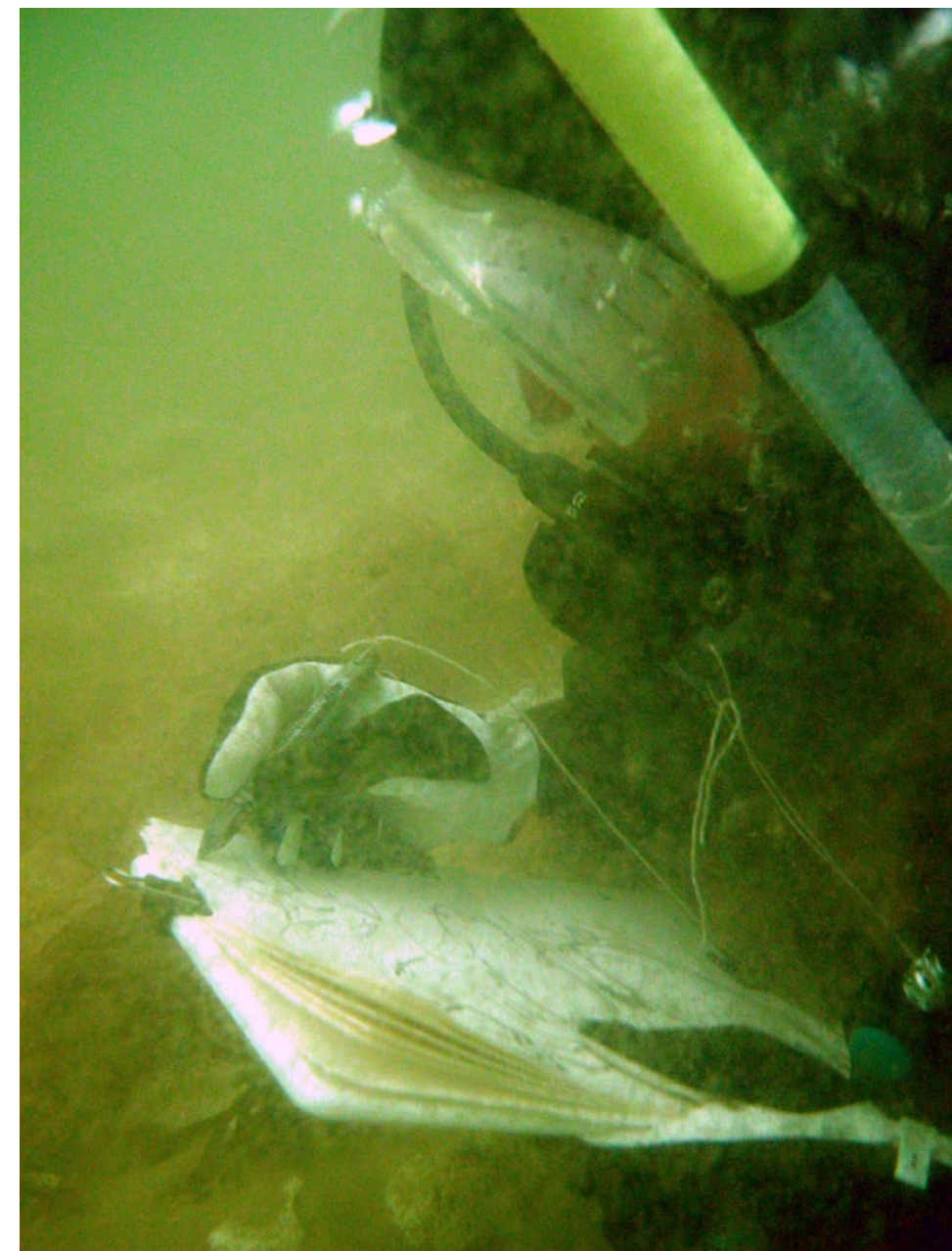
*you had your favorite experiences?*

HM: I have always wanted to learn to dive, so the Wildlife Trusts Undersea Art Award was an ideal opportunity. The Wildlife Trust paid for me to take my PADI course, and then I made three dives off the North Norfolk coast.

I used a heavy grade watercolour paper and a graphite stick to make

sketches, but my dive buddy had to help me find the sketchboard that was floating above me and tied to my belt!

It was very cold and difficult to draw with neoprene gloves on, but considering it was my first-ever dive at sea and I was a complete novice, I think I did pretty well. In fact, concentrating on drawing meant that I didn't worry about the diving.



Mead sketches marine life while on a dive for the UK's Wildlife Trust

express a lightness in the sculpture. For example, I can make a running hare that has only one point of contact (a front leg, for example) which would be impossible in stone or wood.

*X-RAY MAG: What is your artistic method or creative process?*

HM: I just weld things together! In many ways, it's just a 3D collage, and I am using the individual items purely for their shape. I am very careful to use items to express the form and structure of the subject so that there are no parts that look out of place. I want the eye to flow around the work, not get upset by an incongruous right angle that has

no relevance to the muscle or skeleton of the creature.

I don't draw or plan the work. I just start with the head and go from there, placing different things against one another until they 'click' into place. There's no point in drawing the sculpture beforehand, as the scrap items dictate how the animal will stand or look. I enjoy leaving

empty spaces in pieces, as often the negative space is as important as the filled areas.

*X-RAY MAG: What is your relationship to the underwater world and coral reefs? Are you a scuba diver or snorkeler and how has this influenced your art? In your relationship with reefs and the sea, where have*





*Tin Snip Dragonet*, by Harriet Mead. Welded collage of found metal objects, 16.5 x 48 x 17.5cm

whilst allowing people to make a living from it.

Part of the reason behind the Wildlife Trusts sponsoring an artists to learn to dive was that the artists could interpret what they saw and bring a different perspective to the habitat in order to engage a new audience and get people excited by what lives beneath the waves. It also linked in with our government designating Marine Conservation Zones where areas are protected to allow fish and other marine creatures to have a safe nursery area so that fish stocks can be regenerated.

Sadly, only a small proportion of the proposed MCZs were actually approved but the Wildlife Trusts

along with other conservation organisations continue to campaign to have more set up.

*X-RAY MAG: What is the message or experience you want viewers of your artwork to have or understand?*

HM: To celebrate the natural world in all its forms. Wildlife art is not all about big photo realistic paintings of tigers; I want to celebrate the small things and make people think about the way that I have made them.

*X-RAY MAG: What are the challenges and/or benefits of being an artist in the world today?*

## Harriet Mead

HM: One of the big benefits is social media and the internet. Many, many more people see my work online than I could have ever imagined when I first started. I enjoy getting feedback from people all over the world, as for me, it's not always about the sales, it's as much about people enjoying my work and thinking about the creature in a different way.

I do get a bit bemused sometimes when people share my work with other artists, or even just a mate of a welder asking him or her to make one, as if I just throw them together!

I also think that wildlife art does get bogged down with enthu-

Sadly, I haven't had time to go diving again since then, but I have some of the kit and hope to go out again in the future. It was amazing to experience the underwater world, and as I am fascinated by wildlife, it was a privilege to see the creatures in their own space.

I also think that it was a great experience to dive a 'dull' area off the North Sea coast. From land, the sea looks featureless, but once I got underwater, I was amazed at the amount of creatures that I saw.

I strongly believe that seeing wildlife shouldn't be considered as a destination. People visit particular places to see exciting species or visit beautiful reserves or countries, but sometimes you should take time to look at the wildlife on your doorstep. If you look closely, woodlouse is a wonderful thing and is as fascinating in its own way as an elephant!

*X-RAY MAG: What are your thoughts on ocean/freshwater conservation and coral reef management and how does your artwork relate to these issues?*

HM: I'm no expert, but I think that unfortunately, worldwide, through history, our oceans have been treated as a vast dumping ground, whether intentionally or unintentionally. Their very size means that because they are so vast and currents move around from sea to sea, one nation's pollution becomes a problem that affects far more countries than where it first originated.

As a resource, they are plundered because they seem to be limitless, but actually, it is becoming increasingly obvious that the marine habitat is vulnerable. The responsibility to look after the oceans sits with us all as individuals and as nations.

On land, a drop in numbers of a familiar species seems more obvious, as it is within our own environment, but for the vast majority of us, the underwater world is completely unfamiliar, and we cannot experience it firsthand, so cannot visualise the changes for ourselves.

We are told of the threats and issues, but as the ocean is not owned by anyone, it is very difficult to set a cohesive conservation plan in place



*Sawblade Goby*, by Harriet Mead. Welded collage of found metal objects, 10 x 29 x 9cm



# portfolio

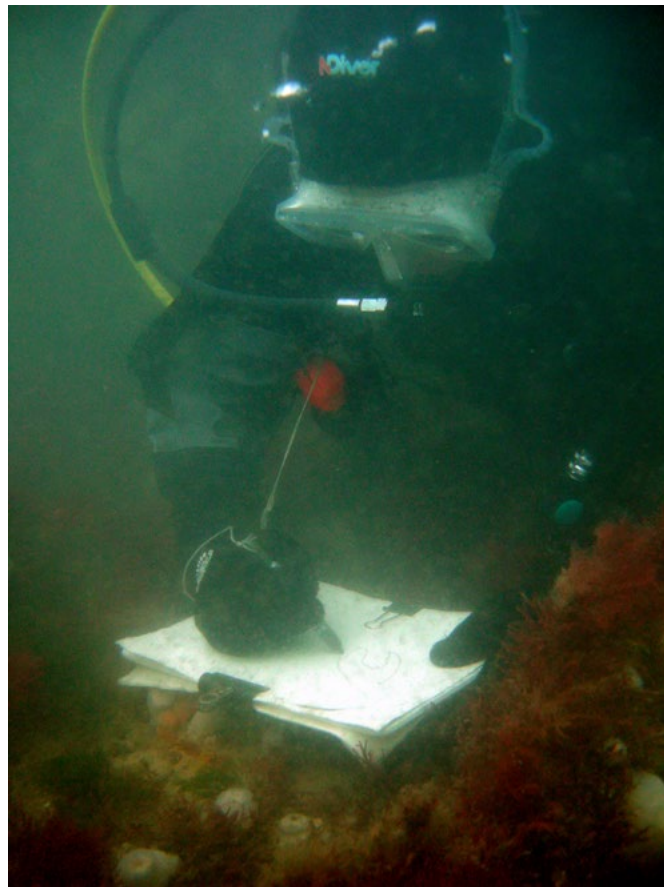
Detail of *Fishscape* sculpture (right) by Harriet Mead. This is a large pike fish among reeds sculpted with found objects welded together; The artist makes a sketch of marine life while on a dive for the UK's Wildlife Trust (below)

siastic, often amateur artists copying reference photos. I think it's a great way to hone your technique, but personally, I'd much rather see someone drawing from life and choosing a subject close to home in a local park or their own garden.

A reference photo does not tell you what the back of the animal looks like or how they move. By observing a subject first hand, I think the resulting work seems much more truthful and alive.

*X-RAY MAG:* How do people and children respond to your works? What feedback or insights have you gained from the process of showing your work to various audiences?

HM: One of the things that I find the most satisfying is that my work seems to appeal to people from all backgrounds. I have had some brilliant conversations with mechanics and farmers who take delight in working out the components



JODY LAWRENCE



JODY LAWRENCE

and reminiscing about old machinery. Often these people would never consider going to an art gallery, as it's 'not their thing', but when they see my sculptures online or through display in public places, they really connect with it.

Children of all ages enjoy spotting things in the work, and I have done little workshops in schools where we have just made collages from all sorts of items from the schoolroom by just lying them on the floor. Their imaginations run wild and it's great fun. It also teaches them that making quick collages, then photographing them, is enough—art doesn't have to be permanent.

*X-RAY MAG:* What are your upcoming projects, art courses or events?

HM: I have a full book of commissions.

I also have various projects to help run with my voluntary work as president of the Society of Wildlife Artists. This year, we will continue our 'Flight Lines' collaboration with the British Trust for Ornithology.

Over the last couple of years, our artists have been looking at bird migration with four visiting Senegal in early 2014 to make work in response to the wintering grounds of many of our summer migrant species. Last year, many artists worked on sites in the United Kingdom to document the summer breeding grounds of our familiar birds, such as cuckoos, nightjars and sand martins.

I will be helping the BTO with a landmark book about migration that will bring the art together with the science behind the research into the extraordinary journeys and pressures that migrat-

ing birds experience each year. It's a very exciting project and will culminate in a large exhibition in 2017. (See: <http://www.bto.org/news-events/news/2015-02/flightlines>)

In addition, we will be working with a conservation organisation in Turkey (DKM) looking at a the Turkish sweetgum tree, which is a key species, and the importance of the sweetgum's habitat for local communities as well as wildlife. The project will work alongside local schools and Turkish artists and will celebrate the area. The project is still in the final stages of being organised but should be very exciting. ■

For more information or to see more of the artist's work, visit: **[www.harrietmead.co.uk](http://www.harrietmead.co.uk)**.

*Fishscape*, by Harriet Mead. Welded collage of found metal objects, 4m x 120cm

