



X-Ray Mag

GLOBAL EDITION
November 2020
Number 101

South Atlantic
St Helena

Lockdown
Local Diving

Contributors' Picks
**My Favorite
Wreck Dive**

Cenote Diving
**Navigation
Protocols**

UW Photo
**Vivid
Color**

Japan
Hachijō

DOMINICAN REPUBLIC

Silver Bank

COVER PHOTO BY PETER SYMES



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Diver on Stuka wreck, Zirje Island, Croatia. Photo by Claudia Weber-Gebert.



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COVER PHOTO: Pod of wild dolphins in the Bahamas
by Peter Symes



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The Folly of Depth Records

As the international diving community has recently come to witness, a scandal surrounding Ahmed Gabr's world record for deepest scuba dive has surfaced. Was it faked? Some accusers, who have opted to remain anonymous for reasons I shall not comment on at this point, have alleged that his record dive was faked, and to that end, have presented to the public a quite comprehensive compilation of evidence in support of their case. The documentation was compelling, but the jury is still out.

The question that remains with me is, "Why?" What is it about these depth records that is so alluring? Why risk one's life and limb to attain it? Why would anyone go to such great lengths as to fake a record, if that was indeed what Gabr did? Status? Peer recognition?

I am sorry, but there is nothing to be proud of here; rather, there is something to be ashamed of. It is folly. It serves no useful purpose. Worse still, it sets a bad example, or creates a norm in which such pursuits are socially acceptable or even laudable.

But they are not. When the criteria for success is just to make it there and come back alive, preferably without injury, it is nothing but a game of Russian roulette. The boundaries get pushed by the next person in line, attempting to break such records. And so, the cycle repeats until someone dies or gets seriously injured. Nothing is gained or learned.

I therefore call upon Guinness World Records (which adjudicated, verified and acknowledged Gabr's record) to cease in doing so in the case of deep scuba diving records, on the same grounds that food-eating records—say, where you stuff your face with as many hamburgers as you can force down in an hour—are no longer recognized: They put peoples' lives, or health, at risk.

Also, quite recently, we have discussed the circumstances surrounding the untimely death of the filmmaker and activist Robert Stewart, a case that remains partially shrouded in the fog of legal proceedings, which are still ongoing as this issue goes to press. What seems

evident from documents and testimonies, which I have had access to, is that Stewart had a penchant for pushing the envelope, perhaps out of impatience and a drive to accomplish what he set out to do.

Going back in time, I ended up revisiting other cases, including the sad ending of Robert Palmer, who was a leading technical diver in the 1990s and one with a rock star appeal and status in his day. He was known for his teaching credo, "Attitude keeps you alive." Yet, he was last seen on a dive in the Red Sea descending past 120m (400ft) *on air*, after which, he disappeared. What drove him to ignore his own teachings? Pride? Defence of his guru status?

Do we ever learn? There seems to be a common denominator for these three cases—I call it "testosterone poisoning."

In diving, it can be just as deadly as an addiction to adrenaline.

Be mindful and stay safe.

*Peter Symes,
Publisher and Editor-in-Chief*



Edited by
Peter Symes

NEWS

from the deep

The Living Coral Biobank will act as an insurance policy for coral biodiversity until such time as the conditions for their survival in the natural system improves.

Living Coral Biobank to house 800 types of hard corals

From coral farming to 3D printing, scientists are resorting to a swathe of new methods to save a vital part of our ecosystem, including a technologically advanced facility where 800 species of hard corals will be kept and bred.



FILE PHOTO BY STEVE JONES

Reef-building corals play a pivotal role in marine ecosystems and constitute the foundation of coral reef ecosystems, which represent the world's most important biogenic structures.

A coral biobank with collections of living specimens of the world's coral species which preserve them in a "coral ark," is coming a step closer to reality.

Architectural designs for the world's first coral biobank in North Queensland have been revealed. If built, the four-storey centre in Port

behind the Biobank. The organisation was created by a group of dedicated professionals to address the urgent need to secure the long-term survival of the



CONTRERAS EARL ARCHITECTURE

The exterior of the coral biobank has been designed to look like a mushroom coral.

Great Barrier Reef and coral reefs world-wide.

Douglas, described as a "Noah's ark" for the reef, would protect and breed about 800 coral species from around the world.

The need is driven by unprecedented losses in coral cover and declines in reef health resulting from a range of pressures—most significantly, coral bleaching events driven by climate change. With every successive bleaching event, we are losing the most vulnerable coral reefs and species, states the Great Barrier Reef Legacy Project—the non-profit group

Inspired by Norway's global seed vault, and with architecture influenced by mushroom coral, the bank will also include a function space, research labs, and serve as an aquarium-like tourist attraction for Port Douglas in far north Queensland, a gateway to the adjacent Great Barrier Reef, the *Guardian* reports.

The project will create optimal conditions for coral storage while minimizing energy consumption and solar gain. Aspiring to the bio-systems of the coral reefs themselves, the building will aim to be self-sufficient and carbon neutral.

Tourist attraction

Tourism Port Douglas Daintree chief executive Tara Bennett said the bio-bank would be a major tourism attraction for the region.

"It would really cement our position as a leading destination for accessing the Great Barrier Reef," Bennett told ABC News. **Donate Now** ■

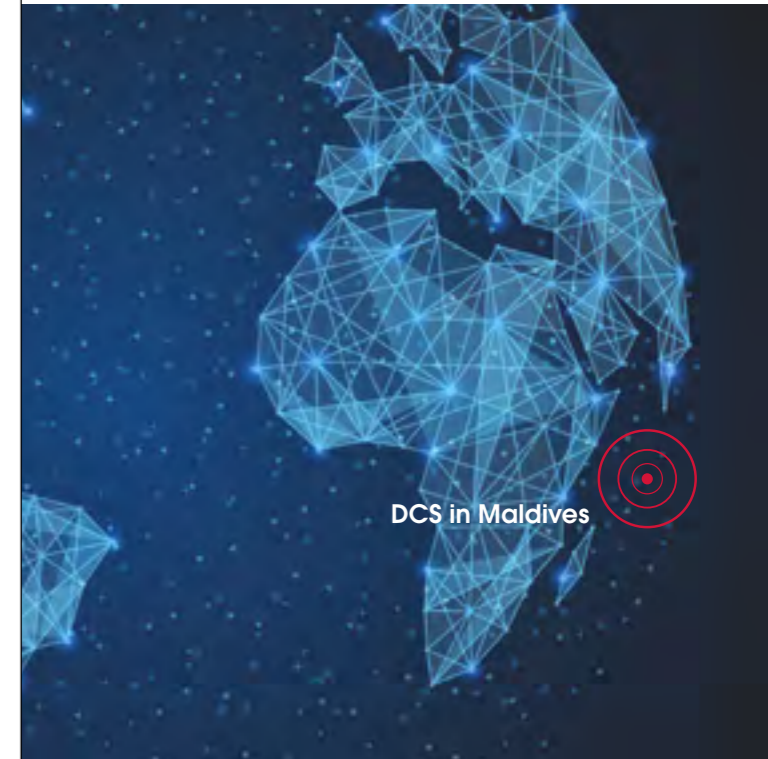
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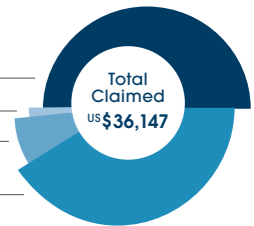
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The scenario summarized above is offered only as an example. Coverage depends on the facts of each case and the terms, conditions and exclusions of the policy. Coverage may not be available in all states or outside of the U.S. Visit DAN.org for complete details.

Edited by Peter Symes

Greenpeace Rocks

I think Greenpeace has come up with a rather nifty idea this time around: **dumping big rocks to deter bottom trawlers from sneaking into protected areas and ripping up the sea with their trawls, destroying vast swathes of bottom communities in the process.**



GREENPEACE

The boulders pose no safety threat to passing marine traffic. Greenpeace UK notified all the relevant marine authorities immediately upon deploying each boulder to ensure safety for all mariners operating in the area.



The Dogger Bank's seabed is one of the North Sea's most important habitats. It is home to sand eels, crabs, flatfish and more. These species are a vital food source for porpoises and seabirds like puffins.

There are no permanent restrictions on fishing activity in the Dogger Bank protected area—about 100km off the eastern coast of England. Whilst it is legal to fish in the conservation zone, Greenpeace UK investigators discovered in summer 2020 that destructive bottom trawlers operate extensively in the Dogger Bank, directly destroying the protected seabed. The trawlers also frequently operate illegally by switching their AIS positioning systems off, a breach of international and UK law, which endangers the safety of other mariners, the NGO writes.

The UK government has failed to take any action since Greenpeace brought this to light. Bottom trawling in the Dogger Bank has increased in recent years. According to the UK government, the Dogger Bank's protected feature, the seabed, is in "unfavourable" condition. According to the *Independent*, the UK's environment department said that the government would put sustainable practices at the heart of its fishing strategy after the Brexit transition ends.

A spokesperson said: "We have already set up a 'blue belt' of protected waters nearly twice the size of England, and we propose new powers to better manage and control our marine protected areas."

The Dogger Bank scallop fishery is temporarily closed until early October to allow for scallops to spawn. This temporary closure does not safeguard the Dogger Bank's protected seabed. ■

SOURCES: GREENPEACE, THE INDEPENDENT

Local Dive Shops are the backbone of our sport. They are the gateway to training, the place where you meet dive buddies, get your tanks filled, book dive vacations, and of course purchase new dive gear. Being a small family run business ourselves, we understand that dive shops need your support now more than ever. We encourage you to support them any way you can to help keep our beloved sport growing.

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Dive shows in a post-COVID-19 reality

The first major dive show in which I participated was DEMA 1994, in New Orleans. It was bustling and buoyant; the dive industry had enjoyed a decade of constant joy. This was pre-Dropbox and immediate transfers of huge files, before Skype and Zoom, and before digital imagery became commonplace. Trade shows were essential events in which new gadgets were unveiled and the place you wanted to be if you wanted to get the news right away and straight from the source—particularly, if you were a media professional with some reporting to do.

We were handed press kits, which included sleeves with slide copies, stills, press releases and other promotional materials. And we schlepped home whole suitcases full of this stuff in those days. It was also a lively place to network, catch up with industry colleagues and make new connections. At consumer shows, we also met with regular customers and readers, and new contributors came by to talk to us.

In recent years, the unveiling of new products has all but largely evaporated. Nowadays, news get posted to us at any given time. Due in no small part to that reason alone, trade shows gradu-

ally became smaller over the years. Frequently, somebody would lament about how a show would keep compacting—which most of them did, and for a good reason. The trade shows underwent a shift towards becoming predominantly networking events. From our perspective, it was a good thing, because we were better off focusing more on that aspect, on trading, and less with casual small talkers, tyre kickers and brochure collectors.

That said, over that past ten to 15 years, many of the classic and once lively big dive expos went into a gradual and then marked decline. They became much smaller, less attractive and less visited. Some, such as Our World Underwater, which was held for many years in Chicago and used to be a big and significant event drawing huge crowds, went into a death spiral and vanished. Indeed, while some new dive shows and events have been innovative and connected with new audiences, many others struggled to remain relevant and attractive.

The pandemic effect

Then the pandemic struck. At first, events that were scheduled to be held during the spring of this year were only slightly postponed; typically, they were only shifted a few months into the future. We all know what happened then. The pandemic did not blow over and these events were forced to reschedule once more. Some were outright cancelled, while others attempted to convert into

some type of digital event instead—often with quite limited success, which is not so surprising considering the size and complexity of such arrangements, which had to be improvised and put together on very short notice, resulting in many glitches.

Dive shows and events are branding and marketing activities for the dive industry. It is the stake holders such as the equipment manufacturers, training agencies and the dive operators such as dive centres, resorts and liveaboards, who are the primary sponsors of these events. Without their active participation, actual presence and funding, there can be no dive shows. Obviously, many of these entities—particularly, the dive operators that form a subset of the hospitality and travel sector—have been left openly exposed to the consequences of the pandemic, as it is savaging the global tourism industry and airlines.

Swathes of the dive industry were already challenged prior to the pandemic. The **survey** conducted by William Cline earlier this month (October 2020) on dive industry sentiments laid bare a whole palette of other factors such as retailers being up against cheaper prices on Amazon, the high bar of entry



due to cost, the “bucket-list” mentality among customers who just want to try it and move on rather than remain a customer or become a part of the dive community, the dearth of business incentives, and so on.

There were many reasons—and on aside, also marked differences between the American and European responses—but several of the complaints are ones I have heard for years. Before online sales it was mail order that was an issue. Same underlying issue, different flavour. COVID-19 both brought many of these pre-existing conditions to the fore and added another thick layer of new challenges attributed to the pandemic, which continues to rage.

A switch to digital

Meanwhile, the dive industry stake holders, who are in a position to do so, are seeking refuge in the virtual realm. Dive operators are sending out enticing news-

letters in the hope that clients will make tentative bookings with them, training agencies are conducting a growing number of webinars and online tutoring, and dive shows, including the upcoming DEMA, are trying out virtual formats as stand-ins for the usual congregations in convention centres.

As for the latter, the dive shows had a strong social attraction, which is going to be challenging to replace. People were looking forward to meeting other people they only get to see once a year. Every year, one of the top reasons for attendees to go to the DEMA Show, according to surveys, is “socialising and networking.” Without this component, how attractive and how effective will upcoming dive shows, events and conferences be? Only time will tell, I suppose. By taking part in the first digital dive show, which concluded only days before this issue went to press, I got an impression of things to come and some matters to mull over. ■

Edited by Peter Symes

Inaugural Scuba.Digital imperfect, but concept holds promise

The virtual dive show, held on 23-26 October, was put together with all the right intentions and much effort. It got a lot right but also had some misses, and the format and platform need more work.

During the event, I sat in on several great presentations, and it was a valuable learning experience setting up, preparing and taking part in the exhibit. Being the first dive event of this size and scope, some teething problems were to be expected, not just on the

part of the organisers but the many presenters and visitors who frequently grappled with getting their tech (their webcams, microphones, speakers, etc) to work. While the still raging pandemic has made Zoom and other video-conferencing platforms more commonplace and familiar concepts, this event made it clear that we are still in the early days of what could quite possibly become a norm in how we conduct meetings, collaborate with colleagues or take part in conferences.

Expo or conference?

As a dive expo, which Scuba.Digital's concept thought to emulate, it did not

quite work out in several key areas. But as a conference, it worked reasonably well, if one thought of it as a virtual cineplex, with presentations going on upon various stages (one main stage and a number of parallel sessions). Presentations were listed on a schedule, so you could wander from one to another. However, with presentations being somewhat spread out across 24 time zones, a number of interesting presentations inevitably ended up being scheduled awkwardly for part of the global audience. To compensate, being on Central European Time, I ended up doing one of my own presentations at a late evening hour in order to conduct it

at a time that was more reasonable for our American audience.

Booths

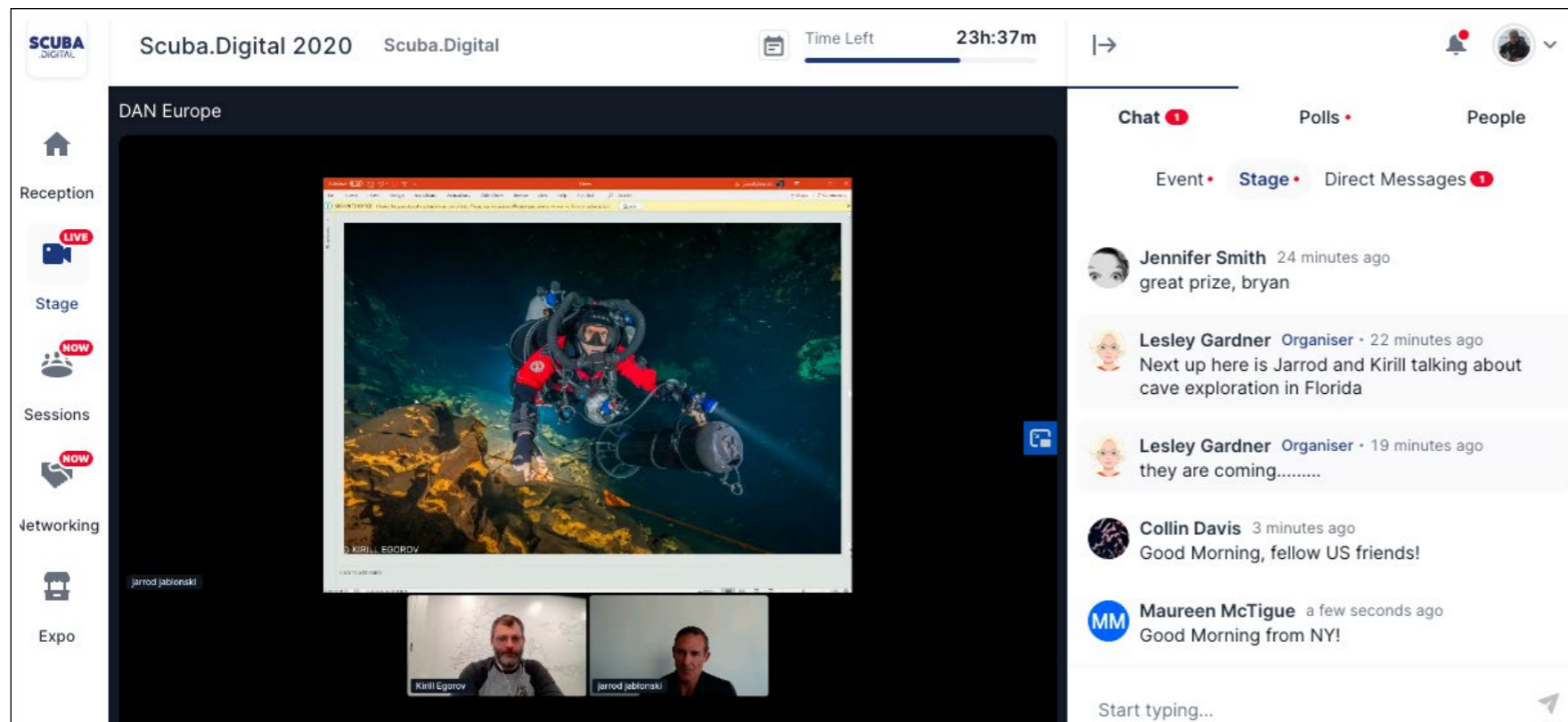
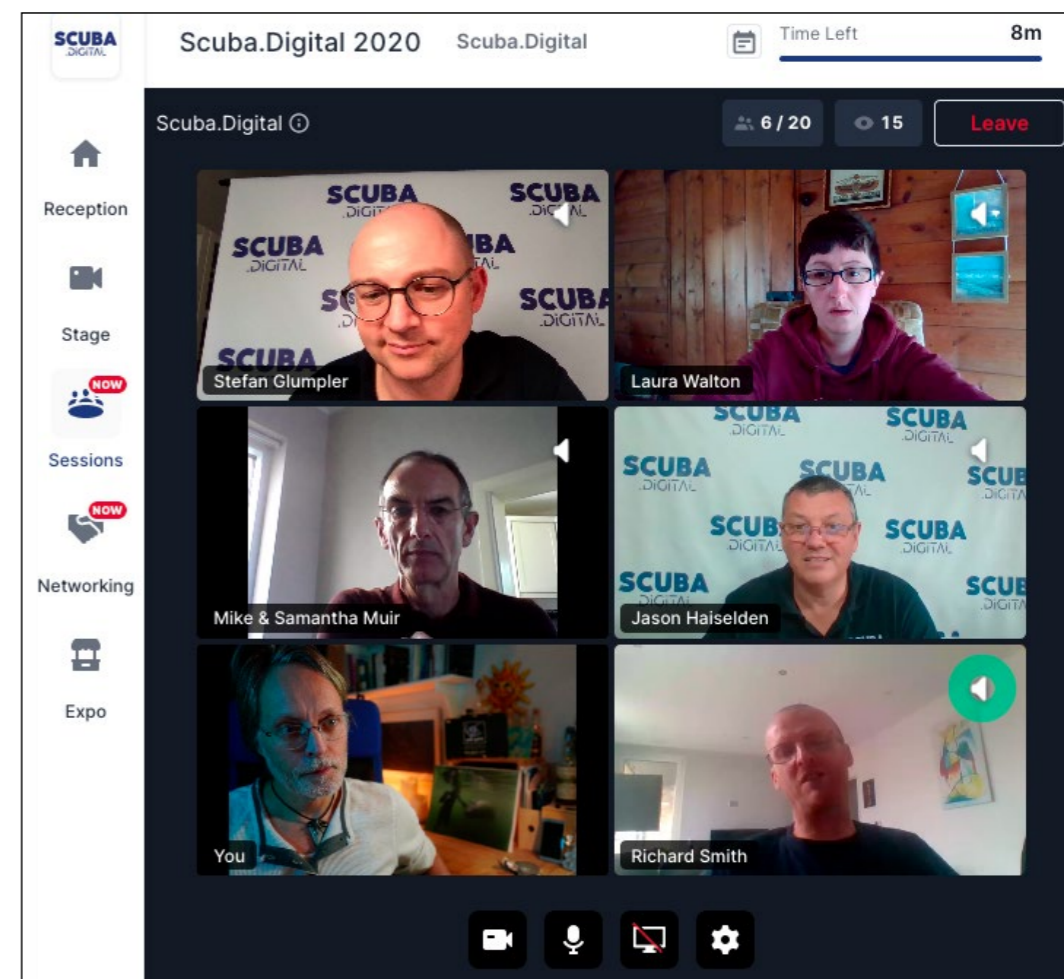
The part that did not work so well were the virtual booths, making it difficult to find and connect with people.

Firstly, there was too little latitude to actually design a booth and drape it with the look and information that one would have at a real show, or on a website. It did not have to be as detailed or advanced as Second Life, but some options would surely have come in handy.

Secondly, almost nobody popped inside booths to have a conversation. In our booth, we had just one visitor who engaged with us, and just about two dozen visitors stating an interest during the whole event. That was rather dismal. Other exhibitors with whom I spoke, related the same experience. I also went to visit other booths and either there was no one there, or I could not establish video or audio connection with those manning the booth.

This component needs to be rethought. That said, one must consider that the total attendance at this inaugural edition left a lot to be desired. It could be an order of magnitude higher and should be for upcoming installations.

Screenshot of a Scuba.Digital session with six participants



Screenshot of presentation with two speakers on the "main stage" of Scuba.Digital's platform

Never before published in book form, see extraordinary images of the forgotten American WWII airplanes resting on the bottom of the Kwajalein Atoll lagoon, from award-winning underwater photographer Brandi Mueller. Available on: **Amazon.com**

Networking

Finding people, or knowing who else was attending, was not easy either. I managed to connect with a few familiar names, but that is not the point of taking part in an event, physical or virtual. The idea, for me anyway, is to meet and connect with new people. But one normally does not jump out at random names, like in some blindfolded speed-dating event. At real shows, people wear badges stating their affiliation, and you generally know where to find them, say, in their

booths. What I would have liked to have seen, for example, was a simulation of a real physical space, say a map, which could be navigated, perhaps populated with avatars moving about.

Looking forward

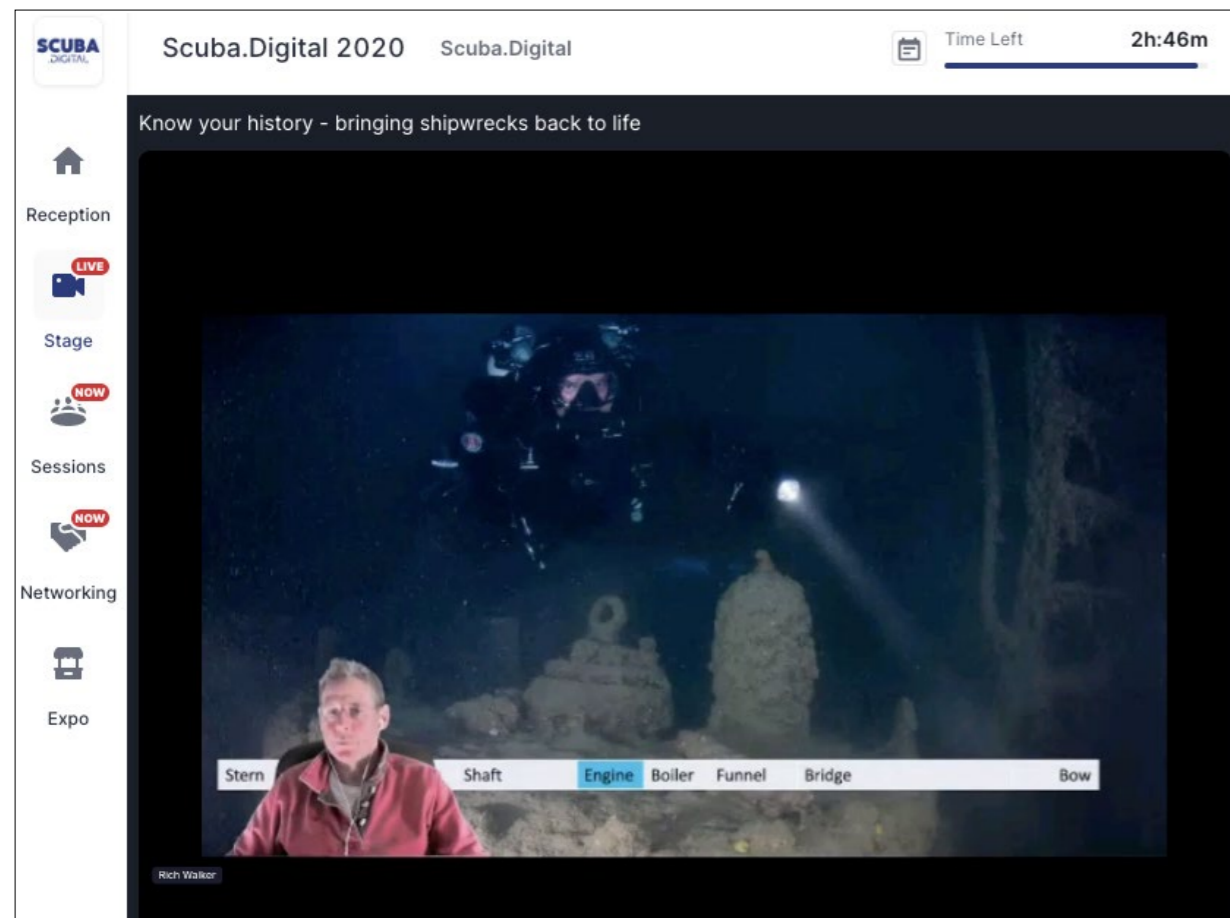
In case this critique comes across as being a tad on the pointy side, let me also be perfectly clear that it is meant constructively and forward-looking, and that I wholeheartedly applaud the organisers for sticking their necks out, giving it

a try, and quite evidently putting in a gargantuan effort. It is the trailblazers who do the hardest work, and the ones discovering the stumbling blocks.

I am also perfectly fine with all the imperfections, because acquiring initial practice or experience has to take place sometime somewhere. This was a good opportunity for participants to cut their teeth, and I always had a clear sense during this event that there was a wide tolerance for people's various struggles or awkwardness with getting to grips with this form of online presence.

Once the kinks are ironed out, virtual expos could quite possibly become potent platforms and certainly pose attractive alternatives to the physical events, or they might play alongside or even on top of physical shows in a dual format. In any case, the concept is not quite there yet. What is still not mature is the technical platform, but I am sure significant strides will be made in the foreseeable future, and I look forward to seeing how far this concept can go. ■

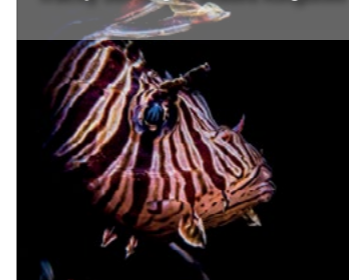
For more information, please visit: scuba.digital



Screenshot of a presentation in progress on Scuba.Digital's "main stage." Rick Walker, GUE, talks about bringing wrecks back to life. Rick's presentation was one of the better ones and an example of how to make it look good.



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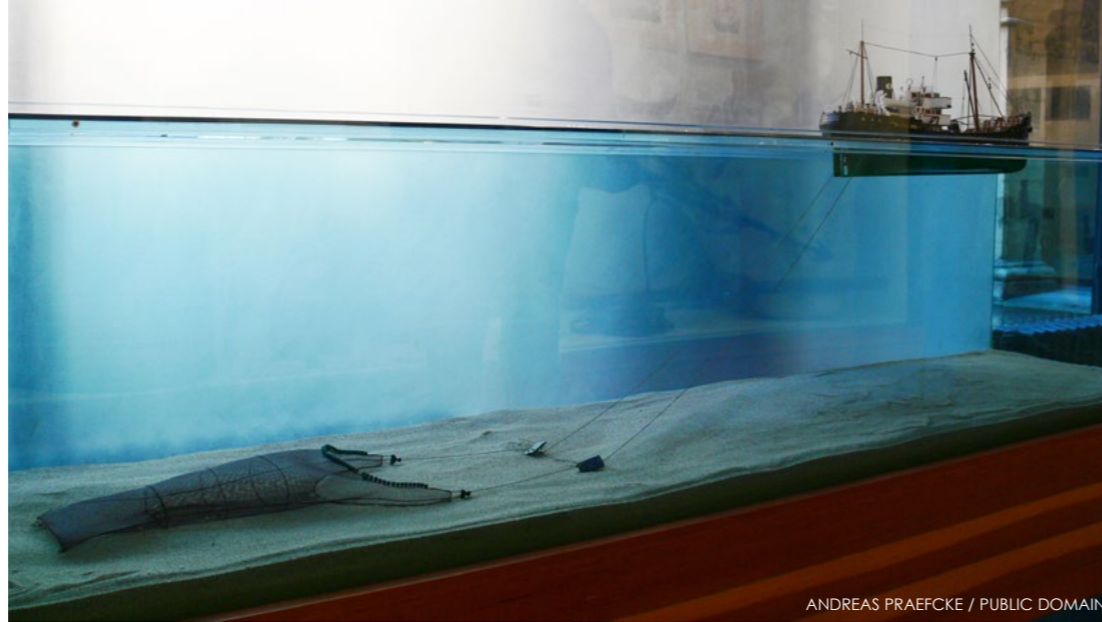
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Model depicting how a bottom trawl is being dragged across the seabed

Historic wrecks are facing destruction by fishing trawlers

Industrial trawlers are not only threatening important marine habitats and iconic species in “protected” waters around UK shores. As a recent BBC documentary made painfully clear, a fragile 17th-century English shipwreck—the world’s

earliest vessel linked to the transatlantic slave trade—is facing complete destruction by 21st-century fishing trawlers.

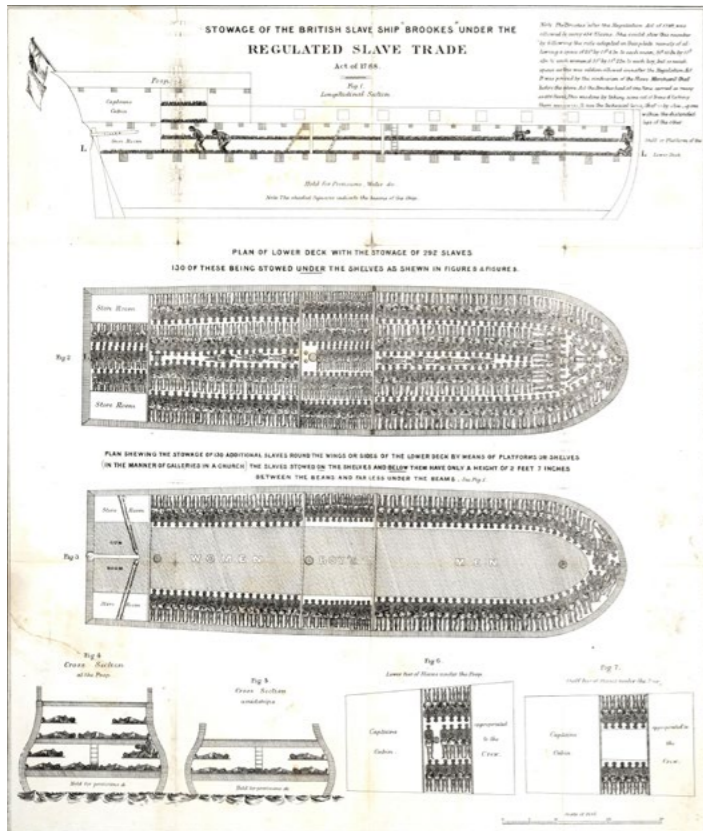
The 1680s Royal African Company trader—considered a sea grave for the slaves who perished on its final voyage—lies on the seabed about 40 miles south of Land’s End. The disturbed remains of the ship was dived by humans for the first time during the making of *Enslaved*, a groundbreaking new documentary series on BBC2 with actor Samuel L Jackson and journalist Afua Hirsch. During filming, divers found fresh

evidence for the damage of the ship, compared to evidence of the wreck recorded by remote-vehicle in 2009.

Dr Sean Kingsley, a leading British marine archaeologist, has been alarmed by underwater footage filmed for a new documentary series about the transatlantic slave trade. It reveals extensive damage to a wreck that was once “a beast of a ship,” carrying 48 cannon, perhaps 600 tons in capacity and manned by a crew of 70.

It is being “pounded into oblivion” by “bulldozers of the deep,” he told the *Guardian*. He said: “Fifty years ago, this wreck must have been a thing of wonder. Today, what’s left is tragic. Trawlers dragging nets for fish and scallops have bulldozed everything. Cannon have been dragged 300 metres away. If trawlers can throw two-ton guns around like matchsticks, then the wooden hull and small finds have no chance.” ■

SOURCES: BBC, THE GUARDIAN, GREENPEACE



A plan of the British slave ship *Brookes*, showing how 454 slaves were accommodated on board after the Slave Trade Act 1788.

DIVE SHOW
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APRIL 8-11
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Edited by
Scott Bennett

To go or not
to go, to
postpone or
not to plan...



COMPOSITE IMAGE BY PETER SYMES, WITH PUBLIC DOMAIN PHOTOS FROM PIXABAY

Dive travellers still caught in COVID-limbo

With the passing of another month, COVID-19 rages on. After a respite over the summer, cases in many countries have spiked dramatically, creating a second wave (or a third, depending on your sources). Travel restrictions and border closings evolve continuously. Nonessential travel is banned between some destinations, while others require a two-week quarantine period at the start or end of a trip. Once again, travel has been put on hold. Or has it?

Despite the media doom and gloom, some destinations have opened up, especially regarding dive travel. These include the Bahamas, most Caribbean countries, Cocos, French Polynesia, Galapagos, Malpelo, Maldives, Red Sea, Sea of Cortez and Socorro. Others, like Indonesia, have opened to

domestic tourism but remain closed to international visitors. However, restrictions remain stringent; travellers must be tested prior to their departure and upon arrival. In some cases, you will be quarantined until test results are available. The good news? If everything checks out, you can dive!

to defer all cruise travel worldwide. This came days before the CDC revealed whether its "no-sail" order banning cruise ships from operating in North America would be lifted or extended. The warning itself is not new, but rather an update to an existing warning issued in the spring.

Meanwhile, cruise lines are offering excursions directly through their companies for scuba and many other water-related activities such as snorkelling, SNUBA and underwater scooters with big bubble helmets called Breathing Observation Bubbles (BOBs).

Cabin fever

If the current situation drags on for months, divers suffering from cabin fever may just decide to go for it. In some cases, the destination may actually be safer than their home country. Regardless, dive operators are suffering, and any visitor will likely get the royal treatment. If the inconveniences are not a deterrent, those wishing to travel will be able to dive locations usually overrun by tourists. To many, that will be enticement enough. Despite current appearances, this situation will end. It is only a matter of when. ■

Regardless of the extremely low chances of catching COVID-19 on a flight, many remain reluctant to travel. To entice visitors, many operators have implemented flexible booking policies featuring no change or cancellation fees. In addition, stringent safety protocols are followed, from sanitizing dive equipment to social distancing practices in restaurants. Safety practices are emphasized in detail on many operators' websites.

No sail

On the flip side, the US Centres for Disease Control (CDC) has updated its warning to travellers

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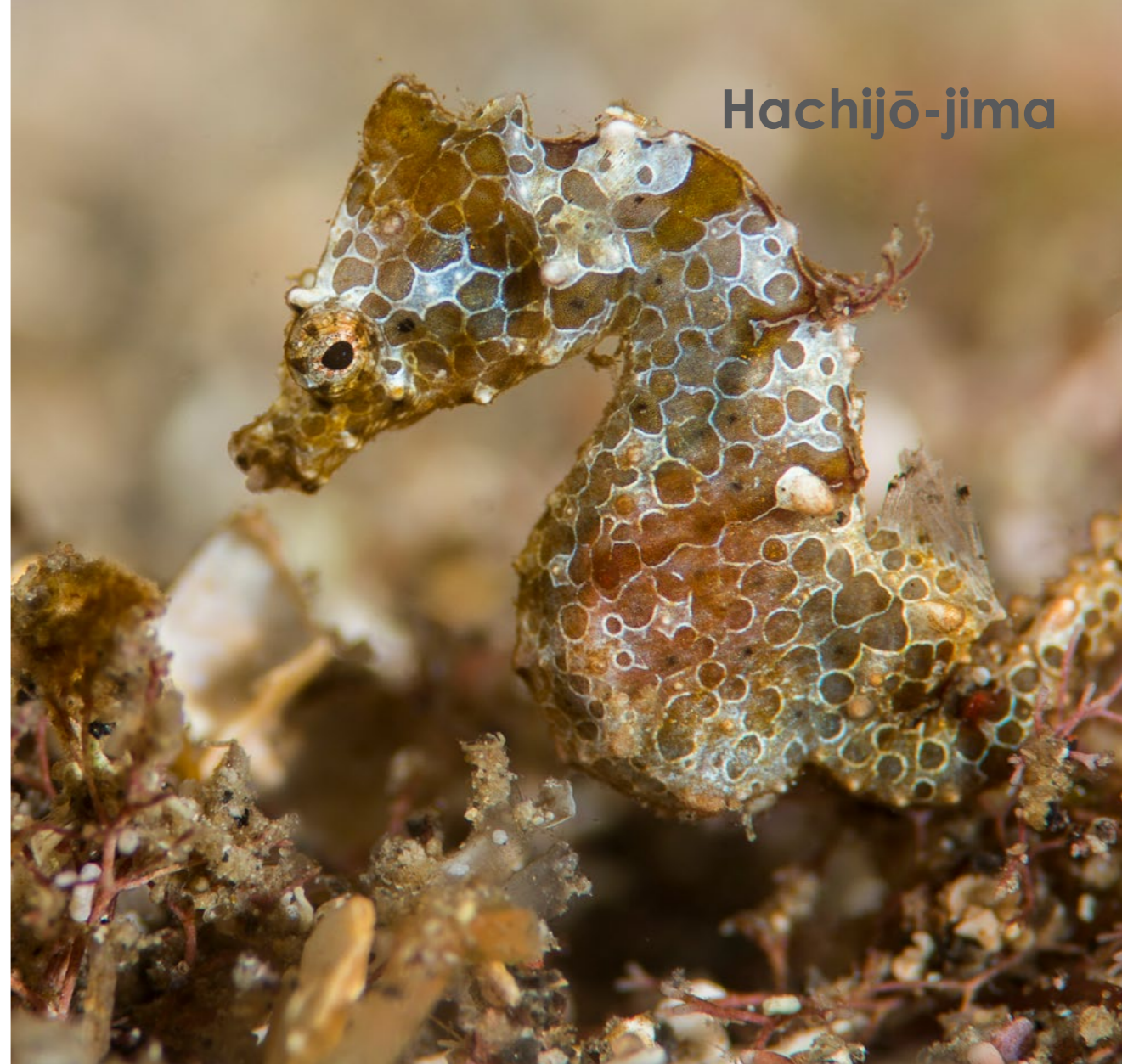


Japan's Hachijō-jima

Text and photos
by Richard Smith

Biodiverse & Home to an Elusive Pygmy Seahorse





Incredible topography off Hachijō (above); The Japanese pygmy seahorse that colleagues and I named in 2018 (top right)

Japan's diving scene used to be a well-kept secret, but more and more people have realised that Japan has much more to offer than just sushi and karaoke. The country spans a vast latitudinal range, from the tropical south where coral reefs dominate around Okinawa and the other Ryukyu Islands, into the almost subarctic north. As a result, its biological diversity is great, with many different habitats accommodating a wide array of species.

Japan's diving has not historically been particularly accessible for foreigners, but over the past few years it has become much easier, and my return visits have shown me that it is certainly worth the effort.

Japan had been on my dive bucket list for many years, and when Okinawa was announced as the location for the quadrennial Indo-Pacific Fish Biologists Conference back in 2013, I jumped at the chance to attend. I was ostensibly in Japan to present some of my pygmy seahorse research at the conference, but my actual goal was to hunt for an elusive and undescribed pygmy seahorse. There are almost no images of these tiny fish and, like much of Japan's marine life, it is hardly known outside the

country. After months of online research (thank heavens for Google Translate) and detective work, I narrowed my search to Hachijō-jima.

Off the beaten path

After leaving the conference in the tropical south, I headed up to Hachijō, which scant few online images suggested to be a hotspot for these unnamed pygmy seahorses. Travelling around Japan is very easy. I hopped on a flight from Okinawa to Tokyo Haneda Airport, and then a 40-minute flight out to Hachijō. The island comprises a conjoined pair of ancient volcanoes, sitting 180mi (~290km) south of Tokyo. Although the Japanese pygmy seahorse was my main focus here, I soon ended up getting dis-



Red-lined bubble snail (above). PREVIOUS PAGE: This is a male Japanese pygmy seahorse. You can just make out his stretch marks from having given birth recently.



Mating pair of *Halgerda willeyi* nudibranch



Diver with green sea turtle (above); The beautiful purple-masked angelfish is another fish found largely in Japanese waters (left inset).

almost 15 percent of all described marine species. The island chain sprawls from the sub-boreal zone in the country's far north, through cool temperate, middle temperate, warm temperate and subtropical, and finally reaching the tropical islands of the south. The wide variety of marine environments within these zones helps to explain some of its enormous variety of species.

Amazingly, Japan boasts almost 2,000 marine species found nowhere else on Earth.

The reason that so many marine creatures in Japan are found nowhere else is thanks to the local oceanographic conditions. Just as the South Pacific Ocean Gyre

pushes water across the Pacific in a counterclockwise motion, becoming the East Australian Current (the one which carried Nemo from the Great Barrier Reef down to Sydney), the North Pacific Gyre, as the Kuroshio Current, pushes water from the Equator northwards to Japan.

This current is the Pacific's largest. It has a significant impact on marine ecosystems, bringing with it warm water and tropical fishes where you might not expect them. This northerly flow also has the effect of creating a barrier to fishes trying to move southwards. The current acts as a wall to their southerly migrations and, as a result, they are effectively isolated in Japanese waters, much like the giant tortoises, marine iguanas and Darwin's finches of the Galapagos. In isolation, they have evolved into unique forms,

and many endemic marine species exist in Japanese waters. Hachijō's waters are heavily influenced by the Kuroshio Current and boast a plethora of rare and indigenous species, so my wish list of animals had grown to be quite extensive by the time my plane touched down.

Hachijō-jima

I had planned to dive with the wonderful Kotaro-san from Concolor Diving, and would also be diving with my friend and long-time dive buddy, Katsuko. As an accomplished photographer, Katsuko has been diving

There is a high diversity of moray eels around the island (above); In 2008, a new species of lined catfish was described from Japan—a school of them are pictured here with a soldierfish (top right); Pair of locally endemic Chromodoris nudibranchs mating (center)

tracted by all sorts of other local species, many of which are found only in this area.

Japan's territorial waters have eleven times as much ocean surface as land area. Its seas cover only 1.2 percent of the globe's total ocean surface area but astonishingly harbour



Wrought iron and Japanese butterflyfishes forming a loose shoal (above); Divers entering the Nazumado dive site in calm seas (top left); An unexpected find of a large harlequin shrimp (left); Hubbard's hawkfish (*Cirrhitops hubbardi*) is a little-known species that is only found around this island group (far left); Whilst watching a Japanese pygmy seahorse, I suddenly spotted a boxer crab sitting right behind it (right).



in Southeast Asia for many years, but she had never dived in the waters of her own country. Kotaro has a great dive operation located in the low-growth forest of the smaller of the two volcanoes, which was where we would meet each morning. A couple of small buildings offered a gear store, compressors, hot showers and changing area as well as a relaxing salon with tables where one could sit and

download images between dives. We stayed at a local full-board hotel around the corner, so things really could not have been easier.

Exploring the seas

Despite there being many shore dives around the island, whenever possible, we dived the site Nazumado, which is generally only possible over the summer

months. On a subsequent trip, however, we also chartered a local fishing boat occasionally.

Kotaro is particularly passionate about the diversity of Hachijō's marine life. He has a well-stocked library, but I learnt just as much from speaking with him. He showed me the beautiful wrought-iron butterflyfish, which is found only around a few of Japan's offshore islands and is especially abundant around Hachijō. We also saw the Hubbard's hawkfish, another rare regional endemic.

There were also several unexpected tropical discoveries, including a pair of harlequin shrimps, several boxer crabs, stunning bubble snails, and striped boarfish in several deeper caves. These latter fish have a wide geographic range but are found at only a few scattered locations around the Pacific. They are large disc-shaped fish with a wonderful bristly beard under the chin.

Entry at Nazumado can be a little hairy; hence, access to the site is limited to just a few summer months or days with particularly good weather. My visits have

been in May and June, generally before cyclone season and when the waters tend to be calmer and the chill has been taken out of them. The currents that bathe the island are, however, unpredictable and temperatures can vary from



The wrought iron butterflyfish can only be found in the Izu and Ogasawara islands of Japan.



Toyama Bay

Striped boarfish often linger in large caves and overhangs around Hachijō (above); The Japanese pygmy seahorse measures just under 2cm in length (right).

day to day between the high teens to mid-twenties Celsius.

On my first dive, Kotaro tasked himself with fulfilling my wish of observing the Japanese pygmy seahorse, and within ten minutes of entering the water, he had found a pair on the side of a huge algae-covered boulder at about 11m depth. They were actually quite large for pygmies, at around 2cm in length, but resembled the tropical Pontoh's species in habit. Like Pontoh's, the Japanese pygmy is also free-living, but has a unique reticulated pattern over the body that in my mind distinguished it from other pygmies I had seen before. Over the next few days, I found a dozen more of these special little fish. It gave me the impression they were fairly common here, but when I returned a few years later with some friends, we saw

just one individual despite searching for many dives.

Since then, along with Japanese, American and Australian colleagues from the International Union for Conservation of Nature (IUCN) Seahorse, Pipefish and Seadragon Specialist Group, we have scientifically described this unusual new pygmy seahorse as *Hippocampus japa-pigu*. "Japapigu" is the name given locally to these fish, and it seemed fitting to name them as such.

The actual naming took a few years, as it was not until 2017 that I met Graham Short, a leading seahorse taxonomist. I was giving the keynote speech about seahorse and pipefish diversity at a seahorse biologist's conference in Florida. During my talk, I mentioned this pygmy seahorse and that I was sure it was a new species. After





The dragon moray eel is a striking resident of the area (above).



A marvellous “Mohican” blenny, possibly *Neoclinus bryope* (top left); A triplefin (*Helcogramma nesion*), described in 2003 and found only in this area (top center); Miniature melo bubble snail (above center); A small scorpionfish that emerged at night (right)

that, Graham and I made it our mission to name it, and in 2018 the new species was officially described. Just this year, we also named another new pygmy from South Africa—the first known from the Indian Ocean. It appears that the oceans have many more secrets to reveal when it comes to these small fishes.

Many surprises

Other fishes of note during our dives were Japanese swallow angelfish, blue-stripe angelfish, dragon morays, and, one of my favourites, the hilarious “Mohican” tube blenny. Of these fishes, only the Japanese swallow angelfish is restricted in its geographic range, but many of these other species are unusually common in Japan compared to the rest of their wider range. The geographic range of

dragon morays, for example, spans from east Africa to Hawaii, but despite several thousand dives looking, Japan is the only place I have ever seen one.

It is not only small fishes that Hachijō is known for. Although I did not see them myself, the deeper areas are frequented by thresher and hammerhead sharks, offering an alternative to the smaller creatures of the reef. I went on a morning dive to hang out at the place the threshers are commonly seen. There was only myself and two guides, who both saw the shark, but I was all distracted daydreaming about pygmies and managed to miss it! The area also gets regular sightings of hammerheads if you go to the right spot, but currents can be quite strong in these areas.

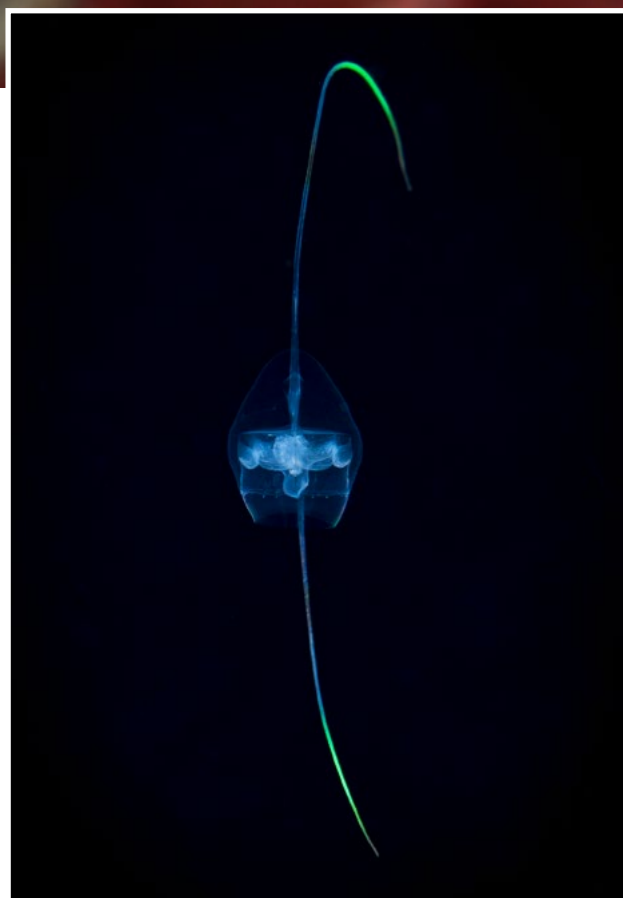
When conditions are less forgiving, there are some large man-made harbours that

offer great diving too. Entry is via protected slipways and the life within these bays is quite different to the exposed sites. Here, we saw more nudibranchs, several stunning bubble snails, and fishes such as blennies that we had not seen outside the bays. There is a mix of algae and hardy coral, making for an interesting substrate to hunt for critters.

Inside a somewhat open embayment, we also did a “Hot Ke Night” dive, where Kotaro set large lamps to attract passing plankton and larval fish, much like a black-water dive. I am generally not too excited

about floating around in the black abyss for a dive, so this made for a great compromise and was rather fruitful.

On the last day of the trip, Kotaro kindly offered to take us on an adventure around the island. The island has been inhabited for many centuries, and we saw some of the first buildings. There



One of the stunning soft bodied organisms observed during “Hot Ke Night” dive



Yellow-fin soldierfish are ordinarily found much deeper than recreational dive limits (above); Hachijō has a high diversity of Halgerda nudibranchs (right).

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were also free *onsen* (hot spring) footbaths looking over the ocean at one spot around the other side of the island. One night, Kotaro also took us out looking for glowing mushrooms. I had never heard of such a thing, but it was incredible to see the two-inch-high mushrooms glowing bright green on the dark forest floor. These land-based activities are definitely worth exploring on any non-diving days.

Mission complete

Despite visiting several locations during my multiple trips to dive in Japan, I have only scratched the surface of what it has to offer the adventurous diver. Even Hachijō offers a different complement of animals at different times of the year, and I will definitely be back. Many other areas around the country also have great diving with various endemics that remain high on my list. In fact, I had planned to return in 2020, which sadly wasn't to

be, but I certainly plan to return in the not-too-distant future. ■

Japan National Tourism Organization (JNTO) has launched a site called "Japan Diving" to welcome divers from all over the world. You can choose from a menu of over 170 dive locations in Japan. For further information about diving in Japan via JNTO, please visit: [japan.travel/diving/en/](https://www.japan.travel/diving/en/).

Dr Richard Smith is a British award-winning underwater photographer, author and marine conservationist who aspires to promote an appreciation for the ocean's inhabitants and raise awareness of marine conservation issues through his images. A marine biologist by training, Smith's pioneering research on the biology and conservation of pygmy seahorses led to the first PhD on these enigmatic fishes. Smith is a member of the IUCN Seahorse,



Pipefish and Seadragon Specialist Group. He has named the two most recent pygmy seahorse discoveries from Japan, Hippocampus japapigu, and South Africa, H. nalu. Smith organises and leads marine life expeditions where the aim is for participants to get more from their diving and photography by learning about the marine environment. He is the author of the book, The World Beneath: The Life and Times of Unknown Sea Creatures and Coral Reefs. Visit: [OceanRealmImages.com](https://www.OceanRealmImages.com).



Silver Bank

— *Swimming with Humpback Whales
in the Dominican Republic*

Text and photos by Matthew Meier



Mother humpback whale and her baby calf, rising to the surface together for a breath of air (above) and resting just below the water's surface (previous page); Mother, male escort and baby humpback whale at the surface (top right)

Slipping softly into the water, I had a straight path to the mother and calf that were resting near the surface only a short distance away. We closed the gap as quietly as a group of excited first-time whale watchers could manage and were rewarded with an initial glimpse of humpback whales from under the water. The newborn stayed close to its mother and swam up and over her rostrum as we looked on.

We stayed that way, frozen in the gaze of one another, for what felt like several minutes before mom slowly turned and gently guided the calf away. Her giant pectoral fin passed in front of my lens, and soon after, a massive tail came into view before gradually fading off into the distance. Our first encounter with humpback whales had been spectacular, albeit brief and entirely on their terms. We climbed back into the boat, animatedly talking with one another and excited for our next interaction with these breathtaking leviathans.

Our voyage began and ended at the Ocean World Marina, near the city of Puerto Plata, in the northeastern corner of the Dominican Republic. Trips run Sat-

urday to Saturday over a 10-week season, which encompasses mid-January through early April each year. From the marina, our band of intrepid adventurers boarded a liveaboard dive boat and set sail for the Silver Bank, a marine mammal protected area and expansive, shallow underwater shelf located over 70 miles offshore in the Atlantic Ocean.

We were part of an exclusive group of approximately 600 annual visitors, as only three permitted boats are allowed on the Bank each season. Once moored at the sheltered anchorage, guests spend the next five days observing and intermingling with the densest population of North Atlantic humpback whales on the planet. Upwards of 4,000 whales migrate

Silver Bank

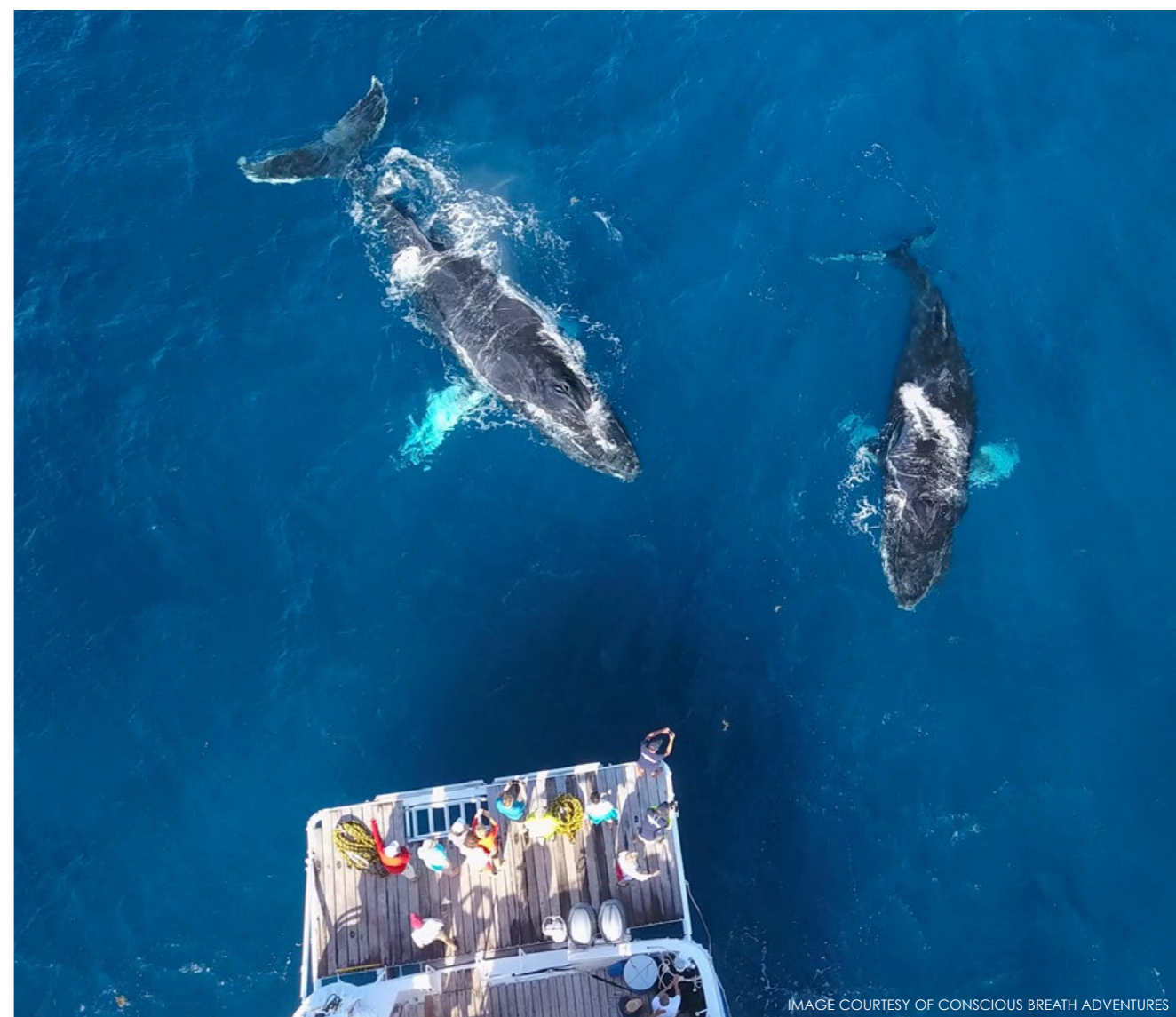


IMAGE COURTESY OF CONSCIOUS BREATH ADVENTURES

Aerial view of two curious humpback whales inspecting the liveaboard





Baby humpback whale calf twists in the water column while rising to the surface (above); Baby humpback whale calf raises its tail fluke while its mother supports it from below (top right); Adult humpback whale breaking the surface for a breath of air very close to our boat (right)

south each winter from their summer feeding grounds to mate and give birth in the warm and comparatively calm waters of the Bank.

About humpbacks

Growing to a length of 35 to 45ft (10 to 14m) and weighing approximately one ton (907kg) per foot, the humpback is the planet's seventh largest whale. Females are larger than the males and whales of the Pacific Ocean grow 5 to 8ft (1.5 to 2.4m) longer than those in the Atlantic. Measuring nearly a third of the length of the whale, the humpback's pectoral fins are the world's

largest animal appendage.

An irregular pattern of knobby tubercles along the trailing edge of the pectoral fins and tail fluke help redirect water flow and increase efficiency while swimming. Human engineers have copied that design pattern to create improved airflow on airplane wings, wind turbines and windmills. Similar tubercles on the whale's rostrum and jaw have whiskers and nerve fibers that act as a sensory organ, unique to humpbacks. The arrangement of the tubercles on each whale can be used to aid in identification, as can the distinct patterning of black and

white coloration on the pectoral fins and tail fluke.

Their scientific name, *Megaptera novaeangliae*, translates to "giant winged New Englander," in reference to their large pectoral fins and their common sightings off New England in the 1900s. Humpbacks feed on krill and small fish by lunging, mouth open, at schools of prey and engulfing huge amounts of water. The water is then pushed out through baleen plates in the jaw to filter out their meal.

The whales do not feed while on the Silver Bank and use their fat reserves to survive the lengthy migra-



tion. A female can lose up to a third of her body weight while fasting during the journey and subsequent nursing of her newborn calf. It is estimated that only 50 percent of the humpback calves survive their first year, due in part to the grueling long migration route and the predators encountered along the way.

The sanctuary

The Silver Bank is part of a larger

preserve called the Sanctuary of the Marine Mammals of the Dominican Republic. The sanctuary was established in 1986, expanded ten years later, and then again in 2012, and now covers an irregularly shaped area of over 40,000 sq mi (64,000 sq km). A series of shallow coral heads along the northeastern boundary act as a wave barrier that helps to subdue sea conditions, making it an ideal breeding and calving ground

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Aerial view of a mother and baby humpback whale with snorkelers maintaining a safe and proper distance at the surface

for the whales.

The 35 by 45mi (56 by 72km) Silver Bank was so named following the loss of a Spanish ship, laden with silver, which ran aground and sank on the coral heads in the 1600s. Voyagers must cross the Puerto Rico Trench, the world's third deepest, at over 14,000ft (4,267m) to access the Bank, and the deep water is home to several additional marine mammal species including sperm whales, which are occasionally spotted during the transit.

Conditions

We arrived at our mooring on the Silver Bank to significantly different weather conditions than when we departed the previous evening. The sky was dark and ominous, and the wind and waves had picked up substantially during our overnight transit. The ocean's surface was inundated in white caps from wind gusts that were consistently spiking between 26 and 29

miles per hour.

Regulations state that small boats are not allowed on the Bank if the wind is above 25mph, so we had to wait until the weather improved before venturing out to look for whales. Which is not to say that we did not see whales from the anchorage; we did, but we were unable to get up close or in the water with them. The day was spent getting to know our fellow passengers, preparing underwater cameras, assembling dry bags and snorkeling gear so we were ready when the wind dissipated. We also spent time learning about proper whale snorkeling techniques so we could make the most of our future interactions.

Rules, etiquette, procedure

Snorkeling is the only in-water humpback whale experience that is allowed at the Silver Bank. Scuba tanks or even diving down into the water column are prohibited. Guests are instructed to



IMAGE COURTESY OF CONSCIOUS BREATH ADVENTURES

quietly enter the water and to stay together at the surface as they slowly make their way over to the whales. The guide enters the water in advance of the group and communicates with the skiff driver as to when the proper time is for the guests to join the festivities.

There are thousands of whales on the Bank, but the key is finding a cooperative whale before even getting into the water. Once a whale is located, frequently by detecting their exhalation spout in the distance, the skiff carefully approaches and attempts to stay with the whale while observing their behavior and breath cycles.

A mother and calf at rest are often the easiest to swim with because the mother, if comfortable with the boat's presence,

will stay down for 20 to 40 minutes between breaths while her baby surfaces every three to eight minutes. The calves are still learning how they fit in this world and are very curious about their surroundings, often leading to a close inspection of the flotilla of snorkelers at the surface. There is nothing that compares to the feeling of wonder and pure joy that sweeps over you while staring into the eye of a whale!

A typical day on the water starts with rolling out of bed to a fresh cup of coffee and a made-to-order breakfast before boarding the tenders around 8:30 a.m. to begin searching for whales. Rarely does one have to venture very far, typically less than a couple of miles, leaving the vast majority of

the sanctuary solely to the whales and devoid of human presence. At some point in the middle of the day, the exact time being dependent on whale activity, the group returns to the mother ship for lunch before venturing back out for another excursion in the afternoon.

Sanctuary guidelines specify that visitors must be back at their liveaboards between 5:30/6:00 p.m., at which point cameras and gear are rinsed, showers are taken, and cocktails are served on the upper deck as guests enjoy the sunset and share stories from the day's activities. There was often an after-dinner presentation in the lounge where we learned about humpback whale behavior, biology, natural history, environmental threats, conservation



Stormy seas, waves and white caps churned up by high winds at the Silver Bank

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A young humpback whale calf practices breaching out of the water

efforts and what we as individuals can do to help protect the species.

Day Two at the anchorage was spent waiting in vain for the wind to subside. Conditions improved in the afternoon but were still not conducive to venturing out on the water. The crew kept spirits high with frequent snacks, and guests were encouraged by repeated whale sightings. Throughout the day, several whales even came in close to say hello, and one whale treated us to numerous breaches during our sunset cocktail hour.

Humpback behavior

With so many whales on the Bank, there was almost always some sort of behavior to observe. The whales were socializing with one another, displaying courtship rituals, and in

theory, mating—though neither the act of mating, nor the birth of a humpback whale, has actually been witnessed. Our efforts to decipher the meaning of these behaviors are purely theoretical but that does not diminish the fascination of watching the whales in action.

Breaching is perhaps the easiest behavior to identify as a whale launches itself headfirst, either partially or fully out of the water, before crashing back into the ocean with a large splash and often a twisting or spinning motion in midair. I have seen whales breach repeatedly, 20 to 30 times in a row without resting, and sometimes they breach once and are done. Equally impressive is a tail breach or peduncle throw, where the whale uses its large pectoral fins to stabilize its upper body under the

water while launching its tail in a sideways thrust, resulting in a loud splash. Humpbacks are known to utilize this behavior as a defense mechanism against attacking killer whales.

Lob tailing or tail slapping is similar in that the whale swings its tail forward and back out of the water, smacking the surface with a boisterous splash. While laying at the surface, humpback whales can produce a similarly loud splash by slamming their massive pectoral fin or fins into the water in what is called a pec slap. The sound can be heard at great distances underwater and is likely some form of communication.

It is not advisable to be in the water during any of the above behaviors, but they make for fantastic photo ops from the safety of the skiffs. These behaviors would also make for great



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Silver Bank



A young humpback whale calf uses its long pectoral fin to slap the water's surface in what is called a pec slap (left); A rainbow forms off a passing rain shower over the Atlantic Ocean (top right); A young humpback whale calf splashes back into the water after a breach (bottom right)

subjects for drone photography, except that unmanned aircraft are only allowed on the Silver Bank with prior permission and a special permit, typically granted solely to documentary film crews. I was not able to obtain a permit, but each of the three boats is allowed to fly a drone for self-promotional footage, and thus the aerial images included with this story are courtesy of Conscious Breath Adventures.

Simulations

We awoke to continued overcast and windy conditions on Day Three, though thankfully the gusts had diminished enough to allow us to head out on the skiffs to look for whales. After breakfast, we loaded up the small boats and commenced with a practice

snorkel drill.

Sitting on the railing with our fins over the edge, the group waited for the boat driver's instruction to enter the water, upon the go-ahead signal from our guide, who was already floating over to a make-believe whale. Permission granted, we eased into the water and slowly made our way over to the simulated whale, doing our best to remember to keep our fins under the surface, so as to remain as silent as possible and not disturb a real whale.

Mission accomplished, we began scanning the horizon for whale spouts amongst the white caps in hopes of utilizing our new-found skills. The opportunity to get back in the water did not materialize as we were hit with a

rainsquall that reduced visibility to nearly zero. The wind picked up again over lunch, and we were unable to get back in the small boats until late afternoon.

Encounters

We had a wonderful up-close encounter with a mother, calf and escort as they let us follow along from the surface, though we were unable to get in the water. At the end of the day, as we made our way back to the liveaboard, a passing cloudburst produced a huge rainbow over the anchorage, instilling hope for a better tomorrow.

When a male is looking to mate with a female, he will stay in close proximity until she is receptive, which can be in as little as 10 to 14





A baby humpback whale calf rises to the surface for a breath of air.

days after she has given birth. The calves are born after a 12-month gestation period and are about a third as long as their mothers.

The primary suitor is called an escort, and each additional male that attempts to court the same female is labeled a challenger. When there are multiple challengers, all vying for the same female, the competition can be intense and is referred to as a rowdy group or a heat run. These clashes are more prevalent later in the season, when there are fewer females remaining on the Bank.

The males chase the female in an attempt to overtake the escort, all the while fighting with one another for position by slamming into one another with bodies, tails and pectoral fins and even attempting to prevent their

opponents from rising to the surface for air. As a result, males will often have scars and battle wounds on their bodies that make them easier to distinguish from the relatively unblemished females. Humpback whales reach sexual maturity between five and eight years of age and are thought to have a lengthy 20- to 30-year reproductive life cycle, during their lifespan of around 70 to 90 years.

Threats

In addition to the challenges that humpback whales face from Mother Nature, sadly there are also multiple man-made threats to their existence. Commercial whaling decimated their population and drove the species to near extinction before the United

Nations recommended a 10-year moratorium on whaling in 1972. The International Whaling Commission voted to further pause commercial whaling in 1982, but a loophole that allows for whaling in the name of research has been exploited by several nations, which continue the practice to this day.

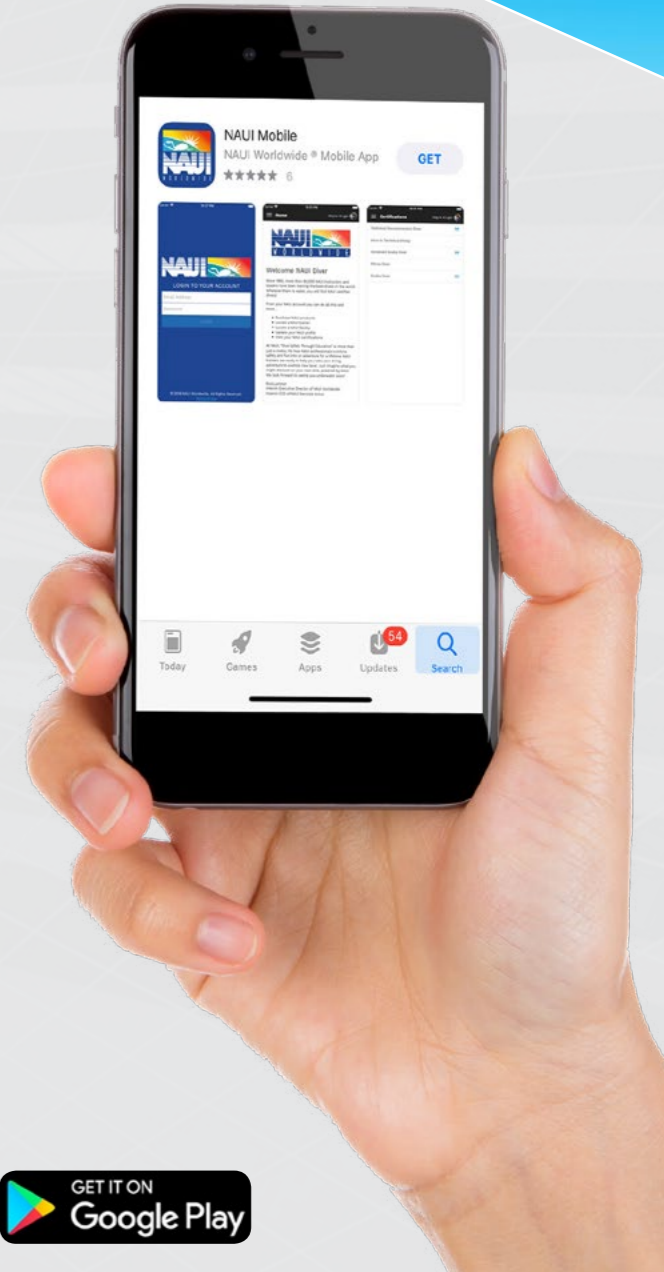
Fishing gear and the threat of entanglement affects hundreds of thousands of cetaceans each year. Our consumer habits can assist on two fronts: by choosing to purchase sustainable seafood to help bring about the replacement of outdated fishing techniques with less hazardous methods, as well as curbing the demand for whale meat and blubber. Until such time as when fishing practices are no longer a



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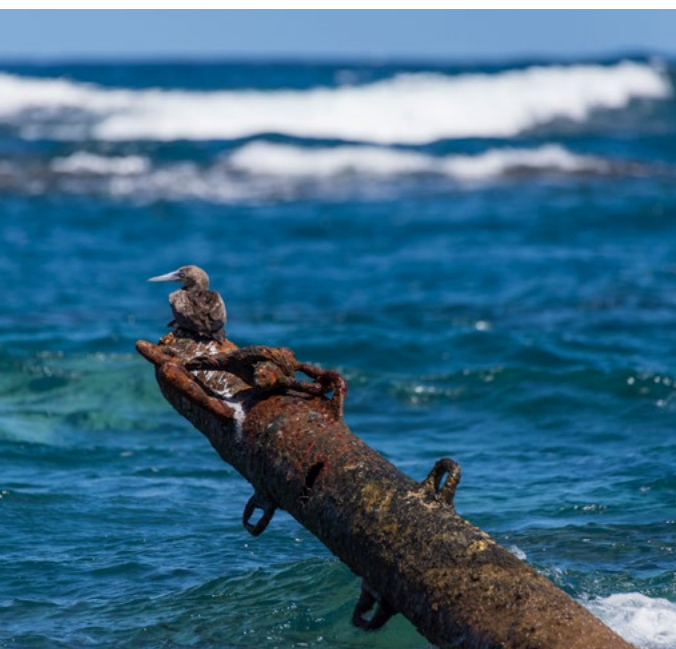
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Remnants can be seen of the *Polyxeni* freighter that shipwrecked on the shallow coral heads of the Silver Bank (top right), much of which is now mostly underwater after being destroyed by multiple hurricanes (above and right); Brown booby bird rests on top of the remnants of the *Polyxeni* (left)

Finally, global warming, ocean acidification and pollution all negatively impact the very water the whales need to survive. Sanctuaries like the Silver Bank are critically important to the health of the species, and they need our continued support.

Displays and interactions

The weather continued to improve on Day Four and we were treated to a fantastic display as six to eight rowdy males chased a female shortly into our morning session. Multiple mother-and-calf pairings followed, but none were stationary enough to allow us to get wet.

Just before lunch, we decided to explore the resident shipwreck, a Greek freighter named *Polyxeni*, which ran aground on the coral heads, decades earlier. Her rusty hull had remained largely above water until two recent hurricanes decimated her remains. It felt great to get back in the water and stretch our



threat, a global network of entanglement response teams has been established to attempt to remove the lines and nets from a whale once it becomes ensnared.

Shipping lanes that bisect whale migration routes and feeding grounds put whales at risk of being struck by ships, leading to injury or death. Research studies can help identify such interactions, and the findings can be used to advocate for changes to shipping lanes to protect the whales.



Mother and baby humpback whale calf rise to the surface for a breath of air (above); A humpback whale surfaces in front of pink sunset (right)

legs, even if we were not yet swimming with whales.

Our afternoon began with a brief encounter with a singing male moving slowly amongst the shallow coral heads, but unfortunately, he eluded us before we were able to get close enough to hop in the water. Finally, we came across the mother and newborn calf, whose interaction at the start of this story allowed us to ultimately see our first whales underwater.

The remainder of the day was spent on board the skiff in pursuit of a rambunctious calf who was repeatedly practicing its breaching, though not always successfully. It was fascinating to watch the calf attempt to emulate the behavior.

We had hoped that it would eventually tire itself out, requiring mom and baby to stop and rest and allow us to get back in the water, but they never lingered. After more than an hour of watching and photographing them from the surface, we had to break off for the day and head for home. That evening, we enjoyed an outdoor BBQ and a night sky presentation on the upper deck. Stargazing while out at the Silver Bank is phenomenal due to the complete lack of light pollution.

Humpback songs

Humpback whales produce elaborate songs of clicks and whistles that can last up to 20 to 40 minutes and each tune is unique to the whales that inhabit a par-

ticular geographic region. The North Atlantic humpback whales have a different song than the humpbacks from the South Atlantic, which is different than the whales in the Pacific. Whales from the same population all sing the same song, though each whale sings in their own voice.

Cetaceans have no vocal cords and use a larynx-type structure in the throat to generate their melodies. They do not need to exhale to create sound, so the exact mechanism by which they sing is still a bit of a mystery. Most of the singers, or singing whales, are male and they frequently orient themselves with their heads down, vertically in the water column while singing.

If you are lucky enough to be in the



water with a singer, not only can you hear the song, frequently you can also feel the sound waves as they resonate in your chest, arms or legs. Each person experiences the vibrations differently, depending on their own physiology. Every skiff has a hydrophone on board allowing guests to listen to the songs

even when the whales are not close enough for snorkeling. We were fortunate to hear singers on multiple occasions during our trip.

Calm seas and curious calf

Our last day on the water began with blue skies, sunshine and the calmest seas

A mother and baby humpback whale calf at the water's surface for a breath of air (left); The *Sea Hunter* liveaboard dive boat anchored on the Silver Bank (below); Water drains off the tail fluke of a baby humpback whale calf as it dives below the water's surface (bottom right).



we had experienced to date. Numerous whales were breaching and tail slapping on the distant horizon, and we took this as an encouraging sign of things to come.

The morning started slowly as we spotted a few spouts but had no luck finding a cooperative whale with which to swim. Around 11:30 a.m., we came upon a mother, calf and escort, which took interest in our boat and stayed in close proximity as we excitedly donned our snorkel gear in hopes that they would allow us to join them in the water.

Timing their breathing cycles, we knew that mom was staying down for nearly 20 minutes between breaths, and so, when she next headed under, we slipped into the water and swam for her "footprint" on the water's surface, where she disappeared. With all of the

recent wind and wave action, the visibility was not ideal, but she was visible below us with the baby tucked under her bright white pectoral fin. A few minutes later, the youngster came up for several breaths and an inspection of the gaggle of humans at the surface. It then went down and came up two more times before mom joined him at the surface and then went down again herself to continue resting. This went on for well over an hour in what would be our best snorkeling opportunity of the trip. It was absolutely amazing to spend this much time watching a baby whale exploring its world!

The skiff with the other half of our passengers on board the liveaboard had come over to join us towards the end of our time in the water. We traded places

with them the next time mom came up for air and slowly moved our boat away so they could enjoy their time in the water. As we were debating whether to risk running back for lunch, the trio of whales appeared again around our boat. We had no idea what was drawing them to us as opposed to our sister ship, but the whales proceeded to swim near our boat for the next three hours.

We had begun monitoring breath cycles, preparing for another in-water session when the calf changed course, came in for a closer look and rubbed the underside of our boat. Mom joined her calf at the surface soon after, as they swam around us in tight circles. With no room to get in the water for fear of landing on the whales, we did our best to capture the scene from the surface as



Looking down on the city of Puerto Plata from the only cable car in the Caribbean, located on Mount Isabel de Torres (above); Replica of Christ the Redeemer statue, sitting on top of a fortress at the top of Mount Isabel de Torres (left); Statue of Neptune on a small island just offshore of Puerto Plata (top right); Chocolate bars from the Del Oro factory in Puerto Plata (right); colorful Umbrella Street near Central Park in downtown Puerto Plata was decorated with a mask for Carnival (far right)



the scenario persisted. After several days of weather-related frustration, we were rewarded with a fantastic prolonged interaction and one of my most memorable days on the water with whales.

Topside attractions

The Dominican Republic is a fantastic place to spend a few days before or after your whale-watching adventure.

We spent a day exploring the area around Puerto Plata on the front end of our trip. The day started with a ride on the Caribbean's only cable car up to the top of Mount Isabel de Torres at 2,600ft (793m). At the summit, there are spectacular views of the city and the Atlantic Ocean beyond as well as walking paths, gardens, lagoons, a cave to explore and a smaller-sized replica of the Christ the

Redeemer statue. Numerous tour guides are available to show you around for tip money, or you are welcome to sightsee on your own.

Once back in the city, we stopped at the Del Oro chocolate factory to refuel and learn about the chocolate-making process. Del Oro produces several varieties of chocolate ranging from milk to dark, and all are certified organic from locally sourced cocoa farms.

Reluctantly departing the chocolate factory, we made our way to the famous Malecon, or esplanade, along the waterfront and stopped briefly to photograph the statue of Neptune. This 22ft (7m) bronze statue is mounted on a small

island just offshore and serves as the guardian of the harbor.

Continuing north along the Avenida General Gregorio Luperón, our next stop was the Fortress of San Felipe. Built by the Spanish in the 16th century to defend the Dominican Republic from pirates, the fort is now a museum featuring some of the original canons and weaponry. Nearby, a lovely woman was peddling the opportunity to take pictures with her donkey, and while I declined to pose myself, I happily paid her to let me photograph the donkey beside the fortress.

Puerto Plata Central Park was our final destination, along with Umbrella Street and the Paseo de Doña Blanca. The

park is more comparable to a quaint town square, with a gazebo in the middle, benches all around and a striking Catholic Cathedral at one end. A short walk from the park, taking you past local shops and colorful Victorian homes, is Umbrella Street. This tourist attraction



Umbrella Street, near Central Park in downtown Puerto Plata (above); Sunset over the Silver Bank silhouettes a large sailboat (left).



is designed for photographs and consists of hundreds of rainbow-colored umbrellas suspended over the street. Less than a block away is Paseo de Doña Blanca, an alleyway that has been entirely painted pink. A bronze figure on a bench, where vacationers pose

encounters we were experiencing just one day earlier. The opportunity to swim with humpback whales is a once-in-a-lifetime type of adventure that I wish I could repeat every year. I am truly struggling to find the words to describe how extraordinary it is to be in the water with

for pictures, and the green plants are the only items that diverge from the color scheme.

Afterthoughts

Our time at the Silver Bank was over far too soon. We returned to the marina after six days off the grid to news of closing borders and cancelled flights from the then impending coronavirus pandemic—a far cry from the awe-inspiring, face-to-face



Silver Bank

whales. I will find a way to return to the Silver Bank, and I urge you to make the voyage yourself. Bring the whole family—you will thank me later. ■

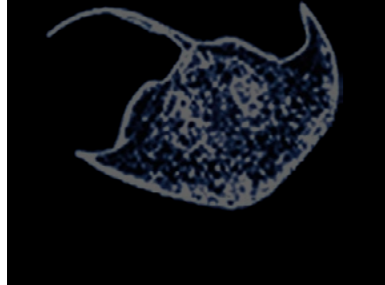
The author would like to thank Conscious Breath Adventures (consciousbreath-adventures.com) for hosting this excursion, the Dominican Republic Ministry of Tourism (godominicanrepublic.com) for their help with flights and logistics, Emotions Playa Dorada (emotionpuertoplata.com) for lodging and the crew of the MV Sea Hunter (underseahunter.com) for taking such good care of us. Thanks also go to Scubapro (scubapro.com) and Blue Abyss Photo (blueabyssphoto.com) for their assistance with underwater dive and photo gear.

Matthew Meier is a professional underwater photographer and travel writer based in San Diego, California. To see more of his work and to order photo prints, please visit: matthewmeierphoto.com.



Donkey wearing flowers poses for tourist photos while standing in front of the Fortaleza San Felipe (above); This pink alley is a tourist attraction near downtown Puerto Plata named Paseo de Doña Blanca (top right).

fact file



Dominican Republic



SOURCES: CONSCIOUSBREATHADVENTURES.COM
US CIA WORLD FACTBOOK, CDC.GOV, STATE.
TRAVEL.US, WIKIPEDIA.ORG, XE.COM

History Christopher Columbus discovered the island of Hispaniola in 1492 at the start of the Spanish conquest of the Caribbean and prior to his landing on the US mainland. In 1697, Spain recognized France's claim to the western third of the island, which became known as Haiti in 1804. The remainder of the island, then known as Santo Domingo, sought to gain their own independence in 1821, but they were conquered by the Haitians, who ruled for the next 22 years, before finally becoming a separate country, called the Dominican Republic, in 1844.

The Silver Bank Sanctuary for humpback whales was established in 1986, and ten years later, that protected area was enlarged, improved and renamed the Sanctuary of the Marine Mammals of the Dominican Republic. Several nursing areas for the humpback whales are safeguarded within the sanctuary, and all activity is strictly regulated. No vessels may visit during whale season without a permit, and there are only three whale-watching permits issued, limiting the number of visitors to roughly 600 persons per season. Government: Presidential republic. Capital: Santo Domingo

Geography The Dominican Republic occupies the eastern

two-thirds of the island of Hispaniola, which is located between the Caribbean Sea and the Atlantic Ocean. The countryside consists of rugged mountains, fertile agricultural valleys and hundreds of miles of shoreline. It includes the Caribbean's largest lake and its tallest mountain, Pico Duarte, at 10,164ft (3,098m). The Silver Bank is located north of the Dominican Republic, east of Turks and Caicos, and is 70 miles (112km) from the nearest island. The rocky plateau rises to depths of 60 to 100ft (18 to 30m) and covers an irregularly shaped area of 35 by 45 miles (56 by 72km). Coral heads on the northeastern edge of the bank protect the anchorage from significant ocean swell and help make it an ideal calving and mating area for the humpback whales.

Climate The climate is tropical year round, with minimal temperature fluctuations. During the ten-week humpback whale season, which runs mid-January through early April, daytime air tempera-

tures can reach 85°F (30°C) and drop down to 70-75°F (21-24°C) at night. Water temperatures range from 72-80°F (22-26°C) and a rash guard or wetsuit is advisable for both warmth and sun protection while snorkeling.

Environmental issues Challenges include deforestation, water shortages and damage to coral reefs by soil eroding into the sea.

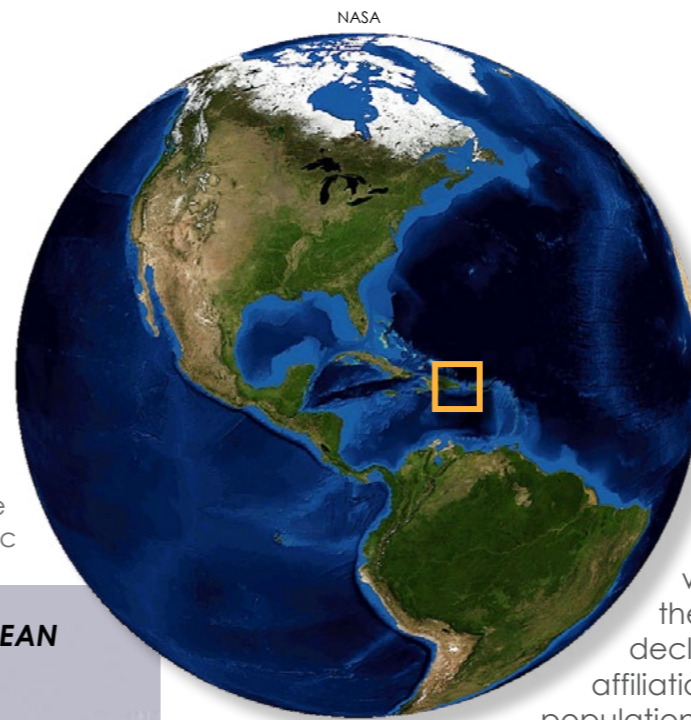
Economy Historically, the economy was supported by the primary exports of sugar, coffee and tobacco; however, with the



US CIA WORLD FACTBOOK / PUBLIC DOMAIN

RIGHT: Location of the Dominican Republic on global map

BELOW: Location of Silver Bank on map of the Dominican Republic



growth in construction and tourism, the Dominican Republic has significantly increased the number of service industry jobs over the last three decades. Starting in 2012, the country also began extracting gold and silver from one of the largest mines in the world. Roughly half of the country's exports and nearly

40 percent of its imports occur with the United States. Additionally, the Dominican Republic is the world's leading exporter of organic cocoa for the chocolate industry.

Currency Dominican Pesos (DOP). Credit cards are accepted on board and at larger hotels and resorts, but ATMs and banks are difficult to find outside of major cities. Exchange rates: 1USD=58.45DOP; 1EUR=69.06DOP; 1GBP=75.84DOP; 1AUD=42.21DOP; 1SGD=43.17DOP

Population The Dominican Republic has a population of 10.5

million (July 2020 est), of which over 70% identify themselves as having some sort of mixed ancestry. Roman Catholic is the religion of choice for roughly 48% of Dominicans, while nearly 30% of the population has not declared any religious affiliation. Over 80% of the population lives in urban areas, mostly in coastal developments and that number is rising at a rate of approximately 2% per year.

Language The official language is Spanish, though English is generally spoken in tourist areas and by most of the crew on board the liveaboards.

Phone/Internet There is no Internet or cell service on board once out at sea, though the boat does have a satellite phone in case of emergencies. Wi-Fi is available when anchored in the marina and at major hotels.

Voltage Electricity is 120 volts/60 Hz, and the plugs have two or three prongs that match types A, B and C. The liveaboards visiting the Silver Bank are likely from a different country, so the sockets may be different. It is recommended that you inquire as to whether an adaptor is needed.

Cuisine The food on board is a mixture of international dishes and local fare, which can be tailored to meet any dietary constraints. Daily made-to-order breakfast, along with buffet style lunch and dinners, are provided, with snacks served between meals.

Tipping Tipping is expected on liveboard dive boats, and each establishment has its own guidelines and suggestions. A tip of 10 to 15% of the value of your trip is generally recommended.

Health Please check with your state department or local embassy for the latest travel restrictions due to the coronavirus pandemic. There is a high degree of risk for food or waterborne diseases such as bacterial diarrhea, hepatitis A and typhoid fever; as well as vectorborne diseases such as dengue fever. Check with the WHO or your dive operator for prophylaxis recommendations and required vaccines.

Hyperbaric chamber The nearest chamber to the Silver Bank is in Puerto Plata. However, as all humpback whale interactions are on the surface and involve snorkeling only, a chamber should not be necessary.

Travel/Visa/Security Please check with your state department for the latest travel advisories and restrictions due to the coronavirus pandemic. International airports in either Puerto Plata (POP) or Santiago (STI) are within 30 to 90 minutes respectively from the Ocean World Marina, where the liveboard boats dock. A passport is required for entry into the Dominican Republic and must be valid for at least six months past your departure date. A visa is only necessary if you are staying more than 30 days.

Websites Dominican Republic Tourism godominicanrepublic.com

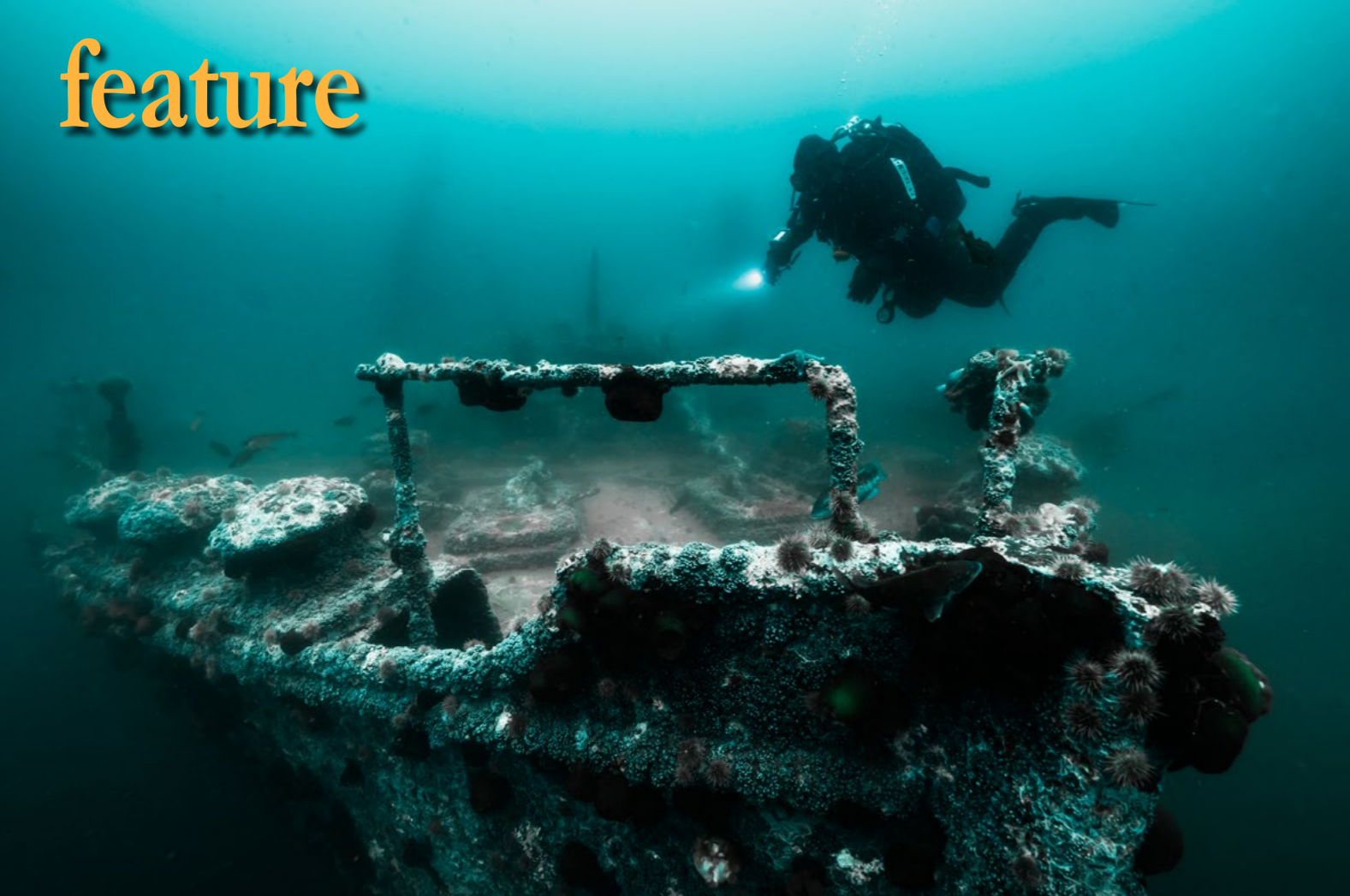
A diver is seen swimming through a large opening in a shipwreck. The scene is dimly lit with a strong blue-green light source from above, creating a dramatic atmosphere. The wreck's structure is visible in the foreground and background, with various pieces of metal and debris scattered around.

My Favorite Wreck Dive

Contributors' Picks from Around the World

Text and photos by Scott Bennett, Larry Cohen, Amanda Cotton, Frankie Grant, Jennifer Idol, Kate Jonker, Matthew Meier, Brandi Mueller, Don Silcock, Olga Torrey and Claudia Weber-Gebert

We asked our contributors what their favorite wreck dive was and they answered with tales and images of remarkable wrecks of all sorts and the artifacts found on them, giving first-hand accounts of their experiences on these underwater time capsules as well as glimpses into the history of each wreck. *X-Ray Mag* contributors reveal the eerie beauty and reverence of underwater wrecks and wreck sites—from the topical waters of Grenada, Chuuk Lagoon, Solomon Islands and Papua New Guinea, to the subtropical waters of the Florida Keys, Southern California, the Egyptian Red Sea and Queensland, Australia, to the temperate waters off North Carolina, Newfoundland and Croatia.

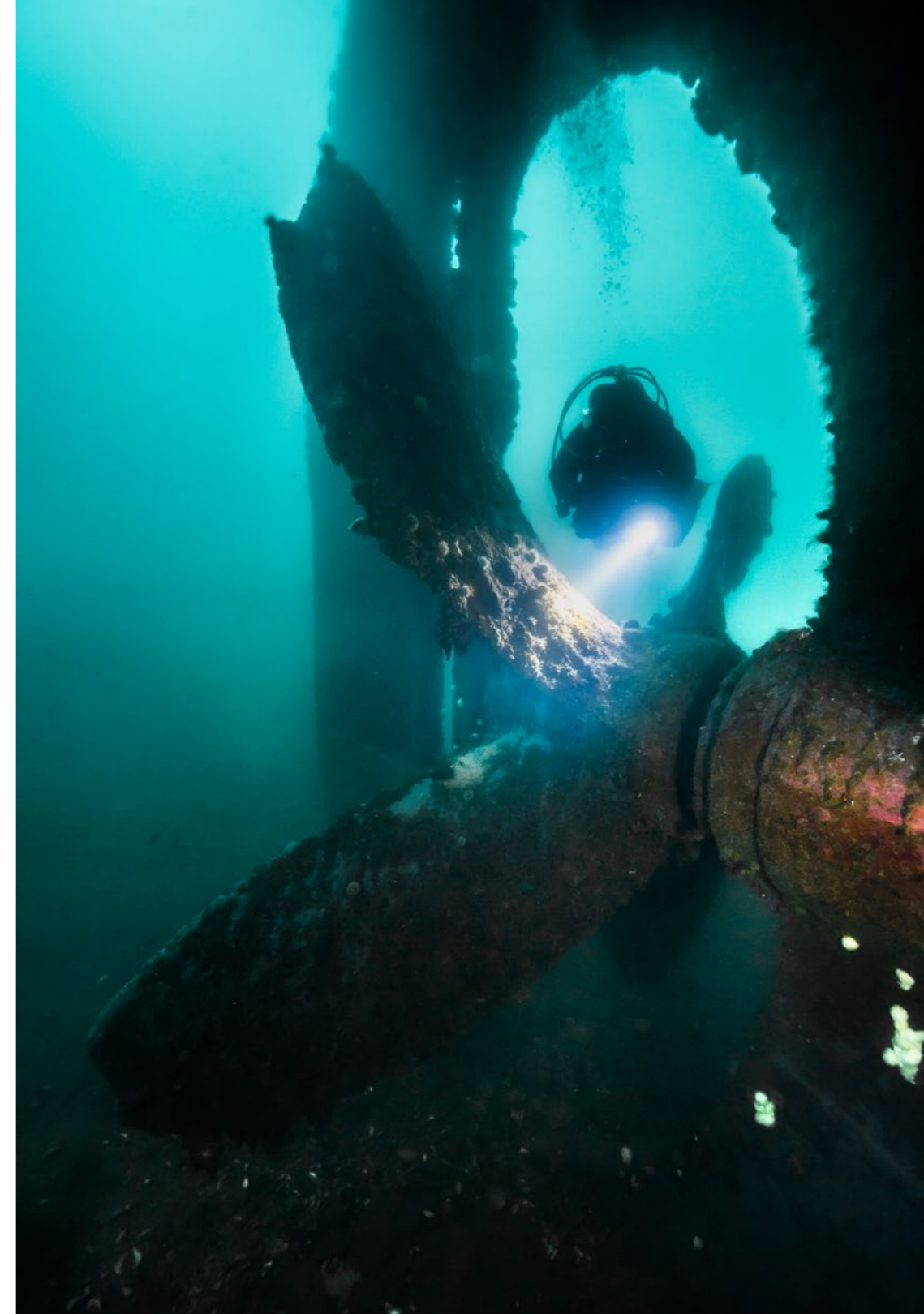


PREVIOUS PAGE: The SS *PLM 27* steel-hulled cargo ship was sunk on 2 November 1942 in Conception Bay at Bell Island, Newfoundland, Canada. This photo shows the damage to the midship of *PLM 27*. The force of the torpedo easily peeled the steel hull open. Exposure: ISO 1250, 14mm, f/8, 1/60s. Camera gear used in all images: Nikon D5 camera, Nikkor 14-24mm lens, Nauticam housing, Inon Z240 strobes

From the bow of SS *PLM 27*, the flattened decks can be seen in the distance. Exposure: ISO 1250, 24mm, f/11, 1/80s (left)

The German U-boat *U-518* fired a torpedo through *PLM 27*'s midship and left a significant hole. Exposure: ISO 1250, 14mm, f/10, 1/80s (below)

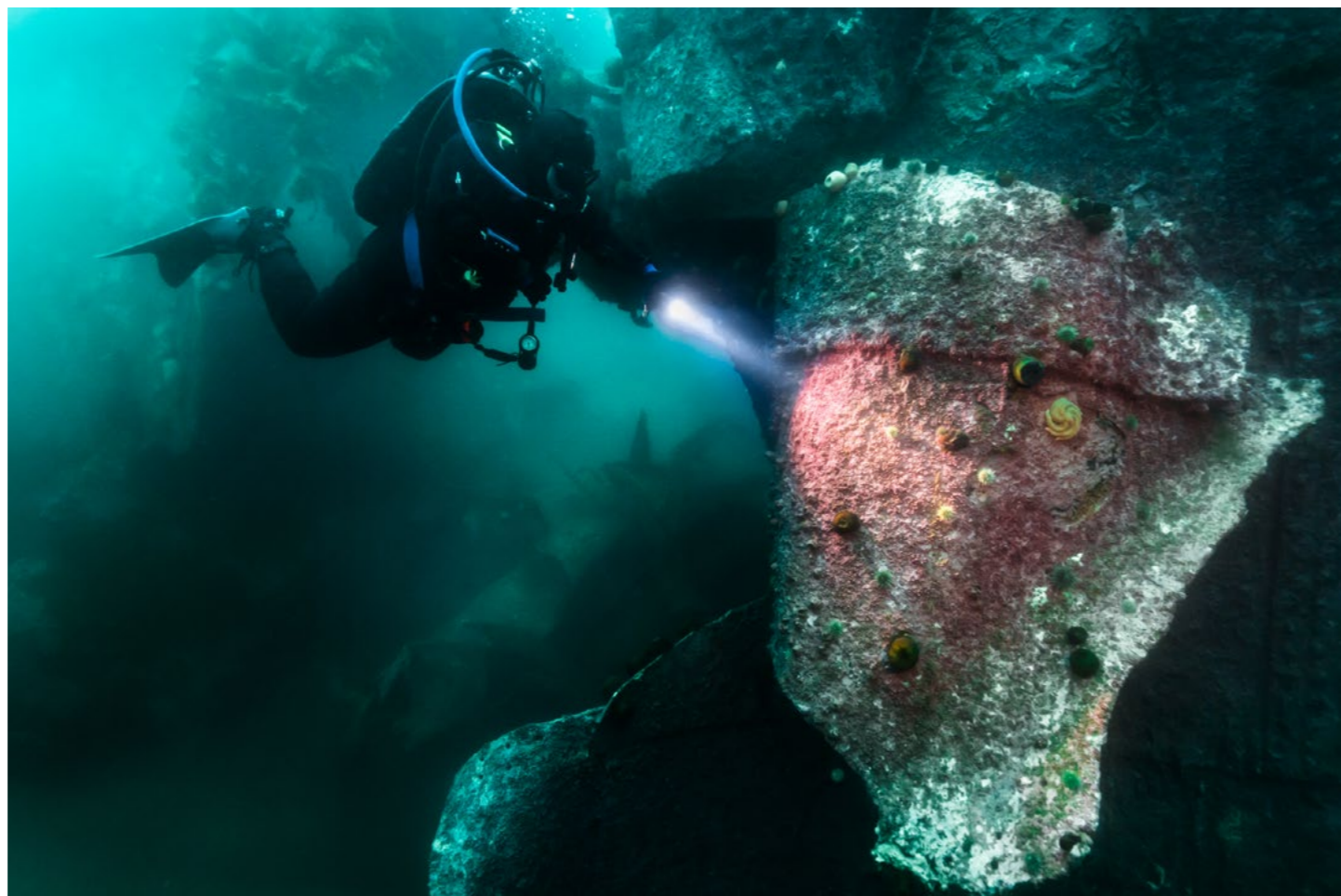
Of the four ships that sank on Bell Island during WWII, *PLM 27*'s propeller is the only one remaining from early salvage operations. Exposure: ISO 1250, 14mm, f/6.3, 1/60s (right)



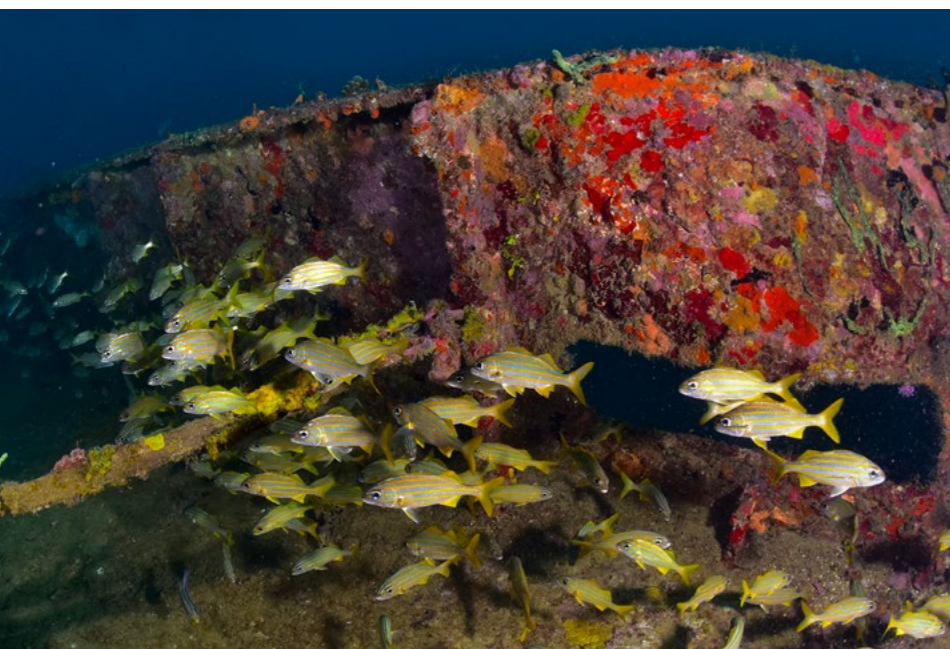
Newfoundland's SS PLM 27

Text and photos by Jennifer Idol

The first dive of any type (and more specifically, wreck diving) is incomparable, so my first Newfoundland wreck dive became my latest favorite wreck dive because of its storied history and the magnificence of the wrecks themselves. I began diving the SS *PLM 27*, the shallowest of the four wrecks sunk by German U-boats in Conception Bay during WWII. This allowed more time to explore the ship from bow to stern. At 400ft (122m) long, the *PLM 27* is an impressive introduction to the intact wrecks found here, though this one is the most damaged of the four ships. These merchant ships, which carried iron ore essential for constructing steel-hulled ships (especially during the war from Bell Island), were sunk in retaliation when Newfoundland stopped selling ore to Germany. I aimed to capture the devastation of this destruction



and the ship's character by focusing on iconic parts of the ship—the bow, propeller, and torpedo hole—and used silhouettes and ambient light, helped by strobes, to emphasize the ship's structure. I love this wreck so much that I lead trips through Ocean Quest Adventures to help others learn how to photograph the numerous wreck sites in the area. Visit: uwDesigner.com



COUNTERCLOCKWISE: On the *Shake'M* wreck, diver and coral (exposure: ISO 400, f/13, 1/100s); smallmouth grunts (exposure: ISO 400, f/9, 1/125s); diver with telesto soft corals (exposure: ISO 400, f/14, 1/100s); the crane (exposure: ISO 400, f/7.1, 1/125s); up the ladder (exposure: ISO 400, f/7.1, 1/125s). Camera gear used for all images: Nikon D810 camera, 10.5mm Nikon lens, Seacam housing, two Ikelite D160 strobes



Creating inspirational experiences



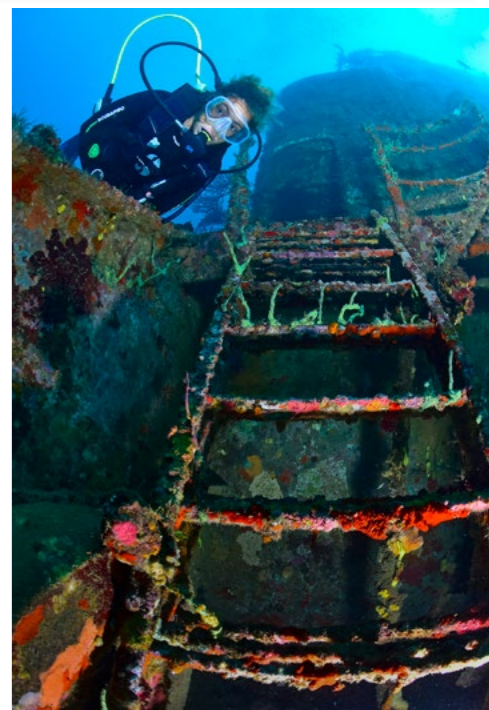
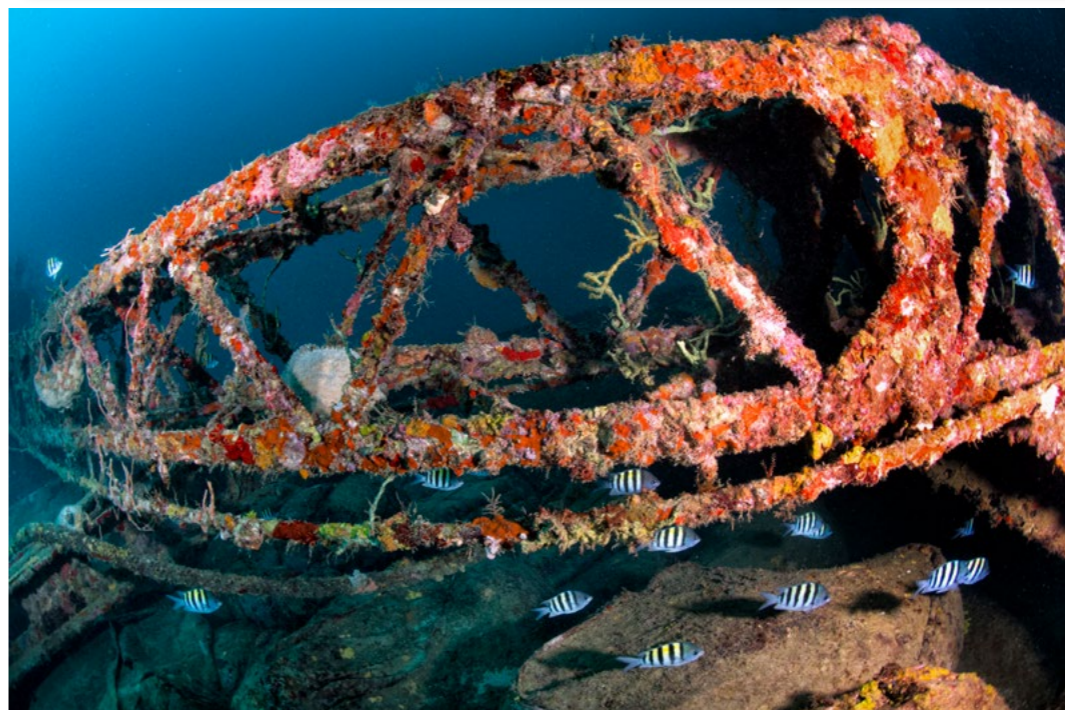


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Grenada's *MV Shake'M*

Text and photos by Scott Bennett

Anchored at the southern end of the Grenadines, Grenada is renowned as the wreck diving capital of the Caribbean. Amongst the island's 30+ dive sites, around 15 separate wrecks can be found off the southern coast, along with three on the rougher Atlantic side. During a weeklong visit with Aquanauts Grenada, a dive at the *MV Shake'M* quickly became a favourite. A 55m freighter, it capsized in May 2001 after its overloaded cargo of cement shifted during a storm. Virtually intact and resting upright at 32m, the decks are situated at around 25m. Massive bags of cement remain strewn across

the open cargo hold, along with machinery and a large crane. Despite its recent sinking, a dense mantle of marine life has already enveloped the vessel, including sponges, fan corals, and most impressive of all, swathes of white telesto soft coral. Fish life is also abundant, including smallmouth grunts, French angelfish, sergeant majors, and the occasional barracuda. Between the fish life and the wreck itself, wide-angle photo opportunities abound. I was also fortunate to have an experienced model as my dive buddy. Grenada-born Tatiana Costantini, a former Aquanauts employee, instinctively posed in all the best spots. Shots of her looking down the ladder and peering from behind the telesto coral made a spectacular dive even better! Visit: xray-mag.com/contributors/ScottBennett



The *Hoki Maru* was transporting car and truck parts when she was sunk (top left); The ship had bombs and ammunition in her cargo holds (above); The size of the *Hoki Maru*'s propeller is impressive (right); Human remains can still be seen, reminding us of the horror of the war (left). Camera gear for all images: Olympus Evolt E-620 camera, Olympus Zuiko 7-14mm f/4.0 lens, Olympus PT-E06 housing with Olympus dome port, dual Sea&Sea strobes, plus a focus light with a sensor, mounted above the port, which goes out when the strobes fire.

***Hoki Maru*, Chuuk, Micronesia**

Text and photos by Larry Cohen

I was in Chuuk Lagoon nine years ago, and to this day, the *Hoki Maru* remains one of my favorite wreck dives. She sits on an even keel with a slight list to port. Her superstructure is at 24m (80ft), the deck at 36m (120ft), and she rests in 50m (165ft). The holds contain many types of cargo, including bombs, ammunition and vehicles. From the huge propeller that is still attached on the outside to all the cargo inside, there is plenty to explore. Inside the wreck, you can still see human remains. This is a stark reminder of what happened on 17 February 1944.

One of the many reasons I love shipwrecks

is their beauty and how they attract life.

However, we cannot forget the reason why they are underwater. Horrifying events, including war, sent these proud ships to their watery graves.

The *Hoki Maru* was built in 1921 for the Union Steamship Corporation of New Zealand. Her original name was the MV *Hauraki*. She was 136m (450ft) long with a gross tonnage of 7,112 tons. She had the most modern diesel, eight-cylinder four-stroke engine at the time and two huge propellers.

In July 1942, she left Sydney, Australia, with a crew of 50 New Zealanders, when the Japanese captured her. The ship was then taken to

Singapore, after 18 months of being overhauled. The vessel was recommissioned as the *Hoki Maru* in January 1944.

But timing is everything. She arrived at Chuuk Lagoon on 15 February 1944. The US Navy attacked Chuuk Lagoon two days later in Operation Hailstone. The *Hoki Maru* was torpedoed and burned. The ship sank before the next day. Visit: liquidimagesuw.com

SOURCES: TRUKWRECKDIVING.COM, WIKIPEDIA.COM



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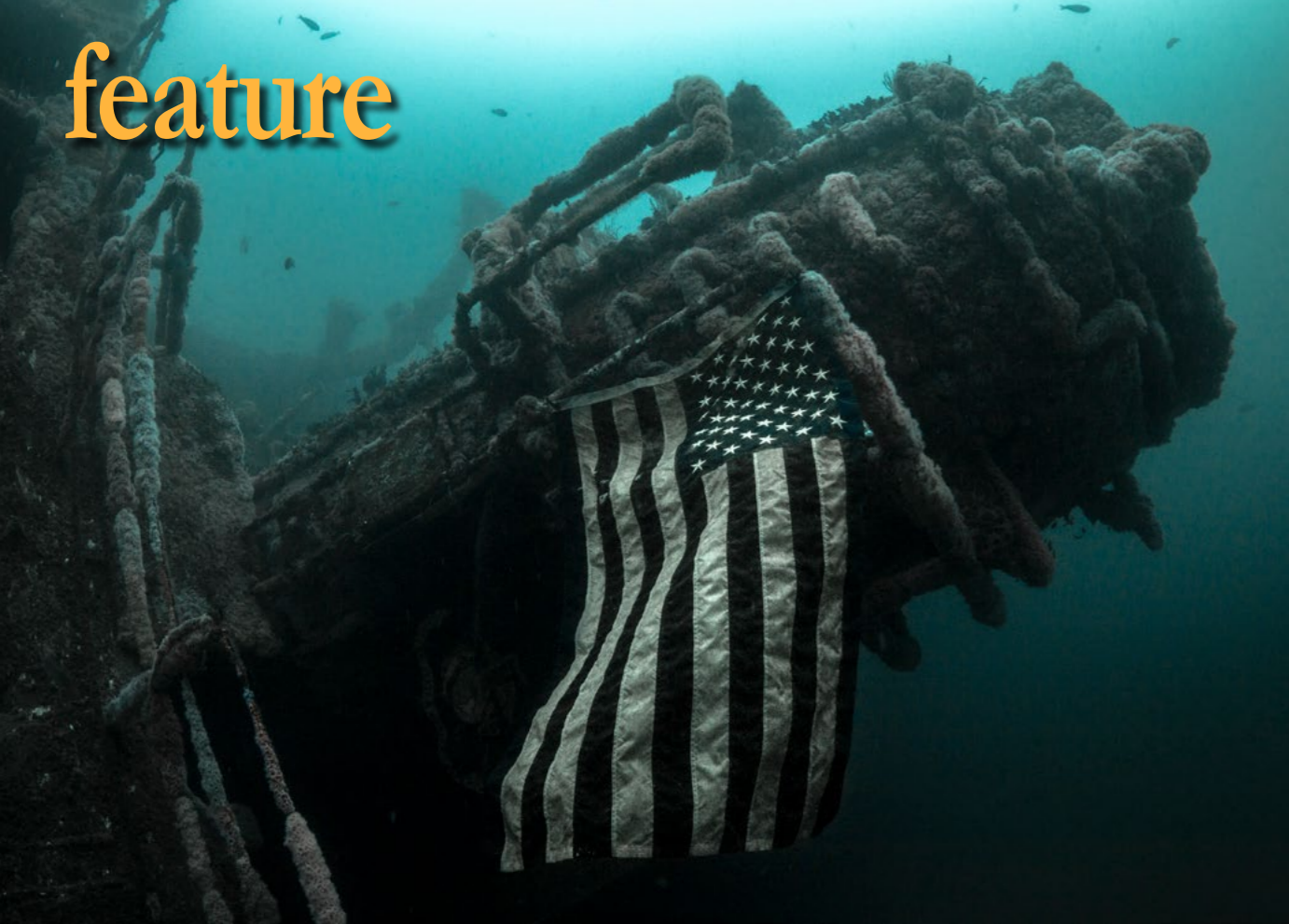
Text and photos by Amanda Cotton

The *Yongala* wreck attracts the weird and wonderful within the ocean realm. A 109m steel passenger and freight steamer ship, which sank in 1911 with 122 aboard, she is one of the most intact historic shipwrecks of great length. Laid to rest in the middle of a vast shipping lane off the coast of Queensland, the *Yongala* is an outpost refuge for a large variety of traveling marine life. The intriguing aspect of the species encoun-

tered on this dive is their size and numbers; the marine life here often seems to be much larger than in other areas of the region and the world. The sheer numbers and variety of marine life found on the *Yongala* are a diver's delight and offer encounters found nowhere else in the world. Diving the *Yongala* wreck is a unique experience and will continue to be far into the future, thanks in part to legislation limits put in place to protect the site and the wreck. Please visit: acottonphoto.com



Located in the middle of a shipping channel, the wreck offers refuge for many species as they travel across remote and barren areas in the region with little relief. Exposure: ISO 400, f/7.1, 1/160s (above); The *Yongala* wreck attracts a wide variety of marine life, including large schools of fish. Exposure: ISO 320, f/7.1, 1/60s (top left); The marine life on the *Yongala* wreck is not only abundant, but seemingly larger in size and healthier than their counterparts found elsewhere. Exposure: ISO 400, f/5.6, 1/125s (left)



HMCS Yukon, Wreck Alley, San Diego, United States, Pacific Ocean (left). Exposure: ISO 400, f/6.3, 1/50s. Camera gear: Canon 7d Mark II, Tokina 10-17mm fisheye, Sea&Sea housing, dual YS-D2 strobes

Gen. Hoyt S. Vandenberg, Key West, Florida Keys, FL, USA (below). Exposure: ISO 320, f/16, 1/60s. Camera gear: Canon 7d Mark II, Tokina 10-17mm fisheye, Sea&Sea housing, dual YS-D2 strobes

Gen. Hoyt S. Vandenberg off Key West and HMCS Yukon off San Diego, USA

Text and photos by Frankie Grant

Two of my most favorite wreck dives are in the United States: the *Gen. Hoyt S. Vandenberg* wreck off Key West in the Florida Keys; and the *HMCS Yukon* wreck, located in Wreck Alley off San Diego.

The *Vandenberg*, which lies at the southernmost tip of the Florida Keys, is the second largest artificially sunken wreck in the world. This purposefully created reef is not only a playground for avid divers but also home to a variety of species, both large and small. At over 522ft long, you can spend an entire week diving this wreck and never take the same path, allowing divers to return time and again and still have just as much fun as their first dive on the *Vandenberg*.

The *Yukon* was sunk in 2000 when unpredictable winds led to the premature sinking of this vessel, causing it to list over onto its side. This created an

extra level of difficulty navigating the wreck, due to disorientation caused by the wreck's position. Adventurous divers who become accustomed to the average of 15ft visibility, are occasionally surprised by late summer days boasting over 80ft of visibility throughout Wreck Alley. Persistence and patience are key for the West Coast diver. Visit: frankiegrant.com



Wreck Dives

Stern of *Momokawa Maru*, a Japanese merchant ship sunk in Chuuk Lagoon in 1944. Exposure: ISO 320, f/7.1, 1/100s

Momokawa Maru, Chuuk, Micronesia

Text and photos by Brandi Mueller

My favorite wreck is the *Momokawa Maru* in Chuuk, Micronesia. I cannot really explain why I love this ship so much, as it is not usually on the top of the list for most who dive the underwater museum of Truk Lagoon where over 50 ships were sunk during WWII. But I always seem to have incredible dives here. The merchant vessel was originally used to transport timber from Siberia to Japan, and its holds were extended to be able to carry the logs. When WWII began, the ship was requisitioned by the Imperial Japanese Navy. It was sunk during Operation Hailstone, an Allied attack on the islands of Truk Lagoon on 17 and 18 February 1944.

The 354ft-long ship rests in 140ft of water on its port side in the Fourth Fleet Anchorage. This area usually has good visibility, and divers are met with clear water. Inside cargo holds, one may find truck frames and airplane parts. The wheelhouse is almost intact, with a steering station, telegraph and speaking tubes still present, and the engine room, while small and relatively deep, is an exciting area with gauges and panels. Visit: brandiunderwater.com



Engine room gauge panel found in the wreck. Exposure: ISO 250, f/8, 1/125s. Camera gear used for both images: Nikon D500 camera, Ikelite housing, dual Ikelite strobes

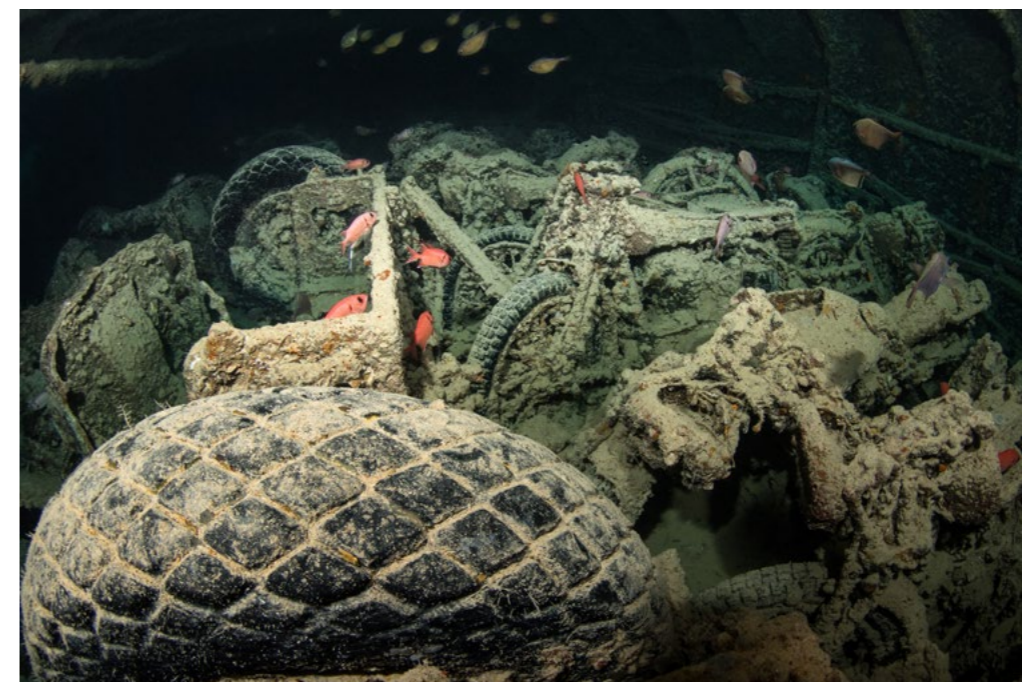


SS *Thistlegorm*, Red Sea, Egypt

Text and photos by Kate Jonker

The wreck of the SS *Thistlegorm* lies in the Straits of Gubal in the northern Red Sea and attracts thousands of divers from across the globe every year. She was an armed British Merchant Navy steamship bombed on 6 October 1941, whilst carrying motorcycles, airplane parts, trucks, locomotives, guns and wartime cargo destined for Allied forces in Egypt. Today, she is an underwater museum and provides a glimpse back into wartime history.

I have been visiting the northern Red Sea on an almost annual basis since 2005 and have dived *Thistlegorm* on countless occasions, always discovering something



BSA M20 motorcycle on *Thistlegorm* (above). Exposure: ISO 160, f/9, 1/125s. Camera: Canon EOS 7D Mark II, Sea&Sea housing, two Sea&Sea YS-D1 strobes and an off-camera Inon Z240 strobe behind the front wheel

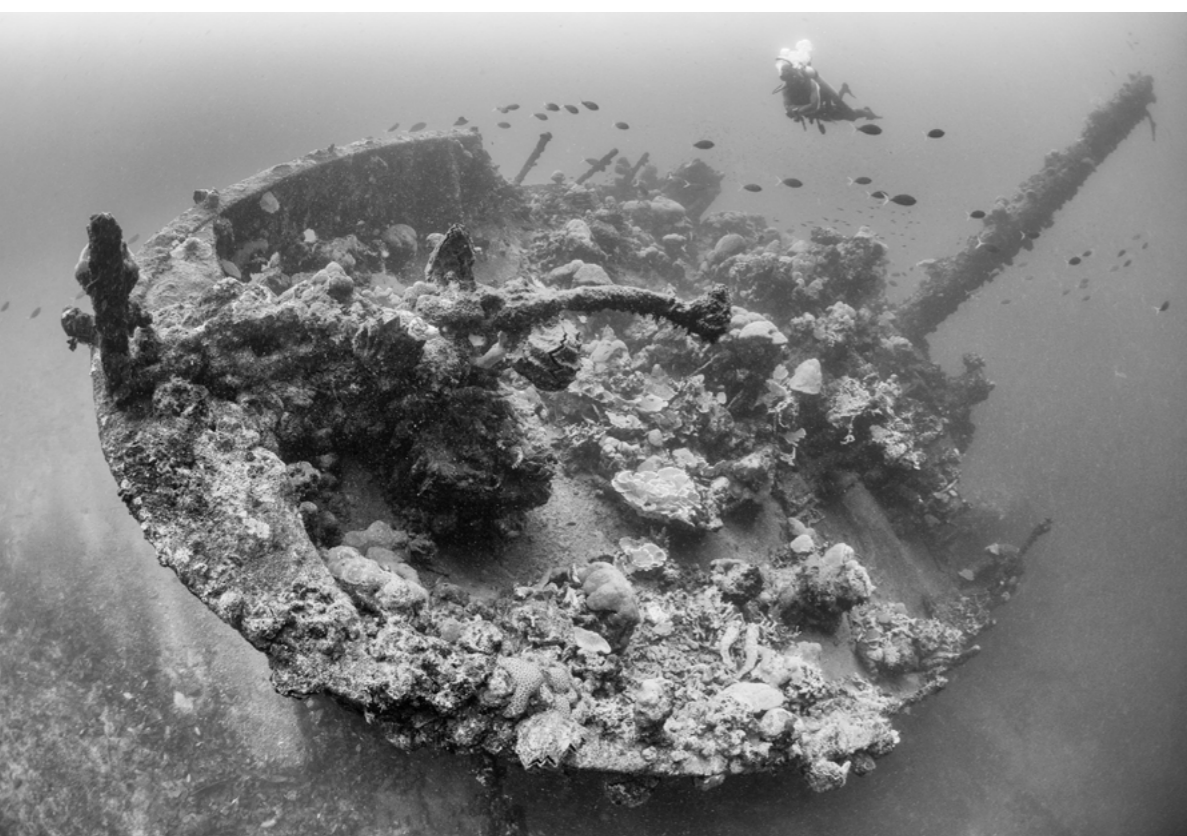
One of the highlights of the *Thistlegorm* wreck is the anti-aircraft gun on stern of the ship (top left). Exposure: ISO 200, f/8, 1/160s; Norton 16H motorcycles on *Thistlegorm* (left). Exposure: ISO 200, f/8, 1/160s. Camera gear used for the remaining three images: Canon EOS 7D Mark II camera, Sea&Sea housing, Inon Z240 strobes

new on every dive. Best dived from a liveaboard, she is a capricious dive, open to the elements. I have had dives with screaming currents and others when there has been no current whatsoever, and dives where the visibility has been less than 10m, while on some days, the entire wreck could be seen from the deck of the boat.

Being 128m long and 18m wide, she is so vast that one needs to do at least three dives on her—one to swim the outside, one to explore the holds and another to go back to the bits you think you missed. And even then, you will never see everything, leaving you wanting to return—which you will! Visit: katejonker.com

Coal Tender on the deck of the SS *Thistlegorm*. Exposure: ISO 320, f/9, 1/125s





Diver and a school of yellowtail fusilier fish swimming alongside the bow (above); View inside the fully intact engine room, with a school of cardinalfish (top right); Dually truck axle and other equipment in the cargo hold (right); Camera gear for all images: Nikon D810 DSLR camera, Sigma 15mm fisheye lens, Subal housing, two Sea&Sea YS-250 strobes. Exposure: ISO 400, f/5.6, 1/60s to 1/100s

Kashi Maru, Munda, New Georgia Island, Solomon Islands

Text and photos by Matthew Meier

I am fascinated by WWII history, particularly in the South Pacific; so being able to see this wreck in person was very special. The *Kashi Maru* was a Japanese supply ship that was sunk by a US B25 bomber while offloading equipment in Mbaeroko Bay during WWII. Palm trees were suspended over the bay to hide the supply depot from the air. However, local Coastwatchers alerted Allied Forces to its presence, and when the bomber arrived, smoke from one of the ships engines was visible through the palm trees, giving away its

location, and the ship was destroyed.

She is now resting nearly upright in roughly 30ft (10m) of water, with the bow deeper than the stern. The metal hull was peeled open from the force of the blast, and the cargo hold still contains truck axles, tires, spools of wire and other gear inside. The engine room was undamaged by the explosion, and the tight space can be carefully explored for those that are properly trained. The bay is at the mouth of a river, and the green brackish water was full of sediment due to recent rains, dictating the conversion of my images to black and white. Thanks go to Dive Munda (divemunda.com) and Solomon Islands Dive Expeditions (solomonsdiving.com) for hosting this adventure. Visit: MatthewMeierPhoto.com

Diver at the bow, showing one of the remaining smoke stacks

SeaLife



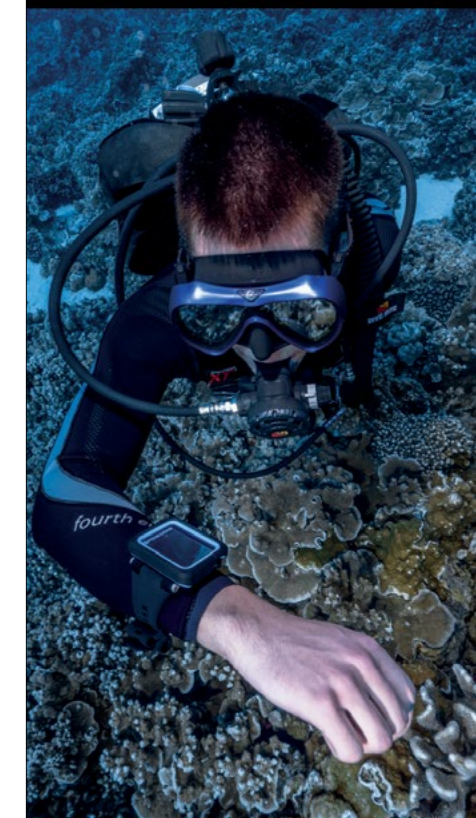
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Diver at tail of Black Jack (left). Exposure: ISO 400, f/11, 1/100s; Overview of Black Jack (far left). Exposure: ISO 400, f/8, 1/60s. Camera gear used in all three underwater images: Nikon D300 camera, 10.5mm lens, Subal housing, dual Ikelite DS160 strobes



B17F Black Jack, Papua New Guinea

Text and photos by Don Silcock

Wrecks are almost always pretty special, particularly so if the backstory to whatever happened is known—which is probably why the wreck of the B17F Black Jack in Papua New Guinea would have to be my favorite!

The Boeing B17 Flying Fortress was a four-engined heavy bomber that saw extensive service with the United States Army Air Force (USAAF) in WWII. It is the third-most produced bomber of all time and earned a strong reputation as a tough and reliable workhorse.

There are a few things that are really special about the Black Jack, starting with the wreck itself, which is in nearly 50m of water, just off the fringing reef near the remote village of Boga Boga at Cape Vogel on the northern coast of the main island of New Guinea. The wreck is remarkably intact, so much so, it looks a bit like a movie set.

Then there is its incredible discovery in December 1986 by Rod Pierce, a long-term PNG resident and dedicated wreck diver. Pierce literally stumbled on the Black Jack while looking for the wreck of an Australian WWII A9 Beaufort Bomber!

Finally, there is the backstory to the Black Jack, which is not only known but a documentary was made about it in which the pilot of the plane Ralph DeLoach, then in his 70s, was tracked down in California and taken back to Boga Boga for a reunion with some of the villagers who helped him and his crew escape from the ditched plane in 1943.

It is an amazing story and you can read all about it in my **Complete Guide to the B17 Black Jack Wreck**.



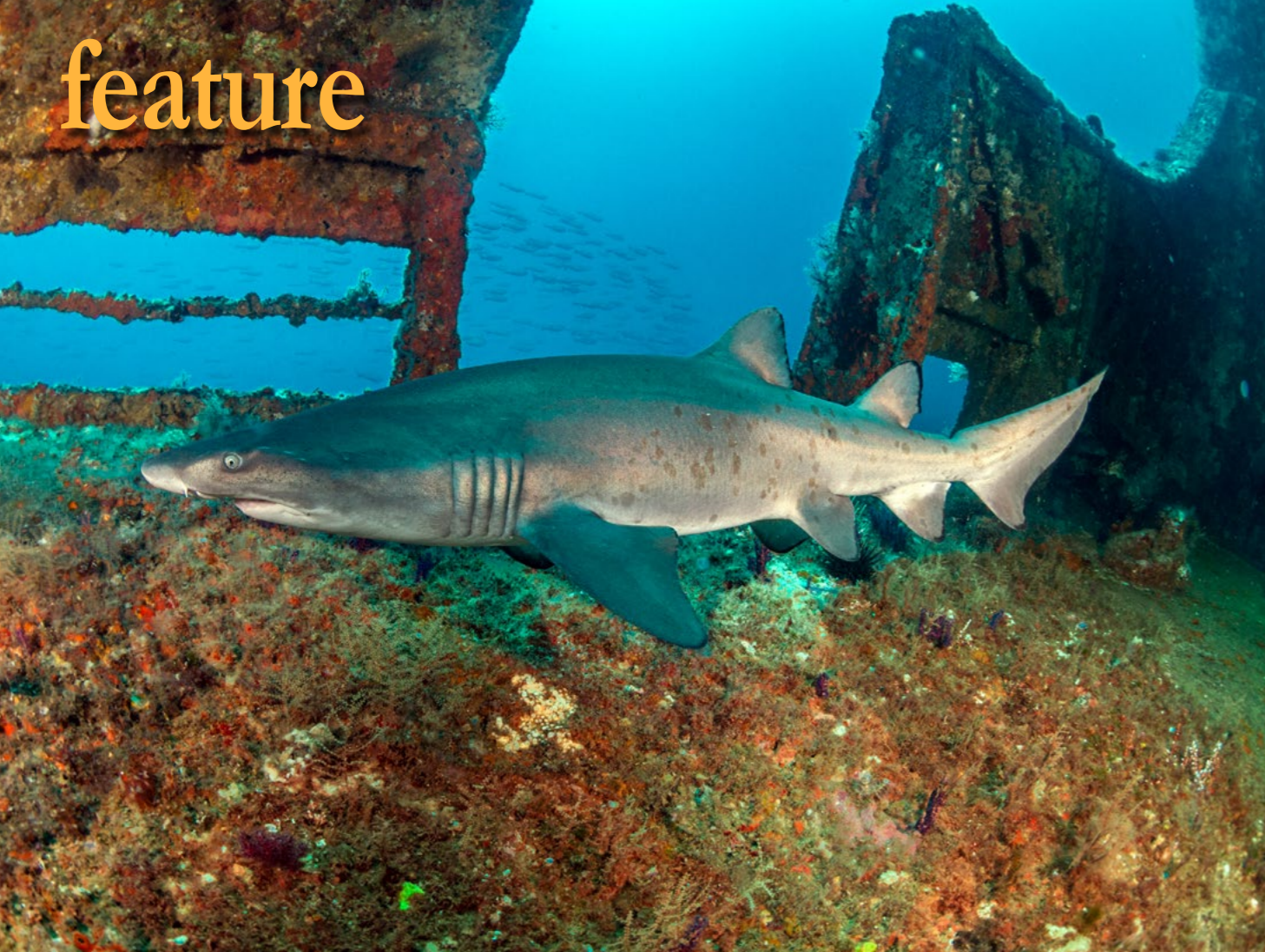
Black Jack propeller (above). Exposure: ISO 400, f/9, 1/60s; Boga Boga Village (right). Exposure: ISO 100, f/8, 1/125s. Camera gear: Nikon D300 camera, Sigma 17-70mm lens, Subal housing, dual Ikelite DS160 strobes

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Juvenile sand tiger shark swims around the main deck (left); Camera gear used for all images: Olympus OM-D E-M5 camera, Panasonic Lumix G fisheye 8mm f/3.5 lens, Nauticam housing, Sea&Sea YS-D1 strobes

pared and sunk as an artificial reef at a depth of 33m (110ft), 48km (30mi) off Morehead City. An intact and small vessel, *Spar* is easy to navigate even in low visibility. Resting on her keel, with a 45-degree list to port, *Spar* can be circumnavigated in just one dive. I saw schools of black jacks as well as scary-looking but gentle sand tiger sharks, which are a main attraction on the wreck. Inside the wreck, it is very spacious and there are lots of rooms to explore. There are ladders on the main wheelhouse and the main deck as well as other interesting features to photograph. I enjoyed diving this wreck because of its structure and the marine life found on it. I would love to go back and take more photos and videos to share. Visit: fitimage.nyc

SOURCES: OLYMPUSDIVING.COM, WIKIPEDIA.ORG, NC-WRECKDIVING.COM

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USCGC *Spar* (WLB-403), North Carolina, USA

Text and photos by Olga Torrey

I have gone wreck diving three times off the coast of North Carolina, which is nicknamed the "Graveyard of the Atlantic" because over 2,000 ships have sunk there. Many shipwrecks were caused by war, collision or weather. Indeed, weather conditions have to be considered when planning a trip to visit these time capsules under the sea. In a week-long trip, it is not unusual to get blown out half of the time. On my last visit there, I did a day trip to the 55m (180ft) sea-going buoy tender USCGC *Spar* (WLB-403) with Olympus Dive Center in Morehead City, North Carolina.

The *Spar* has an impressive history of achievement from convoy duty in Brazil during WWII to oceanographic operations through the Northwest Passage in the '50s (to become one of the first to circumnavigate North America), and in the '60s, logging over 27,358.85km (17,000mi) in northern Europe on a charting expedition. She was awarded gold marks for operations and seamanship so many times in the '80s and '90s that she was dubbed "The cutter with the most gold."

Spar was finally decommissioned on 28 February 1997, and the ship's main engines, generators and other equipment were removed and sold. In June 2004, her welded-steel hull was pre-



A black jack swimming over the main deck (above); A black jack swimming inside the main wheelhouse (right)





WWII dive bomber Ju 87 R-2, Zirje Island, Croatia

Text and photos by Claudia Weber-Gebert

At the end of September 2014, this WWII dive bomber was found by chance during a harpoon competition near the Croatian island of Zirje. The significant discovery caused a stir at the time, since only a few of the 5,752 bombers produced in Germany were still in good condition. The wreck is remarkably well preserved; it has even been said that it is the world's best-preserved Stuka bomber.

In May 2015, I had the opportunity to dive this wreck shortly after diving was allowed for dive operators with permits. The operator gave my buddy and me a ten-minute head start, before all the other divers in our group took the plunge to dive down to the wreck site. So, for a whole ten minutes, we had the Stuka bomber to our-

elves, a silent witness to the war. It made a great impression on me—also because I knew that the pilot had most likely survived. And, at that time, it had not yet been decided whether the wreck would stay on the seabed or be recovered and brought into a museum. So, it was not really certain whether or not it would be possible to dive the Stuka wreck again in the future. I have to admit, I felt a bit strange in this situation, but I focused on taking pictures and enjoyed my alone time with the wreck.

For now, the wreck is still underwater, hopefully available to many divers who visit the site after we did. It is an easy dive site, with a maximum depth at about 28m, and really brightly lit if the sun is shining and the visibility is good.

I am really proud of the fact that my photos of the Stuka bomber wreck have been used in many publications in Europe, including aircraft and dive magazines and books. For further reading, see my article in the **April 2016 issue #72**.



THIS PAGE: Scenes from WWII Stuka bomber wreck found near Zirje Island, Croatia

Engine of Ju 87 R-2 dive bomber on seafloor





St Helena

— *Diving in the Remote South Atlantic Oasis*

Text and photos by Scott Bennett



Outside my window, the South Atlantic lay unbroken—an azure expanse of ocean below and sky above. Three hours after passing the Namibian coast, a lone patch of clouds appeared on the horizon. As we approached, I could just discern patches of green peering through. Atop a narrow ridge, a tiny strip of runway appeared, the sheer drops at each end plummeting to the sea. The necessity of the refuelling stop in Windhoek became apparent; if landing conditions were not favourable, we would have to return to Windhoek. There simply was not anywhere else to go.

Sitting in the South Atlantic 1,200 miles west of Southern Africa and 1,800 miles east of South America, St Helena is the dictionary definition of isolated. A mere speck 10 miles long and six miles wide, the island ascends 4,000m from the ocean floor to its highest point at 820m above sea level. First discovered by the Portuguese in the 15th century, it remained uninhabited until the British East India Company founded Jamestown in 1659. Today, the island is Britain's second oldest territory after Bermuda.

For those wanting to get away from it all, this is the place! Friends Farhat (Raf) and Francisca Jah from their UK-based African and Oriental Travel Company



pioneered diving on the island and have played a pivotal role in developing St Helena tourism. In 2018, they had brought the first diving tour group by air and their report was highly enthusiastic. They insisted I come, but I was not initially enthusiastic; the trip would be long and expensive, and what was there to



THIS PAGE: Views over St Helena. PREVIOUS PAGE: Divers and large school of St Helena butterflyfish on rocky reef

St Helena



Ochre and sienna hues of the rocky landscape of St Helena

see? Then again, past experiences have taught me that the unexpected places prove to be the best surprises.

Getting there

For centuries, the only way to arrive was by boat. In recent years, the RMS *St Helena* made the five-day journey from Cape Town every three weeks and was the island's sole connection to the outside world. That all changed in November 2017, with the opening of the airport. Although finished in 2016, aircraft were unable to land due to excessive wind shear. It was another year before the first commercial flight landed, and a five-day trip was now only six hours from Johannesburg.

I must admit, the flight filled me with trepidation. Before departing, I read an article that claimed it to be

the most terrifying landing the author had ever experienced. During the refuelling stop at Windhoek, Cisca showed me a phone app entitled "St Helena Airport," where the player attempts to land a plane on a 3D graphic representation of the island. Based on her success record, I was thankful she was not piloting our aircraft. Happily, our arrival was smooth, with nary a bump. The bus ride between the terminal and the plane at Johannesburg's airport was more nerve-wrecking.

Once on St Helena, the island way of doing things became apparent rightaway. It took a full hour to clear immigration and retrieve our luggage. Considering we were the only flight for the next three days and there were only 75 passengers, the resulting

queue was somewhat baffling. Then again, as the staff only work a few hours a week, I surmised they wanted to make the most of it.

With immigration cleared, I walked the few metres to the luggage carousel. A stern-looking woman approached with some questions, specifically whether I was bringing in food. "I have a chocolate bar. Is that okay?" I queried. "That depends on whether I'm hungry," she responded, before breaking into a wide grin. "Welcome to Saint Helena!"

Leaving the airport, the rugged landscape was a rock-strewn palette of ochre and sienna. Don't like the scenery? Wait five minutes. As the road ascended, barren landscape quickly transformed to verdant. Trees appeared and we soon



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Jamestown

With the afternoon free, I grabbed my camera and went for a ramble. Jamestown is steeped in history, with over 100 listed buildings. Main Street is esteemed as having one of the finest collections of pristine Georgian

passed Longwood House, Napoleon's residence. Reaching the ridge top, Jamestown appeared far below, wedged between steep cliffs.

We soon arrived at the Mantis Hotel, our home for the following week. The island's most upscale accommodation, it occupies a row of former officers' quarters dating from the 18th century. The elegantly appointed rooms featured a much

architecture in the world, with many buildings constructed from the local volcanic rock.

Each building had a story. Across from the Mantis, New Porteous House hosted the Duke of Wellington, while just down the road, the century-old Consulate Hotel featured a life-size figure of Napoleon on the upper terrace. Dating from 1772, St James' Church is the oldest Anglican church

in the Southern Hemisphere. Coffee aficionados will want to sample a cuppa at the St Helena Coffee Shop. Grown at only two plantations, the locally grown coffee is excellent and amongst the world's most expensive. Bags are available at the shop for GB£15 but can fetch GB£90 at Harrods in London!

However, Jamestown's most iconic landmark is not a building. As staircases go, Jacob's Ladder is seriously epic. Constructed in 1829, the 699-step staircase links Jamestown with Ladder Hill Fort. An incline railway was also constructed, but termite damage prompted its dismantlement in 1871. For those adverse to heights, merely looking up the vertiginous ascent is enough to induce vertigo. For the intrepid able to conquer it, a certificate is available at the museum. "Not today," I mumbled to myself.

During my walkabout, I detected a definite vibe. It felt different, but I initially could not determine how. Then it struck me. Passers-by said hello, their faces not buried in personal electronic devices. Television screens did not



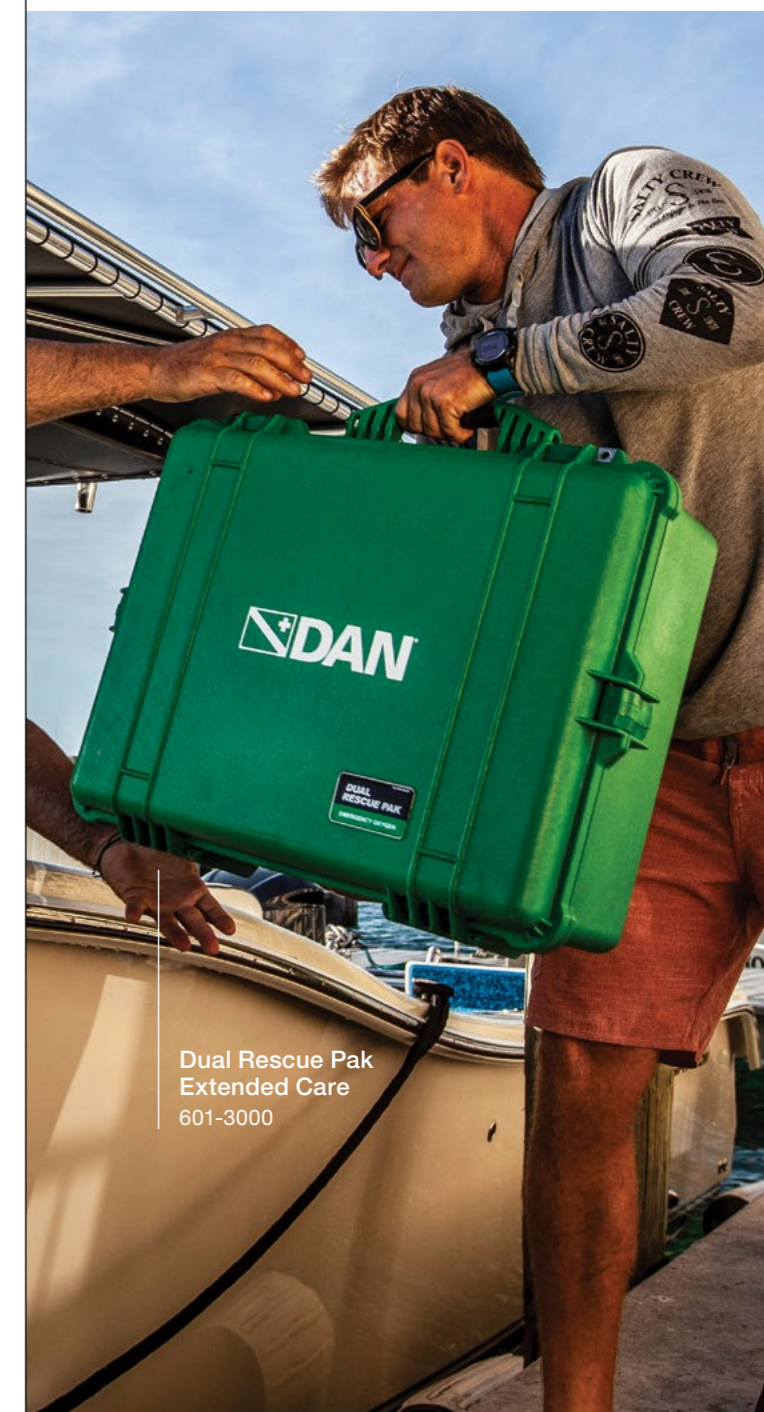
Jacob's Ladder (above) in Jamestown (top) on St Helena; Century-old Consulate Hotel (left)



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Coastline fortifications (above); James Bay (left); The Market (center left) and Customs House (right) in Jamestown



bombard one with 24-hour news, and golden arches were absent from the landscape. It was slower, gentler—reminiscent of times past, when I grew up. Before I knew it, I was won over!

Venturing to the waterfront, I followed the road as it passed the stately old Customs House leading to the wharf. Opposite it, a few old warehouses and a sweep of shipping containers lined the roadway. Above, the vertiginous cliffs were encased in huge swathes of netting to prevent rockfalls. I soon found Sub-Tropic Adventures and beyond that, our embarkation point for the next day's diving. It was going to be a long walk with my underwater camera gear.

Local people and culture

And yes, the inhabitants really do call themselves Saints. The various nationalities and cultures passing through have had a conspicuous impact on

the island's population, with many residents tracing their roots back several centuries or more. The 4,800 inhabitants are a blend of Africans, mixed-race Africans and Europeans, and British settlers and labourers from the Indian sub-Continent, East Indies, Madagascar and China. I asked Anthony how long his family had been here. "We've been here for 200 years," he said. "We have some African, but mostly, we are a mixture of Portuguese and Chinese." DNA testing would no doubt reveal some extraordinary results!

Although English is the official language, that is not immediately apparent. The local dialect, called "Saint," takes some getting used to. My friend Christopher Bartlett likened it to a cross between Cornwall and Australia, but to my ears, it sounded like a mélange of Kiwi, Australian and English. An amalgamation of inflections, it uses ordinary English words in decidedly unusual

ways. "What is your name?" translates to "What you name is?" and "We are going to town" is "Us goin' town." The locals tone it down for the tourists, but once they start conversing in full-on patois, subtitles are required. Listening to a conversation between the women at the coffee shop, I could not decipher a word!

Diving

The next morning, everyone gathered at 9:00 a.m. to assemble their gear. Two groups were going in two zodiacs—downright chaotic by St Helena standards! Getting aboard proved

tricky, stepping down to the zodiac as it pitched in the relentless surf. Fortunately, numerous helping hands ensured that divers and gear boarded safely. With Anthony's dad, Larry, at the helm, we set out for our first dive site at Lighter Rock, a 20-minute boat ride east of James Bay.

Isolated islands are magnets for



St James Church, built in 1772 in Jamestown



Spotted scorpionfish (left) and St Helena butterflyfish (above) at Lighter Rock; Spotted moray eel (top left)

tures both Western and Eastern Atlantic and circumtropical species.

Lighter Rock. Plunging in revealed an environment I had not encountered before. Dramatic seascapes echoed the craggy terrain above, with huge boulders and sheer rock faces riddled with caves, archways and overhangs.

The visibility was exceptional, at times approaching nearly 50m, no doubt due to the lack of sediment from runoff. The water temperature was a comfortable 25°C, and the 5mm wetsuit provided ample warmth.

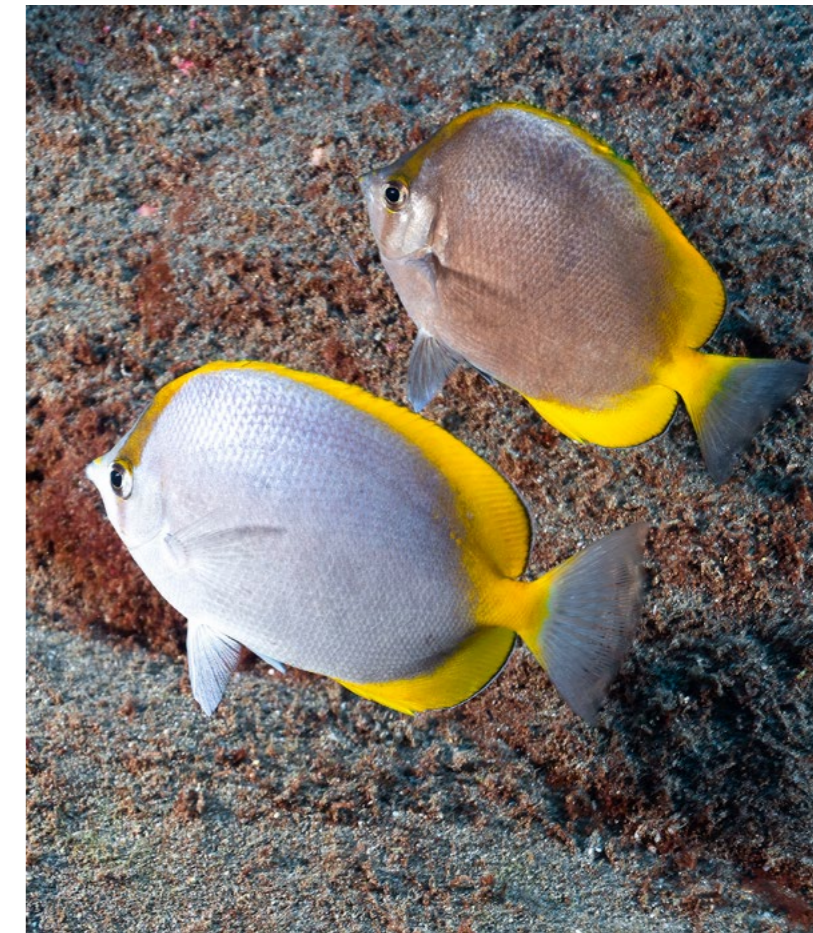
Although reef-building corals were

absent, an abundance of tunicates, algae and sponges encrusted the rock faces. Endemic orange cup corals add a splash of colour along with harpoon weed (a red algae), tiny anemones and various species of hydroids.

What was really astounding was the fish life. Despite the lack of coral reefs or kelp forests, there was no deficiency of fish life—in fact, quite the opposite. Due to long-term isolation, the island is home to a variety of endemic species. Most prolific was the St Helena butter-



flyfish, whose numbers were astonishing. Found at every dive site we visited, schools were so dense that divers could virtually disappear within them. Looking at my photos later on, I dis-



St Helena butterflyfish (above); Bearded fireworm at Lighter Rock (left)



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Spotted moray eel at Sugar Loaf (left); Strigate parrotfish have two colour phases, with the smaller females sporting yellow (below), and the larger males, a dull purple-gray.



Schools of ocean surgeonfish and sergeant majors (left) and divers (top right) on the wreck of the *Bedgellet* (above); Glasseye snapper (bottom right)

covered that what appeared to be strobe backscatter was actually a near-infinite number of fish!

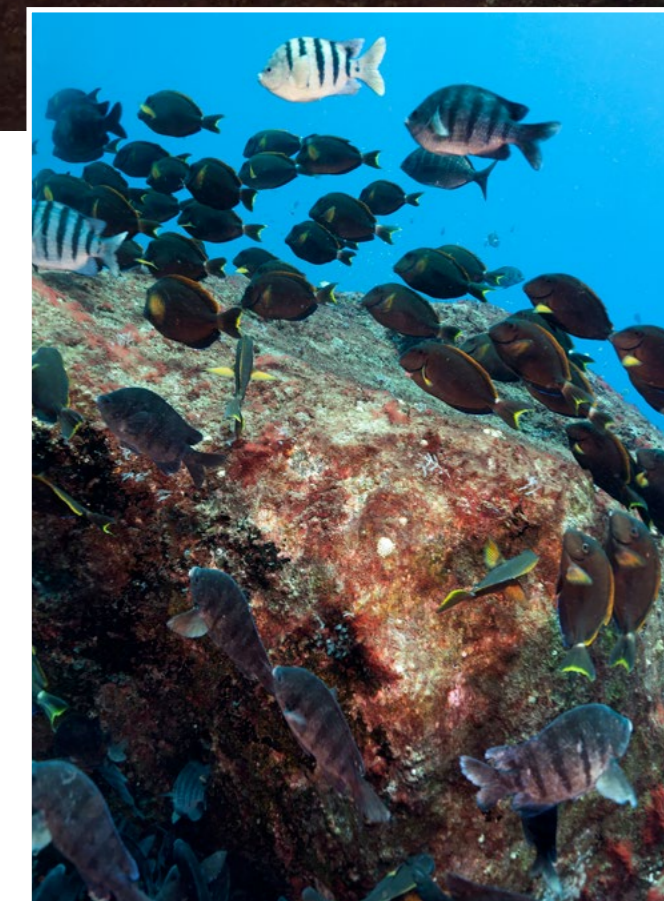
Bedgellet wreck. A short boat ride away was our second dive site, the *Bedgellet*. One of eight diveable wrecks around the island, it was brought from the United Kingdom to salvage another wreck, the *Papa Nui*. However, it broke loose from its moorings during a storm, damaging both itself and other vessels. In 2001, the St Helena government sank it as an artificial reef near Long Ledge on the southern coast.

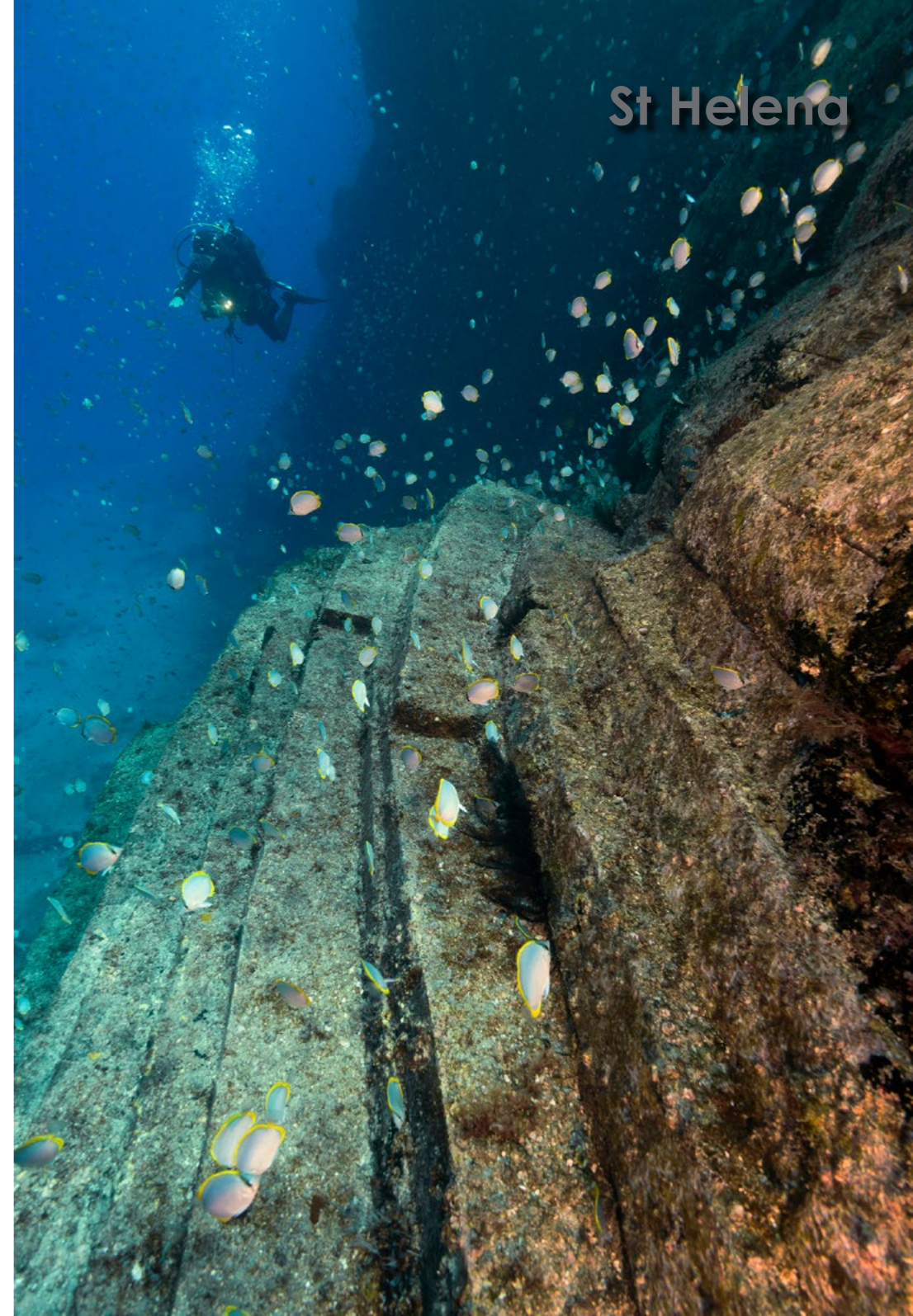
Resting upright at 18m, the vessel was a magnet for fish life. Schools of butterflyfish swarmed upper decks encrusted with growth. Below, glasseye snappers and

island hogfish flashed crimson amongst the numerous openings. Fluffy bearded fireworms scuttled across rock faces while large spotted scorpionfish were nearly imperceptible—something I discovered when I nearly put my hand on one!

Masses of sergeant majors and ocean surgeonfish ebbed and flowed across the reef, while yellow goatfish patrolled the bottom, especially around the island's wrecks. Squirrelfish and blackbar soldierfish mingled under ledges and overhangs as spotted morays peered from their dens with mouths agape. More elusive were hedgehog butterflyfish, distinctively patterned with a chocolate brown head and lower half, topped by white above.

Strangely, what appeared to be two spe-





Chilean devil rays at Sugar Loaf (above); Island hogfish at Billy Mayes Revenge (left); Long Ledge dive site (top left); Diver at Long Ledge (right)

cies of parrotfish was actually one. The strigate parrotfish features two colour phases; it is believed the smaller yellow versions are females and the larger, dull purple-grey individuals are males.

Other notable endemics include island hogfish, St Helena white seabream, flameback angelfish, St Helena flounder, St Helena wrasse, St Helena damselfish and Melliss's conger. Seven species of moray eels have been recorded, with spotted and brown being the most commonly encountered by divers.

Numerous crab and shrimp species, including several endemics, can also be seen, especially on night dives. Both green and hawksbill sea turtles are present too, although there have been no records of successful nesting on the island. A variety of pelagics have also been recorded, includ-

ing skipjack and yellowfin tuna, wahoo, sailfish and swordfish.

Northwestern coast

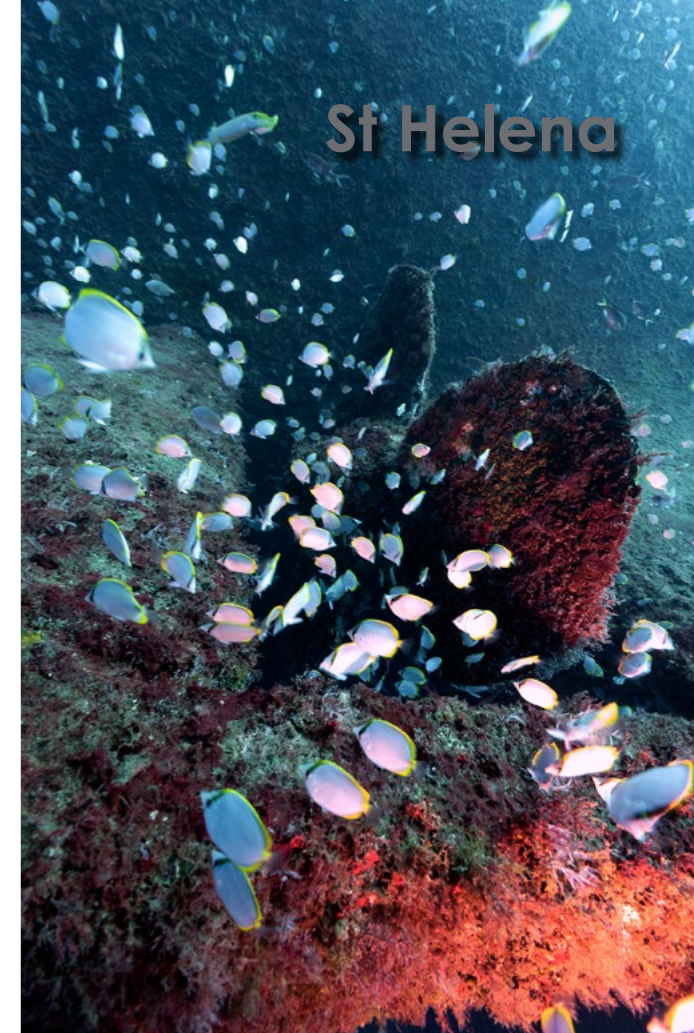
The remainder of the week was spent exploring the area's excellent dive sites, the majority of which were situated along the island's northwestern coast. As conditions roughened, we missed out on some shallower sites and

wrecks, but there was still plenty to discover. As Anthony was occupied with the second group of divers, Raf guided us at the sites—his previous experience diving the island proving indispensable.

The dive site of Long Ledge was especially striking; its steep formations resembling the steps of a colossal undersea temple. Another favourite was the

School of soldierfish at Sugar Loaf (above); St Helena wrasse at Billy Mayes Revenge (right)





Frontier wreck (top left); Diver at Egg Rock (top centre); School of St Helena butterflyfish at propeller of Frontier wreck (above); Almaco jacks at Barn Cap (left); Island cowfish at Billy Mayes Revenge (centre); St Helena white seabream school at Frontier wreck (bottom left);

Frontier wreck, a fishing trawler confiscated by the government after a large amount of cannabis was discovered aboard. Sunk in 1994 to form an artificial reef, it now rests in 27m of water. Part of the vessel has toppled on its side, the corroding frame resembling the ribs of a long-dead whale. Along with the ubiquitous butterflyfish, St Helena white seabream swarmed in abundance along with St Helena

sharpnose puffers, island cowfish and St Helena wrasse. Nudibranchs and spiny lobsters were commonly observed here, but I was so engrossed in the big picture, I forgot to look!

Western coast

On another day, we headed for the western coast to dive a pair of sites. Both located near the airport, Sugar Loaf and Barn Cap featured

astounding visibility, in excess of 40m. Almaco jacks were especially curious, frequently approaching divers, while large ocean triggerfish proved more wary. Smaller cousins of the manta, Chilean devil rays cruised the open water. Although common, we did not see any for the first three days but saw seven here during two dives. Other sites included Egg Rock, Billy Mayes Revenge and Torm Ledge, each revealing

amazing fish life and superb visibility.

The diving was quite easy, with most sites averaging around 20m. However, with the nearest decompression chamber in South Africa, it was imperative to be aware of bottom times. For the most part, currents were minimal. A great book for divers is the Marine Life of St Helena by Judith Brown. Available at local shops, it is a comprehensive guide to the island's marine life and wrecks. Anthony contributed some of the photos in the book.

Topside attractions

Although I had come for the diving, there was plenty to experience topside. On one afternoon, I took



Plantation House, the governor's residence, built in 1792 by the East India Company (above); High Knoll Fort (right); Jonathon, the 188-year-old tortoise (bottom)

a short tour with Wayne Crowie, who had driven us from the airport on the first day. Our first destination was the High Knoll Fort, dating from 1874 and the largest of the island's military installations. From town, it appears Jacob's Ladder is the high point, but the road ascended farther to the fort's lofty perch at 584m. The view from the eroding ramparts commanded spectacular vistas over the island—a miniature continent of mountains, forest, farmland and semi-desert.

Our final stop was Plantation House, the governor's official residence. Huddled amongst forested grounds, the stately manor was erected in 1792 by the East India Company. It is also home to the Island's most famous resident: Jonathon the tortoise. At 188 years old, he is believed to be the planet's oldest known living land creature and shares his outdoor

compound with several other tortoises. His advanced years do not stop him from chasing the females, though. Well, "chasing" might be something of an exaggeration.

With visiting hours over, I had to settle for a walk along a fenced pathway. I could just discern Jonathon hiding under a cluster of low trees. Opposite the house, farm plots extended into the distance, with a variety of crops on display. Above

the property, white birds wheeled overhead. I asked Wayne what they were, and he replied, "White birds!" In fact, they were fairy terns, a common island resident. The



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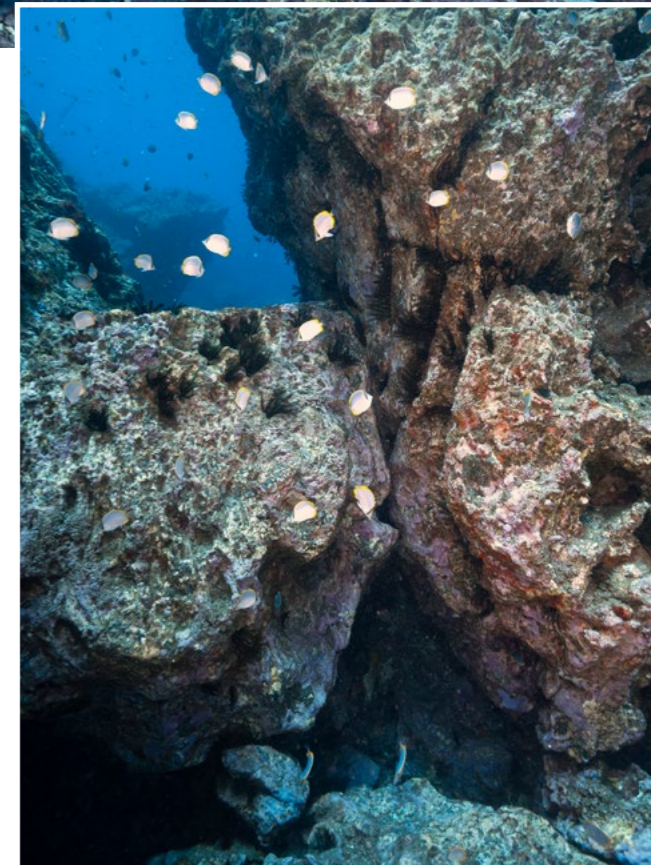


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Trumpetfish, sergeant majors and squirrelfish on reef (above); St Helena butterflyfish on rocky reef (right) and Long Ledge (top left); Orange cup corals at Billy Mayes Revenge (left)

erally full, but only arrive twice weekly, on Saturdays and Tuesdays. Run by SA Airlink, the Embraer E190-100IGW seats 98 passengers, but numbers are limited to 76 in case a tailwind landing is required during challenging weather.

Cuisine

Most evenings, we dined at the Mantis. The meals were excellent and very reasonably priced, especially considering our remote location. Contrary to what we had heard in Johannesburg, the island had not run out of beer! On another night, we ventured up to Rosie's Place, located in Halftree Hollow, near the top of Jacob's Ladder. Ascending the narrow switchbacks, I thought it appropriate that Wagner's "Ride of the Valkyries" was playing on the taxi stereo.

Before dinner, I had a chat with owner Rosie Bargo. I asked how long they had been open. "It's been just over a year now. Going on a year and two months, really," she said. "Locals from all over the island and tourists, when they are on the island, tend to stop by. They like the view." Sitting on the veranda, watching the sun burnish a band of low-lying cloud, it was easy to see why.

I had heard that it is difficult to get people to work evenings. "Yes, that's always a struggle on the island," she said with a laugh. "I've lived in the States for four years, and the young kids of school age, they are working in the restaurants; that's how they make their money. Here, it's a total opposite. Lots of people are used to 9-to-5 jobs and don't want to work the unsociable hours. Not at all!

island's early inhabitants were not particularly creative in the naming department.

During the week, I spoke to residents about life on the island and the responses were as varied as the islanders' genetic makeup. A referendum was held on

whether to build the airport but was by no means a landslide win as many were content with the RMS *St Helena*. Once the airport opened, tourist arrivals were promised but have yet to materialise, leaving many frustrated. Flights are gen-



It's been a struggle. So far, I have three chefs, which are from South Africa, and they do excellent food, so you will have to try some later!" And, try it, I did. I ordered a pizza, and it was superb.

Whale sharks and cetaceans

Our journey coincided with the arrival of some very big visitors. During the summer months between November to March, whale sharks congregate around the island in large numbers. The world's largest fish, they can reach lengths up to 14m, but these gentle giants are filter feeders, sieving plankton and small fish through mouths up to 1.5m wide.

Although they can be observed while diving, whale shark excursions are done by snorkelling. Guidelines are stringent; participants must remain 3m away from the sharks and no touching is allowed. However, I quickly learnt that the sharks seem unaware of the rules.

Photographing happily, I was unaware of just how close it was. Looking up, I was startled to see a whale shark was only an arm's length away! I frantically manoeu-



vred to get out of its way, scraping my knee on it in the process. "It wasn't my fault! I wasn't even moving," I protested to Anthony, who had watched the entire episode from the boat. "Don't worry about it," he said with a chuckle.

We spent the next 40 minutes with the shark, which proved to be exceedingly tolerant. During encounters in other

countries, whale sharks descended the moment I hit the water. Not so here, as they were both tolerant and highly curious. If they moved away, pursuit was not necessary, as they inevitably returned for another look. They also were not surrounded by a fleet of boats, so I suspect snorkellers are still a curiosity rather than an annoyance. It was hands down, the

THIS PAGE: Whale sharks can be seen in the summer months from November to March.





St Helena

Whale shark (above); Rugged St Helena landscape with forested peak (top right); Napoleon's Tomb in the Sane Valley (right)

best encounter I had ever experienced.

A second excursion was available two days later, and several of us jumped at the opportunity. This time, we headed for the western coast and quickly encountered another whale shark. In a great moment of bad timing, it appeared

alongside the boat just as I did a backward roll. For a brief moment, I thought I was going to get squashed between it and the boat! This individual proved even more curious, but this time, I manoeuvred out of the way in plenty of time. Seeing it approach one of the other snorkellers, I marvelled at just how big it was. This one was easily 10m long and could have swallowed her in a single gulp!

St Helena's waters are also home to a number of cetacean species. Spotted, rough-toothed and bottlenose dolphins are year-round residents, while hump-back whales can be found between June and December. While individual whales are sighted

in June, mothers with calves are sighted from July onwards, which indicates the females arrive to give birth.

Rugged terrain

On our last day, we did a full-day island tour with Aaron Legg of Aaron's Adventure Tours. Despite its compact size, the island boasts an extraordinary range of topography, from grassy plains and semi-desert to lush, forest-clad peaks. It is also extremely rugged, so driving anywhere takes a lot longer than one would expect. Our four-wheel drive proved essential, as Aaron took us on some bone-rattling roads. With names like Longwood, Half Tree Hollow, Deadwood Plain, the Gates of Chaos and Great Stone Top, I felt like I had been transported to Middle Earth!

Historical figures

The island also features a grand history, with famous visitors, including Captains Cook and Bligh, Edmond Halley and Charles Darwin. However, there is one



man to which the island is inexorably linked: Napoleon Bonaparte. After his defeat at the Battle of Waterloo in 1815, Napoleon was exiled to St Helena, spending his final years at Longwood House where he died in 1821.

After stopping for a view of Jamestown, we set off for Napoleon's

Tomb, situated in the Sane Valley. An easy 1km return walk, the setting was quite beautiful, surrounded by gardens and shaded by tall trees. The only thing missing was Napoleon himself. He was only interred here from 1821 to 1840, when he was exhumed and taken back to in Paris for burial.



Rugged landscape of Sugar Loaf on St Helena



Dirt road (above) into the valley of Sandy Bay (top right), located on the southern side of St Helena; New Zealand flax on the roadside (right)

Napoleon died on 5 May 1821, and much debate surrounds the actual cause of death. Some claim the British poisoned him, but the story told at Longwood is that he succumbed to long-term exposure to toxins in the wallpaper. In 1858, the French government was granted possession of Longwood, and today, along with the burial site, it remains a French property, administered by a French representative under the authority of the French Ministry of Foreign Affairs.

Nature, flora and fauna

Passing the wind farm I had seen from the fort, a sign indicated the site of a Boer internment camp. During the Boer War between 1900 to 1901, over 6,000 Boer prisoners were held on the island. A detour out to the coast revealed dramatic cliffs with stunning views of Turks Cap and the Barn, formations we had seen from one of our diving excursions. Heading back, we kept a lookout for wirebirds, the island's sole indigenous bird species and national bird. Deadwood Plain's open expanse

is a favoured nesting area and we observed many, with several right by the roadside. From less than 200 birds in 2006, numbers have rebounded to over 500.

For our packed lunch, we stopped at the Millennium forest, once home to the Great Wood, an extensive forest of indigenous gumwood trees. With no native land mammals, the flora and fauna were soon decimated by introduced livestock, cats, rabbits and rats, with several plant and insect species becoming extinct. In 2002, the Millennium

Forest project was implemented to replant part of the lost forest. Gumwood is slow-growing, so it will take time to regain its past grandeur. In the meantime, if you get lost, just stand up.

After lunch, another off-road excursion took us to a dramatic overlook of the airport and the peaks of Greater and Little Stonetop. Ground-hugging sour

plum carpeted a semi-desert landscape of ochre and sienna tones, but only minutes away, the landscape was dominated by New Zealand flax. The manufacture of flax fibre generated considerable

revenue for several decades, but transport costs and competition from synthetic fibres initiated its downfall. The British Post Office's decision to use synthetic fibres for its mailbags dealt the fatal blow



Turks Cap Bay (top left); twin rock pillars called Lot and Lot's Wife (top right); Baptist church with Lot's Wife in background (right); Wirebird (left); Rugged northeastern coastline of St Helena (far left)

and the mills closed in 1965. "The Suez Canal and elastic bands sealed the fate of Saint Helena," said Aaron with a chuckle.

Landscape and landmarks
At the island's southern end, plant-

ed eucalypt forests dominated, while higher still, tree ferns shrouded Diana's Peak, the island's highest point at 818m. En route, we made a quick stop at Bell Rock, which really does sound like a bell when struck. Passing one of the

island's coffee plantations, we commenced our descent to the coast. The landscape changed yet again, giving way to an arid landscape. Dominant landmarks were twin rock pillars called Lot and Lot's Wife, named for the biblical tale of Sodom and Gomorrah. We passed a tiny Baptist church with Lot's Wife as a backdrop, and I was amused by the irony! Nearer the coast, the arid terrain featured

date palms and I felt like I had gone from Hawaii to the Middle East in a matter of minutes.

Arriving at Sandy Bay revealed a St Helena first: an actual beach—the black sand a testament to the island's volcanic origins. At one time, a stone wall separated the shore from the valley, as it was a favoured spot for smugglers to come ashore. Today, only a small section of the wall remains. Although inviting, the rough waters are unsafe for swimming. Heading back to Jamestown, we passed the familiar sights of Plantation House and Half Tree Hollow, before our zigzag descent back to town. Despite the island's compact size, we did not come close to seeing everything.

Afterthoughts

Reflecting on my stay, the island was a curious cross between a 1970s time warp and a parallel universe. Along with all the wonderful things the island has, it is notable for all the things it does not: ATMs, fast food chain restaurants, billboards and shopping malls. Make no mistake though, this is no criticism. Quite the opposite, in fact. In our madcap era of hyper-connectivity, St Helena was a wonderful breath of fresh air, harkening back to simpler times. Despite the new air connection, St Helena remains off the beaten path, but that is a huge part of its appeal. Even in the 21st century, it is reassuring to know places still exist where the journey remains an integral part of the destination. ■

Special thanks go to the African and Oriental Travel Company (orientafricatravel.com), Sub-Tropic Adventures (stadventures.com), and the Mantis St Helena (mantissthelema.com).

fact file



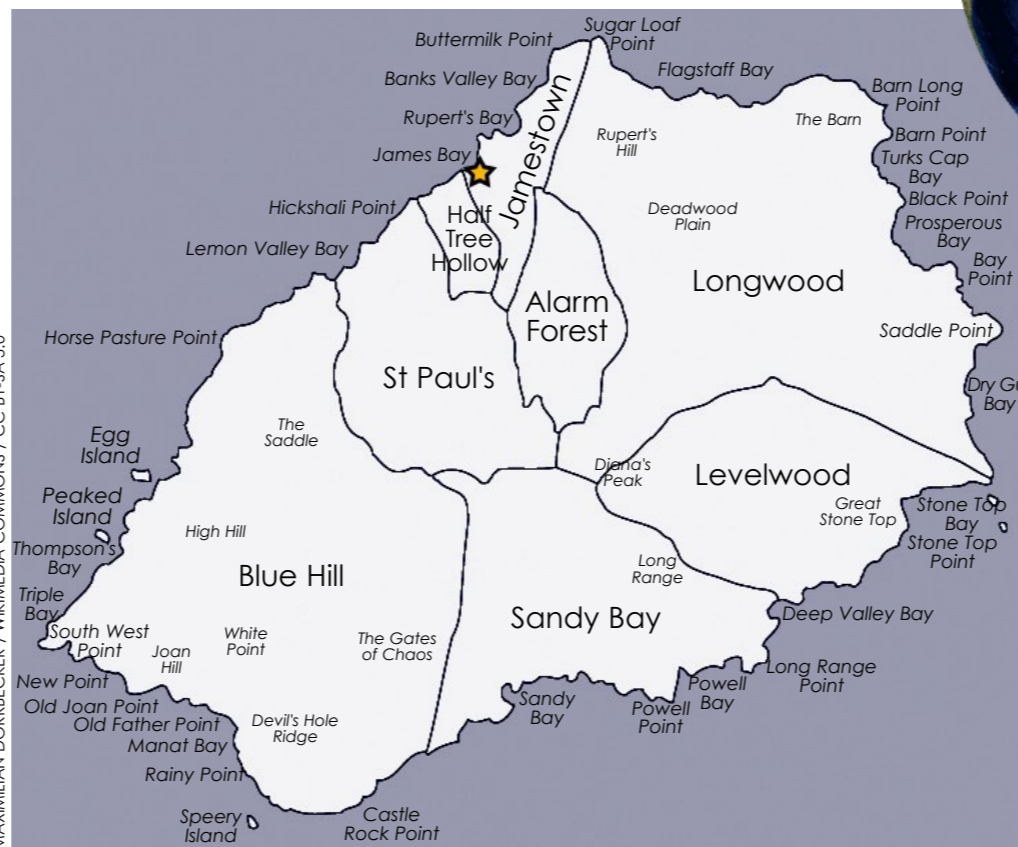
St Helena



SOURCES: SAINTHELENA.GOV.SH, STHELENAAIRPORT.COM, US CDC, US CIA WORLD FACTBOOK, US DEPT OF STATE, WIKIPEDIA.ORG, XE.COM

History St Helena is a territory of the United Kingdom. When it was first discovered by the Portuguese in 1502, St Helena was uninhabited. During the 17th century, it was garrisoned by the British. Famed for being the place where Napoleon Bonaparte was exiled to from 1815 until his death in 1821, it declined in importance as a port of call after the Suez Canal opened in 1869. Between 1900 and 1903, several thousand Boer prisoners were kept on the island during the Anglo-Boer War in South Africa. Since it was one of the most remote populated

places on earth, the British government decided to build an airport on St Helena in 2005. But it was not until 2017 that commercial air service to South Africa via Namibia actually commenced. Nowadays, it takes just over six hours on weekly flights to St Helena from Johannesburg via Windhoek in Namibia, which includes a refueling stop in Windhoek. This air service replaces the mail ship, which, in the past, made a five-day voyage to the island every three weeks. Government: parliamentary democracy. Capital: Jamestown



Geography

St Helena is located in the South Atlantic Ocean, about halfway between Africa and South America. The rugged, volcanic terrain includes plains and small scattered plateaus. Coastline: 60km. Lowest point: Atlantic Ocean, 0m. Highest point: Diana's Peak, 818m.

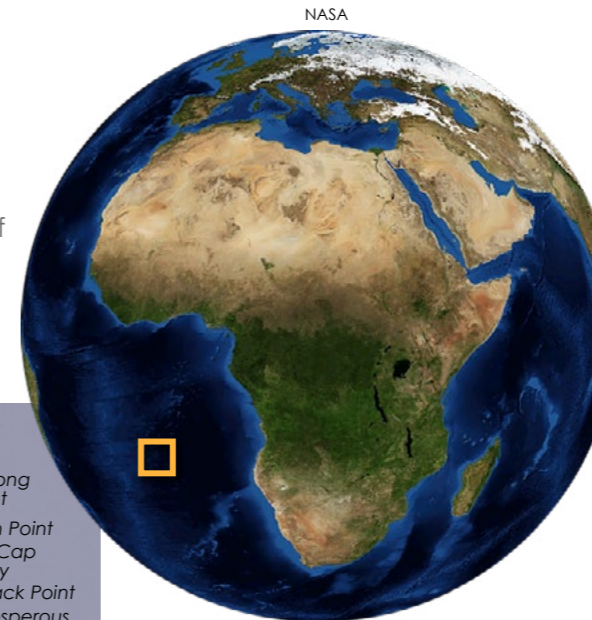
Environmental issues

Development continues to threaten St Helena's unique biota, which includes endemic plant species that are unknown in the rest of the world.

Economy Largely dependent on financial support from the United Kingdom, the local economy

receives more than double the amount of annual budgetary revenues in assistance. Locals rely on fishing, raising livestock and selling handicrafts for income. Since there are few jobs on St Helena, a quarter of the workforce has had to move to Ascension Island, the Falklands or the United Kingdom, to seek employment. Agricultural products include corn, coffee, potatoes, vegetables, fish, lobster, livestock and timber. Industries include construction, furniture-making, lace-work, fancy woodwork, collectible postage stamps and fishing. Exports include coffee, handicrafts, frozen and canned fish, and salt-dried tuna and skipjack.

RIGHT: Location of St Helena on global map
BELOW: Location of Jamestown on map of St Helena



Climate St Helena has mild and tropical marine climate, tempered by trade winds.

Population 4,577 (2019 est). Ethnic groups: African descent 50%, white 25%, Chinese 25%. Religions: Protestant 75.9% (including Anglican 68.9, Baptist 2.1%, Seventh Day Adventist 1.8%, Salvation Army 1.7%, New Apostolic 1.4%), Jehovah's Witness 4.1%, Roman Catholic 1.2%, other religions 2.5% (including Baha'i) (2016 est). Internet users: 1,800

Currency Saint Helenian pounds (SHP). Exchange rates: 1SHP=1.28USD, 1SHP=1.09EUR, 1SHP=1.00GBP, 1SHP=1.79AUD, 1SHP=1.75SGD

Language English

Phone/Internet The country code for Saint Helena is 290. From St Helena, there is capability to communicate worldwide. There is also ADSL broadband service, LTE coverage of 95 percent of population, including voice calls, text messages, mobile data and inbound and outbound roaming. In Jamestown, there are Wi-Fi hotspots. Many services that are not offered locally are made available for

visitors. Because international telephone and Internet communications rely on a single satellite link, sometimes sun outages can occur (2020).

Travel/Visa All visitors are required to complete an Arrival Declaration Form. Upon arrival, visitors must show proof of medical insurance, arrival and departure tickets, payment for short-term permit, a passport valid for six months, and a St Helena e-Visa for certain nationalities (see list at: sainthelena.gov.sh/2017/public-announcements/visa-requirements-for-visiting-st-helena). Since St Helena is so remote, travel insurance, which covers both missed departure and delayed departure, is strongly recommended. Driving is on the left in St Helena.

Health & Safety Especially during the coronavirus pandemic, please check first with your state and health department for the latest travel advisories and restrictions before booking your trip. Crime levels on St Helena are low. There is a risk of hepatitis A and typhoid through contaminated food or water, no matter where one is staying. There is rabies present in bats, which is not a major risk to most travellers except those involved in outdoor activities in remote areas.

Decompression Chambers There is no hyperbaric chamber on St Helena. There is medivac to Cape Town or Johannesburg in South Africa, at the diver's insurance cost.

Websites
St Helena Tourism
sthenatourism.com ■



Sunset on the bay at Jamestown



Lockdown Local Diving

— *Dives Found in Contributors' Backyards*

Text and photos by Andrey Bizyukin, Larry Cohen, Brent Durand, Dmitry Efremychev, Jennifer Idol, Kate Jonker, Matthew Meier, Pete Mesley, Don Silcock, Olga Torrey and Martin Voeller

As many divers face travel restrictions during the coronavirus pandemic, our contributors highlight the often overlooked or unsung yet intriguing diving that can be found in one's own backyard. *X-Ray Mag* contributors share their favorite local haunts—from a spring-fed Texan lake to a quarry and a sinkhole in Russia to the temperate waters off New Zealand, Japan, South Africa, New Jersey and Northern California to the subtropical waters of Southern California and Sydney, Australia—where they captured compelling underwater images.



School of opaleye and garibaldi among sea grass and feather boa kelp. PREVIOUS PAGE: School of juvenile seniorita fish in the kelp and sea grass beds

Bat Ray Cove, San Clemente Island, California, USA

Text and photos by Matthew Meier

Thankfully, local diving is still possible during the pandemic, and while this dive site requires boat access, it is still one of my favorites. San Clemente Island is located off southern California and is controlled by the US military. As such, it is not always accessible, but when conditions allow, it offers spectacular diving. Bat Ray Cove has a multitude of underwater topographies, which make it possible to dive this site repeatedly. I once spent two full days here, without moving anchor, and never ran out of things to shoot.

There is a shallow sea grass bed up against the island, which transitions into feather boa kelp, and ultimately, a giant kelp forest anchored in only 40ft (12m) of water. In the shallows, you can find leopard sharks, schools of juvenile seniorita fish, opaleye and garibaldi.

Soupin (tope) sharks can be seen swimming in the shallows and among the giant kelp, along with schools of blacksmith and jack mackerels. California sea lions will swoop through intermittently, and the occasional harbor seal will play peak-a-boo in the kelp.

Under the boat is a sandy bottom where angel sharks, stingrays and the namesake bat rays bury themselves. Adjacent to the kelp forest is a rocky reef wall, which is covered in fascinating marine life. Here, you will find moray eels, California spiny lobster, anemones, rock scallops, sea stars, blennies and kelp rockfish. We were even lucky enough to have a giant sea bass hang out under the boat one afternoon. These behemoths once faced local extinction, but conservation efforts, which have protected them from commercial and sport fishing since 1982, have helped to rebuild the population. It is always a thrill to swim next to a fish that can grow up to 8ft (2.5m) long and weigh as much as 500lbs (227kg). Visit: MatthewMeierPhoto.com



Portrait of a giant sea bass (above); Three California spiny lobsters hiding in the rocky reef (center inset); Leopard shark swimming in the shallows (top right); Bat ray swimming along the edge of the kelp forest (upper right); Soupin or tope shark swimming over kelp in shallow water (bottom right)





THIS PAGE: Underwater views in a dolomite quarry near the town of Shchelkovo in Russia

Dolomite Quarry, Shchelkovo, Russia

Text and photos by Andrey Bizyukin

Moscow during the pandemic: All the shops, restaurants, night-clubs—everything is operating, but there is no way to fly out of here to dive in distant lands. The borders are closed. What can a withering diver do in the capital? Out of despair, my dive friends Andrey Loginov and Alexander Nyrov and I began traveling to nearby lakes in search of new dive sites. A dolomite quarry near the town of Shchelkovo, just 20km from the capital, immediately caught our attention.

Here we found clear waters, good visibility, lush seaweed on the bottom, large colonies of Spongillidae green sponge (which is known to be an excellent water purifier), and an underwater forest with trees abundantly covered with shells. With comfortable diving depths of 5 to 7m, we were able to see and enjoy all these beauties found in this freshwater underwater world. The water temperature was 6 to 8°C, and the dive time was about one hour. For this dive, drysuits are recommended.



Compared to what one may find in tropical seas, this quarry had a completely different underwater landscape but still an interesting one, exciting enough for divers who have no place to go yet. If you are bored looking at your four walls in Moscow during the pandemic, we say, "Welcome, let's go diving together!" Please visit: xray-mag.com/contributors/AndreyBizyukin

At the dolomite quarry in Shchelkovo, Russia, one will find clear waters, good visibility, lush seaweed, colonies of green sponge and a submerged forest of shell-covered trees.





Diver Olga Torrey explores the *Stolt Dagali* (far left); Hatch area inside the *Stolt* (left); Table supports in the crew's dining room (right); Plumose anemones decorate the wreck (bottom right).

Local Dives



penetration will enjoy exploring its interior. In the crew's dining room, at 65ft (~20m), you can still see many table supports that used to hold wooden tables. This interior area has many openings with plenty of light. Deeper in depth and

area. One of the most popular was the *Stolt Dagali*.

The *Stolt* was a 582ft (~177m) M-class tanker with a 70ft (~21m) beam. Built in Copenhagen, Denmark, in 1955, her homeport was Oslo, Norway. On Thanksgiving 26 November 1964, the ship left Philadelphia, Pennsylvania, and headed to Newark, New

Jersey, with a cargo of vegetable and coconut oil. That night, there was heavy fog, and the Israeli luxury liner SS *Shalom* was heading out for a Caribbean cruise. Around 18mi (~29km) southeast of Manasquan Inlet, the *Shalom's* bow crashed into *Stolt*, slicing the ship's portside at a 45-degree angle and cutting her in half. The 142ft (~43m) stern section is now sitting in 130ft (~40m) of water and comes up to 65ft (~20m). The bow stayed afloat and was refitted onto the MT *C.T. Gogstad*, which was renamed the *Stolt Lady* in 1965.

The wreck starts at a reasonable depth, so it is a great dive for both intermediate and advanced divers. The structure is gargantuan, with an interesting exterior. Advanced divers trained in wreck

enclosed, the engine room can be entered.

Before the pandemic, hardcore divers visited the wreck year-round, but the main New Jersey dive season was from April to November. Visibility on the wreck is usually good and can reach 40ft (~12m). The water temperature on the wreck is around 50°F (10°C). In the fall, the Gulf Stream moves closer to the *Stolt*. This is when the temperature is the warmest and visibility is the best. The *Stolt* attracts marine life all year round, but in the fall, we see tropical fish that get caught in the Gulf Stream. One fall, my dive partner Olga Torrey and I were astounded to see a huge barracuda, which had taken residence in the upper section. The *Stolt* is decorated with plumose anemones and is home to lobsters, mussels and scallops, which may make a nice dinner for divers carrying a goody-bag.

We want to travel like most divers. But during this time of lockdowns, we are lucky to have a large assortment of historical wrecks, including the *Stolt Dagali*, close to home. Visit: liquidimagesuw.com

SOURCES: EXECUTIVE ORDER NO. 146 BY GOVERNOR OF NEW JERSEY PHILIP D. MURPHY, NATIONAL MARINE SANCTUARY SYSTEM, NJSCUBA.NET, SKIPSHISTORIE.NET



The *Stolt Dagali*, New Jersey, USA

Text and photos by Larry Cohen

The coronavirus pandemic kept New Jersey charter boats at dock, but in the middle of May, they were given the go-ahead to run with restrictions. To adhere to social distancing rules, boats were limited to ten people. Booking a spot had to be done online or over the telephone to limit physical interactions. Signs showing 6ft (~2m) spacing between people had to be on the deck, and all enclosed spaces were closed to passengers. With the "new normal" rules, divers in the US Northeast were happy to have transportation to many of the wrecks in the





Gerstle Cove, Sonoma Coast State Park, California, USA

Text and photos by Brent Durand

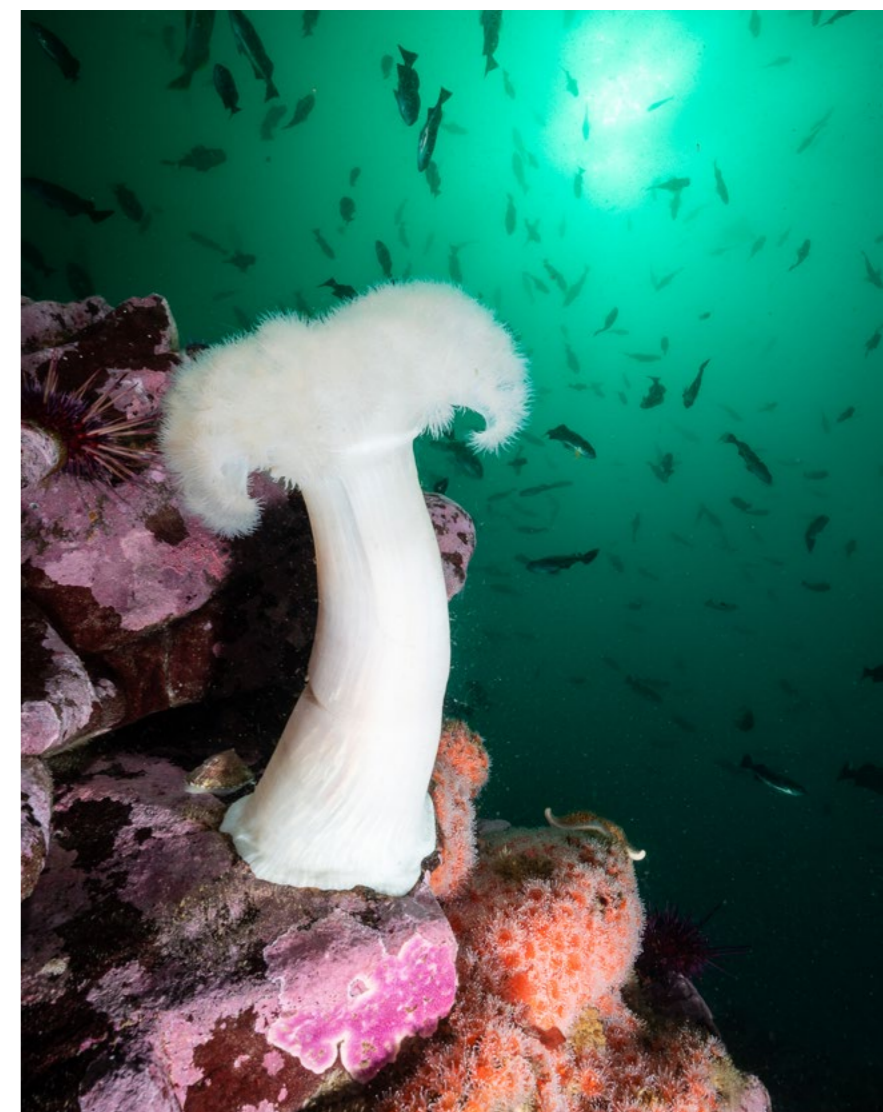
Closures due to COVID-19 have been affecting industries across the world, including scuba diving and dive travel. At home, California closed public beach parking, which kept me, and most divers, out of the water for weeks. I am facing personal challenges like most of us, but I am also very fortunate that once the beaches reopened, I was back out there safely diving as much as usual.

One of my favorite local dive sites is Gerstle Cove in Sonoma Coast State Park. Gerstle Cove is one of the first nice dive sites you will encounter when exploring the Sonoma coast from south to north. The underwater terrain features massive boulders, rocky reefs and submerged pinnacle structures, which you can spend many hours exploring. This rugged terrain is a prelude to the even more impres-

sive dive site topography you find diving farther north in the county and through Mendocino.

Marine life includes lingcod (*Ophiodon elongatus*), cabezon (*Scorpaenichthys marmoratus*), many species of rockfish, giant fish-eating anemones (*Urticina piscivora*), plumose anemones (*Metridium farcimen*) and a healthy assortment of macro life. You can enjoy searching for critters in cracks and swim-throughs, and when keeping an eye out to the green water, look for stellar sea lions and harbor seals.

Gerstle Cove has been a marine reserve since 1971, and even though the ecosystem is facing a number of different challenges, the combination of marine life, unique dive terrain and the sense of exploration you inherently feel when diving here make it a dive—or many dives—to remember. Visit: tutorials.brentdurand.com



Fish-eating anemones, or *Urticina piscivora* (above and top center); Pacific sea nettle, or *Chrysaora fuscescens* (top right); Giant plumose anemone, or *Metridium farcimen* (bottom right)



THIS PAGE: Scenes from Blue Lake, a limestone sinkhole near Samara, in the middle of Russia, far from the sea



Blue Lake, Samara, Russia

Text and photos by Dmitry Efremychev

In the beginning of 2020, no diver could ever have imagined that our lives and the global dive community could change so dramatically, and that it would be so difficult to find places to dive. As the coronavirus pandemic broke out all over the world, countries began shutting their borders and the world became closed. A difficult situation developed for active divers, and questions arose about how to find at least some kind of local diving in their regions in order to keep the diving spirit alive.

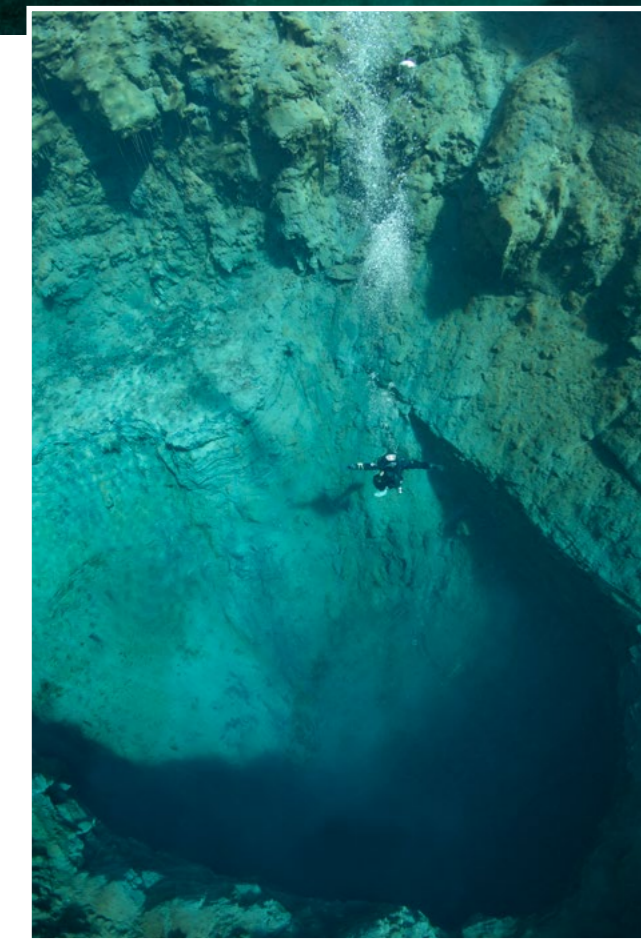
As a dive instructor in Samara, Russia, I was located in what one might call the real "outback," thousands of kilometers away from any sea or ocean. So, I began looking for new dive sites in my own region, and found one just 130km from the city, in the Sergievsky region. Here, I found a very unique little lake, 50m in diameter; it is a limestone sinkhole, 21m in depth, with great visibility and clear blue water.

From the shore, it is easy to see the lake bottom. When you are underwater, looking up at the surface,

you can actually see the faces of people on the shore, because it is so clear. The water in the lake contains hydrogen sulphide, so sometimes you can smell its pungent scent. The lake does not freeze as there is a constant flow of water out of the lake, and the water temperature is only 7°C all year round.

While the lake is called Blue Lake, it is a world of charophyte green algae and various microorganisms live here. Blue Lake has changed over time. At first, it was 18m deep, then the lake bottom collapsed, and its depth became 30m. An underwater cave formed under one of its walls. When the first explorers came to this underwater cave, they saw that the cave opened up and its walls expanded into huge chambers, with great depths. Later, due to the erosion of the lake's opposite wall, the cave collapsed and was filled up.

Reading up on the lake's history and diving there, my fellow divers and I began to understand that the depth of the lake had changed often; it is like it is alive, and at any moment, it will reveal to us more unknown underwater galleries. According to scientists, a very complex and deep underground water system passes through here. Visit: scuba-mafia.ru.

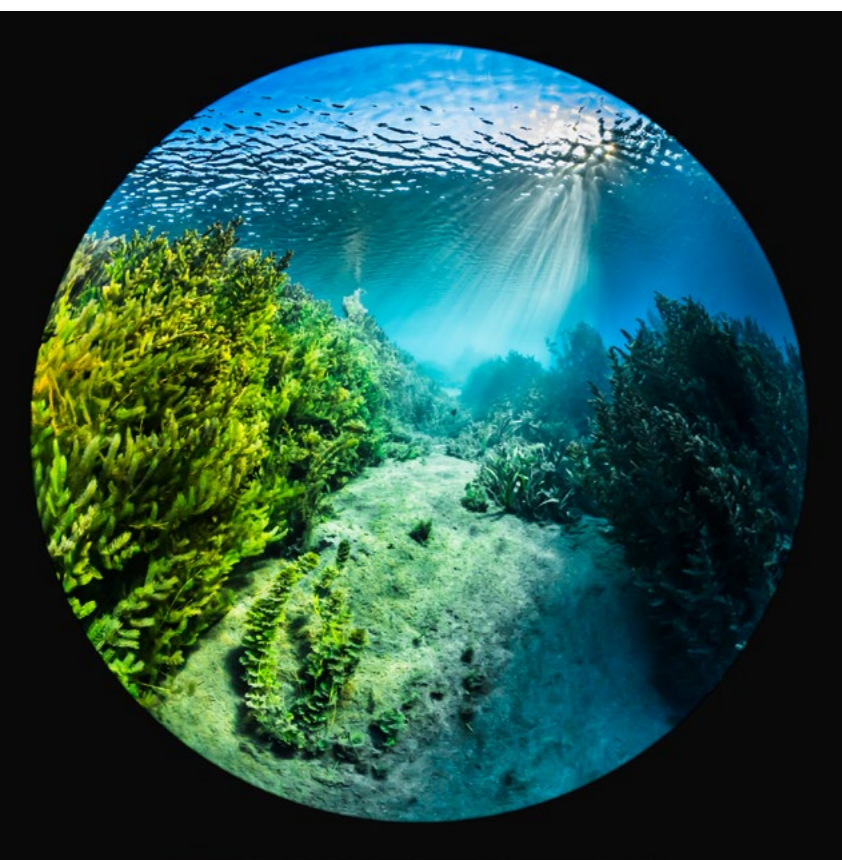




Spotted gar (*Lepisosteus oculatus*) thrive in Spring Lake and can often be found schooling (above).



View of Spring Lake from the dive area (above); The yellow-bellied slider is a water turtle (right). Six species of turtles in Spring Lake hide within the Cabomba vegetative growth.



Heading toward Rio Grande Springs, vegetation surrounds the limestone springheads.

Spring Lake, Texas, USA

Text and photos by Jennifer Idol

Local dive sites can be magical opportunities for exploration and photography. Just a short drive from my home in Central Texas, a very special ecological resource is home to a diverse aquatic ecosystem that includes seven endangered species. Since the time of the Clovis Native Americans, people have been drawn to the pristine waters of Spring Lake, fed by the Edwards Aquifer through limestone springs.

Once known as Aquarena Springs amusement park, Spring Lake is now managed by the Meadows Center for Water and the Environment as part of Texas State University in San Marcos. The site has been designated

a critical habitat and, under the new management, has been restored to its natural state.

Just 15ft (4.5m) deep, the shallow and clear waters provide innumerable types of subjects from macro to fisheye. Among my favorite subjects are turtles and spotted gar, which hide from divers. I prefer to dive in the mornings or evenings to capture angled sun rays in the water column.

As a volunteer diver, I help keep invasive plants, including algae, out of the springs. I enjoy contributing my time to this local body of water while I appreciate its beauty. I have been visiting these springs since my childhood and have enjoyed every state of its evolution, from Ralph the diving pig and the world's longest dive to the educational center and its glass-bottom boats.

Open year round with consistent water temperatures, the possibilities are endless for creating unique photos at the springs. A dam at the southern end keeps the water level constant and scientific instruments measure the flow of many of the springs.

Divers giant-stride from a floating dock to enter this entirely-other world. Closed for most of the coronavirus outbreak, Spring Lake has finally reopened. I look forward to going home.



For further reading on local diving, I have showcased local waters in my book, *An American Immersion*, a quest in which I became the first woman to dive 50 US states. Please visit: uwDesigner.com



Local Dives



The rock formation that resembles a dog, giving Stone Dog dive site in Gordon's Bay its name (above); Divers leaving Harbour Island in Gordon's Bay, wearing required masks during lockdown (left); Speckled klipfish at Pinnacle dive site in Gordon's Bay (top left); Protea dorid at Stone Dog dive site in Gordon's Bay (bottom left); Dancing maroon-lined flatworm at Stone Dog dive site in Gordon's Bay (below)

Gordon's Bay, South Africa

Text and photos by Kate Jonker

I live in South Africa and in September, we were still in lockdown. When lockdown started on 16 March 2020, we were banned from the beaches. All forms of water sports (including surfing, boating and diving) were prohibited. Six months later, we were given the green light to launch again, and we did our first lockdown dives in Gordon's Bay in mirror-flat, clear blue water.

It was sheer bliss to roll back into the ocean. It was like coming home. As we descended, it felt as if the fish were coming up to greet us. I swam to my favourite spots on the reefs to see if my fish and

nudibranch friends were still there.

The rare protea dorids had grown from just a few millimetres to over a centimetre in length. The soft coral nudibranchs had also quadrupled in size, and despite there being fewer around, egg ribbons adorned the soft corals. Flatworms danced in the gentle surge as they reared up, searching the water column for the scent of a mate or food, or both. With spring just having sprung, I expect to see tiny nudibranch and flatworm babies popping up on the reefs any day now.

As I glided over the reefs, the fish followed me around. Octopuses peered out from their homes under rocks, and cuttlefish rested on their perches, watching us (and the world) go by. It was

interesting to observe the changes on the reefs, something one would not usually notice when diving them every day. The soft corals and sponges had spread and blossomed, and even the false corals had grown.

It was great to be back in the water again, to be lulled by the ocean's gentle hand and to relax to the sound of marine life crackling on the reef. People refer to a "new normal" emerging after lockdown, but for me, this is the normal, and I hope it never changes. Visit:

katejonker.com





The *Canterbury's* Main Operations room and captain's chair (above); Starboard side main deck corridor, encrusted with colourful sponges (right)

HMNZS *Canterbury*, North Island, New Zealand

Text and photos by Pete Mesley

One of the positives to come out of the global pandemic and with 100 percent of my international business just stopping dead in the water, was re-establishing my backyard diving haunts. The diving in New Zealand is without a doubt some of the most underdiscovered temperate diving on the planet. But unfortunately, most of my business has taken me out of the country for much of the year. So, I am pretty lucky to be able to have this at my doorstep.

Probably one of my favourite wreck sites is the Leander-class frigate HMNZS *Canterbury*. This vessel was purposely sunk in 2007 as an artificial reef and wreck diving site for keen "rust heads." This 113m-long warship sits bolt upright in a well-protected cove, in about 36m of water. This makes it one of the best wreck playgrounds in the North Island

of New Zealand. I was lucky enough to dive the wreck quite a bit when she first went down but have not had the opportunity for quite some time to dive her since then. Until recently.

Good mates and slick dive operators Shane Housham and Julia Riddle from Northland Dive play host to taking people out diving *Canterbury* and other amazing sites around the Bay of Islands. We came out of lockdown in May, and one of the first dive trips I did was visiting *Canterbury*. And, what excellent conditions greeted us—some of the best visibility I had ever seen on the wreck! So, that was well appreciated. Since then, I have been back numerous times, teaching advanced wreck penetration programmes and photography workshops. All in all, I cannot really complain, having this wreck site only a few hours' drive away. Visit: lust4rust.co



Canterbury's sonar control room, just forward of the Main Operations room



Aft entry into the gun bay turret area, which housed the 4.5-inch gun



Australian pineapplefish, or *Cleidopus gloriamaris* (left); Hairy striate anglerfish, or *Antennarius striatus* (right); White's seahorse, or *Hippocampus whitei* (below); The public jetty at Clifton Gardens in Chowder Bay, Sydney, Australia (bottom right)



Clifton Gardens, Sydney, Australia

Test and photos by Don Silcock

Like many other divers who like to travel and explore global dive locations, the COVID-19 pandemic has dramatically changed my way of life in 2020. All the trips I had carefully planned for this year have been cancelled, I cannot get back to the island of Bali where my wife and I live most of the time, and we are well and truly “hunkered down” here in Sydney!

But inside every challenge, there is usually at least one opportunity; in my case with COVID-19, there have been two! First of all, once the gyms were allowed to open, I have been able to really concentrate on getting fit—no travel excuses now. Secondly, I have rediscovered Sydney diving and developed a “local” dive site in which I am beginning to really understand where to find things. Which means that I can plan images in advance and really finesse specific techniques—something that is rarely possible on most dive trips.

My local site is Clifton Gardens (aka Chowder Bay) in Sydney Harbour and part of one of the most expensive and desirable suburbs in the “Emerald City.” There are a few things that are quite special about CG, as it is often referred to as. Starting with the fact that although water temperatures are quite low, going down to 16°C in winter, the site has a number of exotic critters you would normally associate with warmer waters. Then, there are the White's seahorses (*Hippocampus whitei*) to be found at CG, together with an eclectic mix of other very photogenic subjects like the Australian pineapplefish (*Cleidopus gloriamaris*).

Plus, CG is very easy to dive—there is

a good car park to get kitted up in, and entry is from the sandy beach near the main public jetty. Usual depth is less than 10m, and the only real hazards are fishing lines, plus the resident large stingray, which often appears from nowhere to startle you. Clearly, a playful individual! Visit: indopacificimages.com





Diver Larry Cohen entering the Challenger 600 airplane to take photos of the salon's interior (left); Diver Anna Svanidze descending on the wooden boat (below); Divers Larry Cohen and Gregory Borodiansky descending upon the Challenger 600 airplane (right); Diver Gregory Borodiansky swims over the Cessna aircraft (lower right)



Dutch Springs, Bethlehem, Pennsylvania, USA

Text and photos by Olga Torrey

The 2020 scuba season is very quiet, at best. With the coronavirus pandemic, the world came to a halt, and scuba divers had to find new ways to get wet, work on their skills and continue to learn. While I cannot travel to faraway dive destinations, just 90 miles from my home in New York City is a fantastic playground for divers!

A 50-acre lake, Dutch Springs has attractions at depths of up to 100ft (~31m). Because it is fed by a spring from an underground aquifer, which filters the water through limestone, it has excellent visibility. I like diving the quarry because of its diversity. There are plenty of attractions underwater and on the surface. Dutch Springs has it all: a Challenger 600 jet, a Sikorsky H-37 helicopter, an air force crane and other submerged vehicles, boats and

structures. The pump house, from the time when the site was a working quarry, is now underwater. Platforms have been placed in shallow water for students to perform skills as required by their instructors.

Besides the unique collection of rusty retired modes of transportation and working machinery, the lake is also home to marine life. On most dives, you will encounter largemouth bass, rainbow trout, palomino trout, pumpkinseed sunfish, koi, carp, goldfish, yellow perch, crayfish, freshwater sponges and zebra mussels.

Marine life can be seen in different parts of the lake. Pumpkinseed sunfish, koi, carp and goldfish occupy the pump house. Largemouth bass inhabit the steep walls. Rainbow trout and palomino trout mark their territory around heavy metal, which includes a school bus, silver comet and fire truck. As a photographer,



there is a wealth of subjects to photograph and practice my wide-angle, fish-eye and macro techniques.

The centerpieces of the quarry are the Sikorsky H-37 helicopter and the Challenger 600 airplane. The size and shape of these flying machines are spectacular. These "Big Boys" of the quarry are on display in midwater for the enjoyment of the dive community. Their little brother, the Cessna aircraft, is another

airplane wreck I like to visit. It sits in shallow water, on the top edge of the wall. Largemouth bass live inside the aircraft.

As a child, I dreamed of becoming a pilot and an astronaut.

Dutch Springs gives me the chance to fantasize about flying these aircraft. Sitting in the cockpit, I look out into the green water and see fish instead of birds.

Dutch Springs is normally open from mid-April to mid-November. In 2020, it opened in mid-July due to the pandemic. I enjoy camping on the Dutch Springs



grounds. This year, camping is not permitted. The water temperature at depth is around 50°F (10°C). Even in this cold water, diving Dutch Springs is a warm enjoyable experience. Visit: fitimage.nyc
SOURCE: DUTCHSPRINGS.COM





Shark Scramble, Ito, Japan

Text and photos by Martin Voeller

"Win-win" is a phrase often heard in the business world, meaning an interaction in which all participants can profit in some way. There is a great example of this scenario in the dive community of Ito (Chiba), Japan, namely at the "Ito Diving Service Bommie," where on any given day of the year, congregations of 300 to 400 houndsharks can be seen.

Members of fishing industry in Ito had been faced with an unsolvable problem for a very long time: houndsharks getting caught in fishing nets and devouring the fish, which were intended to be sold at the markets. These houndsharks, as seen from the fishing industry's perspective, were pests, affecting business in a detrimental way—up to 100 sharks would end up daily in the nets.

As all business relationships should be win-win, the local fishing industry and the local dive shop agreed on a deal: Members of the fishing industry would provide the dive shop with bait, and the dive shop would simply set up bait boxes far

away from the fishing nets, so as to lure the sharks towards the bait and away from fish in the nets. As a result, fishing as a business (and the fish caught in the nets) would be protected, and the dive shop could create more business by guiding divers to the dive site now called Shark Scramble.

This site has been my "backyard" of diving over the years. These gluttonous sharks create a tall tower around the bait box, and people now refer to it as the shark tower or "sharknado." It is definitely thrilling and will get your adrenaline rushing as you find yourself in the middle of a feeding-frenzy tornado. Shark Scramble is a unique dive site in its own right, and probably incomparable to any other dive site around the world. Visit: poseidonphotos.com

Banded houndsharks form a "shark tower" around a bait box at the Shark Scramble dive site in Ito, Japan (above); Close-up face shot of a banded houndshark inside a "sharknado" (top center inset); Banded hound sharks forming a "shark tower" around the bait box (center); Banded houndsharks swarming over the ocean floor (top left); Banded houndsharks inside the shark tower (bottom left)





Text by Simon Pridmore

—The Scuba Confidential column in this issue is adapted from a chapter in Simon's book *Scuba Exceptional: Become the Best Diver You Can Be*.

In Part I of this two-part series (see last issue), I made a correlation between scuba diving and driving a car, particularly in the context of learning how to anticipate and assess dangerous situations, make well-informed sensible decisions and stay safe—things that motorists tend to group together under the catch-all phrase of defensive driving.

I also outlined a defensive diving strategy involving how to use your dive computer. Here are a few more strategies that I see as intrinsic to the defensive scuba diving concept, where “defensive” carries the same meaning as in the motoring world, that is: safe, careful, conservative and thoughtful.

Avoid the “normalisation of deviance” pitfall

In a nutshell, normalisation of deviance is having a safe procedure, then cutting a corner on this procedure and continuing to cut the same corner until it becomes

routine and you rationalise that the corner-cutting makes sense. For example: You take two lights on a night dive because if one light fails, you can use the other. If you do not have a second light, you will be left completely in the dark; you will not be able to see where you are going; and, when you ascend, you

will have no way of showing your surface support where you are.

One day, you find yourself preparing for a night dive and find that you have only one functioning light. The other has been smashed in transit; perhaps a cylinder fell on it. You proceed with the dive anyway. You tell yourself that

if your single light were to fail, then you could always team up with another diver, borrow their second light, or just swim around with them, letting them light the way, then surface together. Nothing goes wrong. Your single light works just fine and you use the same rationale, now backed up by experience, to justify

not investing money in a replacement second light. You continue to night-dive with only one light.

This is normalisation of deviance: unacceptable behaviour becoming routinely acceptable. It is not just a scuba diving phenomenon, of course. It appears in pretty much every field of human

Defensive Diving *Part II*

ILLUSTRATION: COMPILED WITH PUBLIC DOMAIN IMAGES FROM PIXABAY





opinion

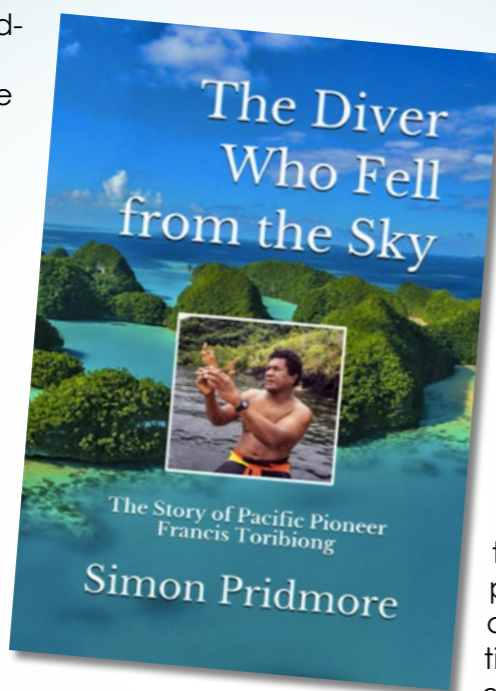
"...assume that you will have a problem during the dive and will have to deal with it on your own."

activity. Nor is it merely an individual phenomenon; it can affect or infect an entire community. And it does seem to be something that we scuba divers excel at. Think about some of the things that scuba divers do all the time. For instance, recreational divers continue to

dive when they are very low on air and regularly go into deco on a single cylinder. Meanwhile, technical divers often dive in overhead environments without a back-up buoyancy device, carry insufficient open-circuit bailout when using a CCR, or extend the life of CO₂ absorbent

A New Book from Simon Pridmore

When his country needed him most, Palauan Francis Toribiong came along and helped the Pacific island nation find its place in the world and become an independent, forward-looking 20th century state. And he achieved this, improbably, via the sport of scuba diving. This is the inspiring tale of an absolutely unique life, written by Simon Pridmore and illustrated with images of the beautiful islands of Palau, above and below the water.



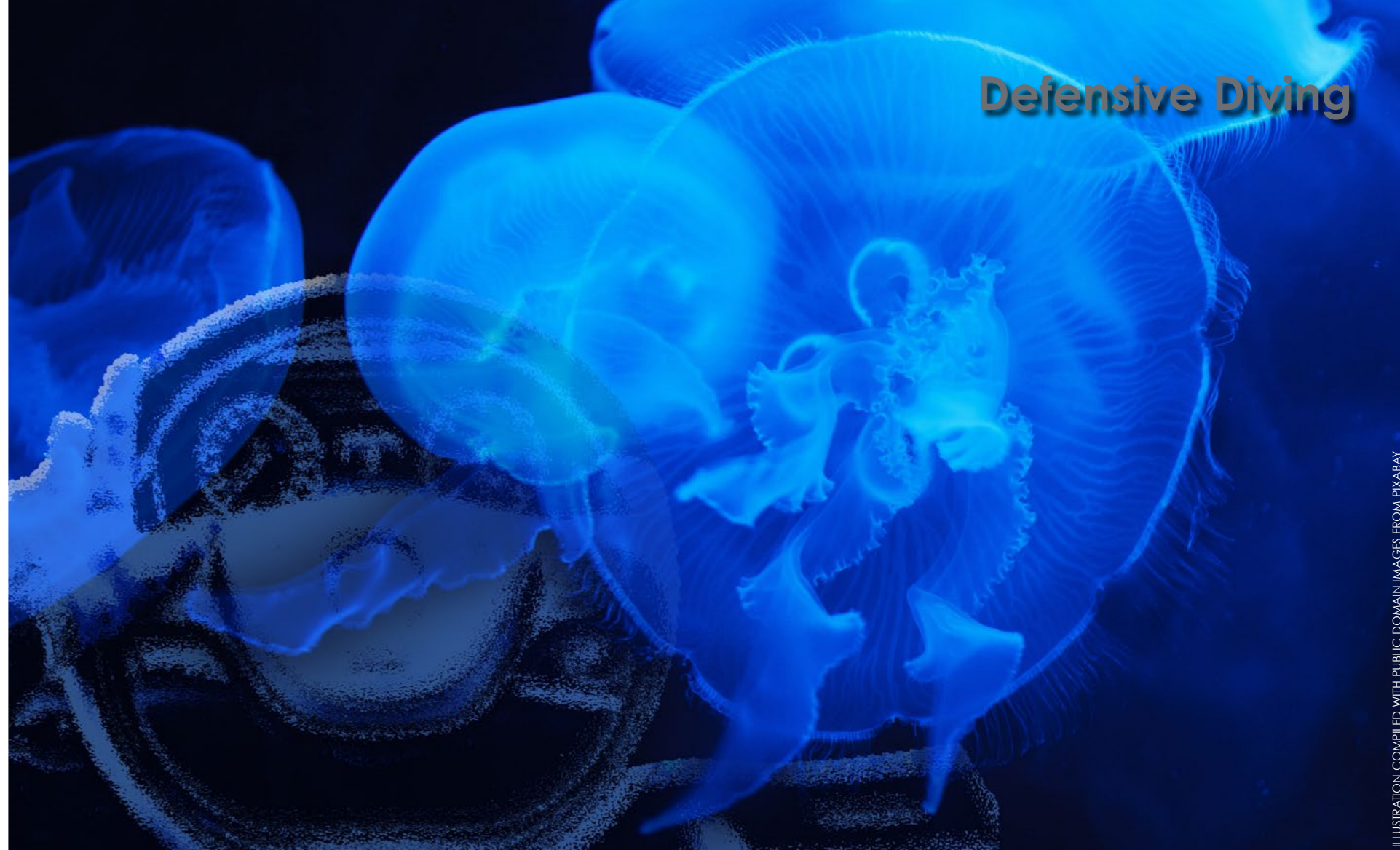
him this title, people were speaking both literally and figuratively.

Toribiong was so completely different from all of his contemporaries in terms of his demeanor, his ambitions and his vision, that it was as if he had come from outer space. Palau had never seen anybody quite like him and there was no historical precedent for what he did. He had no operations manual to consult and no examples to follow. He wrote his own life.

Toribiong was born poor, had no academic leanings and no talent for diplomacy. Yet he was driven to succeed by a combination of duty, faith, a deep-seated determination to do the right thing and an absolute refusal ever to compromise his values. And, as well as all that, he was Palau's first ever parachutist—known by islanders as "the Palauan who fell from the sky." In giving

Toribiong was the first Palauan ever to seek and seize the international narrative. No Palauan, in any context or field, had previously thought to go out into the world and say: "This is Palau—what we have is wonderful. Come and see!" This is his astonishing story.

Available in paperback or ebook on: **Amazon, Apple, GooglePlay and Kobo**



Defensive Diving

beyond manufacturer and industry recommended limits.

It is a matter of mindset. Having bypassed an established procedure and got away with it, some divers may argue, "I didn't come to harm nor did I find myself in danger, therefore the procedure must be unnecessary or exaggerated," or else, "I didn't come to harm nor did I find myself in danger, therefore I must be special in some way—some kind of diving superhero."

A defensive diver will take the opposite view and say, "I made a mistake and I got away with it. That will never happen again. In fact, what can I do to make sure I never make that mistake again?"

Do not abandon responsibility for your dive

Never follow a divemaster or dive guide blindly and without question. Never give anyone complete authority over your

dive. Scuba diving professionals are just people. People get things wrong, people overestimate their abilities, people get distracted, people get tired. Make sure that you are actively involved in all decisions concerning the dive, that you know the dive plan, understand your role in the team and have an idea of who your fellow divers are and how experienced they are. Be prepared to take full responsibility for yourself during the dive and also be prepared to assist one of your teammates or even your divemaster or guide if they get into difficulty. It happens.

Assume the worst

This strategy is similar to the "what-if" concept but, whereas "what if" refers primarily to an approach to choosing and configuring equipment, "assume the worst" is more a question of attitude. There is a parallel here with the advice commonly given to inexperienced driv-

ers: Always to assume that every other driver on the road is an idiot and prepare to act accordingly.

From a scuba diving point of view, this equates, among other things, to the following:

- a) Assume that the person you are diving with is going to get into trouble and is going to need your help.
- b) At the same time, assume that you will have a problem during the dive and will have to deal with it on your own.
- c) Assume that diving conditions will deteriorate during the dive and that you may have to abort.
- d) Assume that the boat will not be there when you ascend and that you will have to help the crew find you.

ILLUSTRATION COMPILED WITH PUBLIC DOMAIN IMAGES FROM PIXABAY



ILLUSTRATION COMPILED WITH PUBLIC DOMAIN IMAGES FROM PIXAR.BAY

opinion

“Dive the same way as you drive. Watch the ocean as you watch the road.”

too, especially if you are in a shipwreck or cavern. You will probably need to pass this way again on exit. Be alert for signs of changing water conditions. Look up to the surface from time to time to see what is happening there.

3. Always be aware of how you are diving and how you look in the water. Think about your trim, how you are streamlined, what your fins are doing and what your arms are doing.

4. Dive the same way as you drive. Watch the ocean as you watch the road. Keep your eye on other divers in the water, like you do other drivers. Anticipate what they may do and be prepared. A diver with poor fin control in a confined space can quickly reduce the visibility in that space. A heavy breather may run out of air quickly. Someone else's problem can always become your problem too. In my career, two out-of-air divers have torn the regulator out of my mouth (and ripped my mask off in the process) in their desperation to find a source of air to breathe. Neither

was part of my group.

Be constantly attentive

There are four main aspects to this:

1. Replace or repair anything that malfunctions during a dive before the next dive; this includes leaky O-rings and hoses.
2. Look ahead and think ahead. Early recognition of potential problems gives you more time to react. Do not forget to look behind you

e) Assume that the boat will not turn up and that you will need a plan B; for example, swim to shore or prepare to be floating for a long time until searchers or fortuitous fishermen come by.

f) Make sure each piece of your equipment is functioning properly before every dive, but still assume that it is going to fail, just when you need it the most.

puter set to air is also a buffer. As long as you do not descend deeper than the maximum operating depth of the nitrox mix, there is absolutely no reason why this is not completely safe. It is an excellent way to reduce the risk of decompression sickness, particularly if you are on a multiday dive trip with several dives a day.

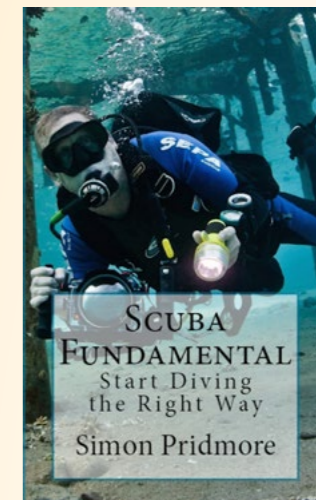
Make it a habit to do longer surface intervals between dives rather than calculating minimum surface intervals to cram as much diving time into a diving day. If you want to spend more time in the water, a much better way of doing this is to spend an extended period shallower than 9m at the end of each dive. During this time, your body will be releasing inert gas accumulated during the deeper part of your dive. Experiments that monitor the presence of tiny bubbles in divers after diving have shown that this practice reduces a diver's post-dive bubble count considerably.

Build buffers into all aspects of your dive planning and execution. Be thoughtful and develop a defensive mindset along the lines set out here. You will find that focussing on safety as your priority carries no downside in terms of the quality of your diving. ■

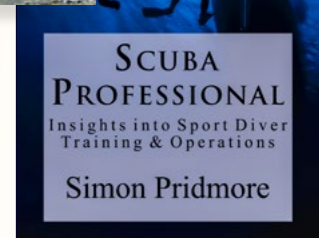
Simon Pridmore is the author of the international bestsellers Scuba Confidential: An Insider's Guide to Becoming a Better Diver, Scuba Professional: Insights into Sport Diver Training & Operations and Scuba Fundamental: Start Diving the Right Way. He is also the co-author of the Diving & Snorkeling Guide to Bali and the Diving & Snorkeling Guide to Raja Ampat & Northeast Indonesia. His recently published books include The Diver Who Fell From The Sky, Dive into Taiwan, Scuba Exceptional: Become the Best Diver You Can Be, Scuba Physiological: Think You Know All About Scuba Medicine? Think Again! and the Dining with Divers series of cookbooks. For more information, see his website at: SimonPridmore.com.

Get the series!

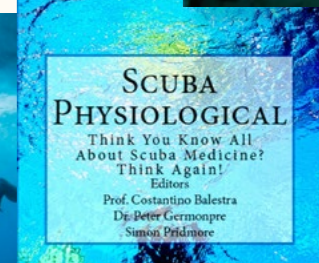
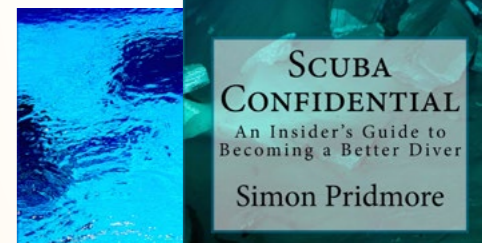
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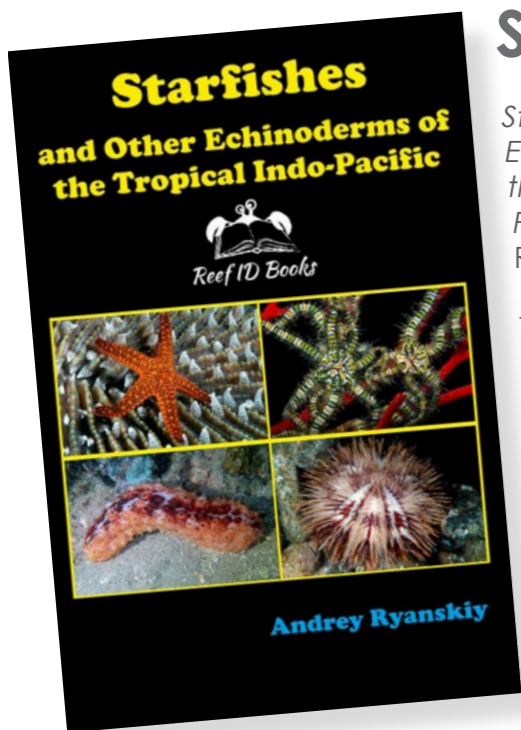
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Visit the author's website at:

SimonPridmore.com

Edited by
Catherine
GS Lim



Starfishes

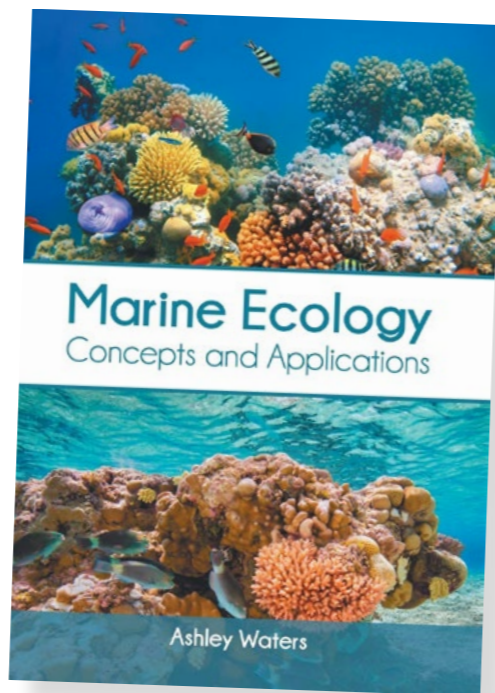
Starfishes and other Echinoderms of the Tropical Indo-Pacific, by Andrey Ryanskiy

This handy field guide facilitates easy identification of starfishes, sea urchins, sea cucumbers and other echinoderms in tropical Indo-Pacific, ranging from the Red Sea to Hawaii, the

Marshall Islands and

Guam. It contains photos of 450+ species, including 100+ that had never before been published in field guides or popular books. Validity of species names has been verified with the World Register of Marine Species (WoRMS).

Paperback: 92 pages
Publisher: Andrey Ryanskiy
Date: 29 August 2020
ISBN-10: 5604204986
ISBN-13: 978-5604204986

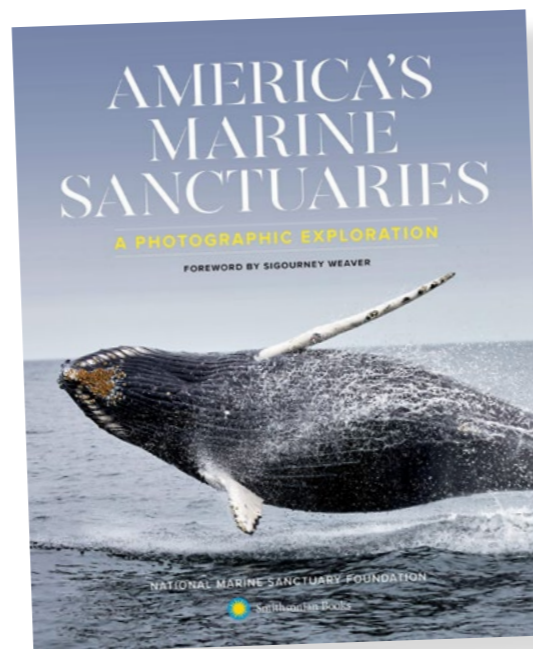


Marine Ecology

Marine Ecology: Concepts and Applications, by Ashley Waters

Marine ecology examines marine-life populations, habitats and interactions amongst organisms and the surrounding environment. This book is a comprehensive resource that covers all the important aspects of marine ecology and its current status in our present-day context. Written in student-friendly language, the topics are written in a coherent flow, accompanied by an extensive use of examples.

Hardcover: 208 pages
Publisher: Syrawood Publishing House
Date: 8 September 2020
ISBN-10: 164740035X
ISBN-13: 978-1647400354



Marine Sanctuaries

America's Marine Sanctuaries: A Photographic Exploration, by National Marine Sanctuary Foundation

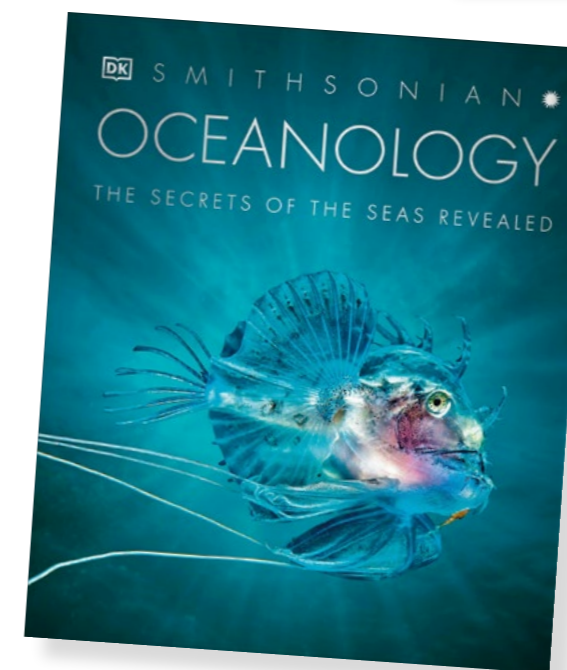
America's Natural Marine Sanctuary consists of 14 marine sanctuaries that span more than 620,000 square miles, ranging from the Hawaiian Islands to the Great Lakes and the Florida Keys. Besides preserving America's maritime heritage, they serve as living laboratories for science, research, conservation and education. Using 175 colour photographs and lively narrative, this book showcases each of the marine sanctuaries as well as its marine inhabitants and wrecks. It also highlights how the sanctuaries have shaped America's development, survival and identity.

Hardcover: 224 pages
Publisher: Smithsonian Books
Date: 20 October 2020
ISBN-10: 1588346668
ISBN-13: 978-1588346667



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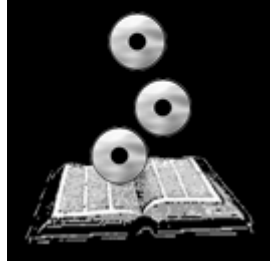


Oceans

Oceanology: The Secrets of the Sea Revealed, by DK and Maya Plass

The oceans hold a vast array of astounding creatures of all shapes and sizes, from microscopic plankton to gigantic blue whales, from seaweed to starfish. Published in association with the Smithsonian Institution, this book takes the reader to every corner of the oceans, from coral reefs and mangrove swamps to deep ocean trenches. Using clear illustrations and photographs, readers learn interesting snippets about some of its marine inhabitants. The book also examines the physical forces and processes that shape the oceans, like global circulation systems and tides, to undersea volcanoes and tsunamis.

Hardcover: 416 pages
Publisher: DK
Date: 29 September 2020
ISBN-10: 0744020506
ISBN-13: 978-0744020502

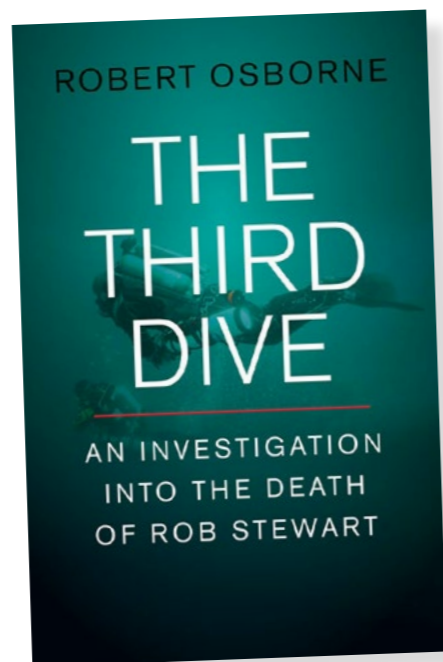


Maritime Archaeology

Sunken Treasures: Discoveries in Shipwrecks From the Maritime Silk Road 800-1900, by Karin Gaillard

Written in both English and Dutch, this book describes the treasures originating from seven shipwrecks along the Maritime Silk Road (800 to 1900)—treasures in the form of Chinese porcelain and other artefacts, as well as the new insights about the ships and their cargo. This book also touches on the development of maritime archaeology in the Netherlands and in Asia.

Hardcover: 160 pages
 Publisher: Uitgeverij Waanders & De Kunst
 Date: 14 October 2020
 ISBN-10: 9462622574
 ISBN-13: 978-9462622579

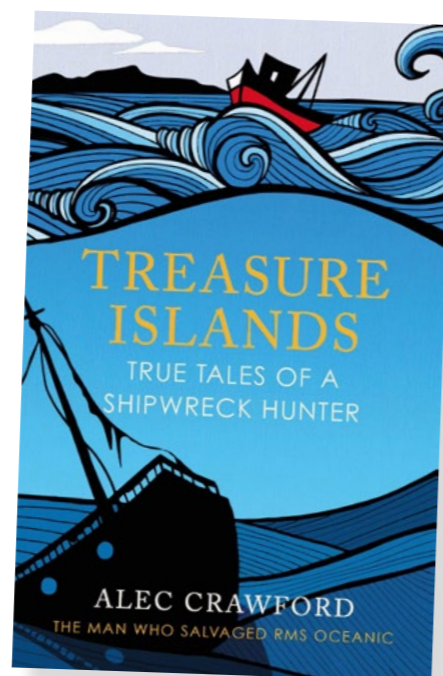


Rob Stewart

The Third Dive: An Investigation into the Death of Rob Stewart, by Robert Osborne

In 2017, renowned diver and award-winning filmmaker Rob Stewart drowned while filming *Sharkwater Extinction*, a follow-up movie to his 2006 documentary *Sharkwater*. It was a tragedy that shocked everyone in marine conservation and the diving community. Even today, three years later, questions remain as to what really happened that fateful day. In this book, investigative journalist Robert Osborne attempts to uncover the truth, through interviews and investigative reporting.

Hardcover: 216 pages
 Publisher: Rocky Mountain Books
 Date: 1 October 2020
 ISBN-10: 1771603550
 ISBN-13: 978-1771603553



Shipwrecks

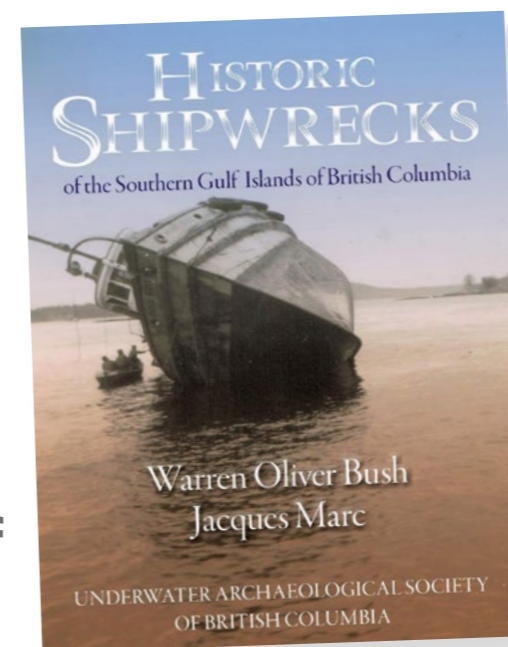
Treasure Islands: True Tales of a Shipwreck Hunter, by Alec Crawford

This book follows the experiences of salvage diver Alec Crawford, starting with his early salvage attempts and subsequent adventures in Hebridean waters. Then came the challenge of salvaging the White Star vessel RMS *Oceanic*, off the remote island of Foula. Having fixed their sights on what many regard as an undiveable wreck, Crawford and his partner subsequently face not only dangerous waters and terrible weather conditions, but also a legal battle when a salvage company takes action against them.

Paperback: 256 pages
 Publisher: Birlinn
 Date: 28 October 2020
 ISBN-13: 978-1780276014
 ISBN-10: 178027601X

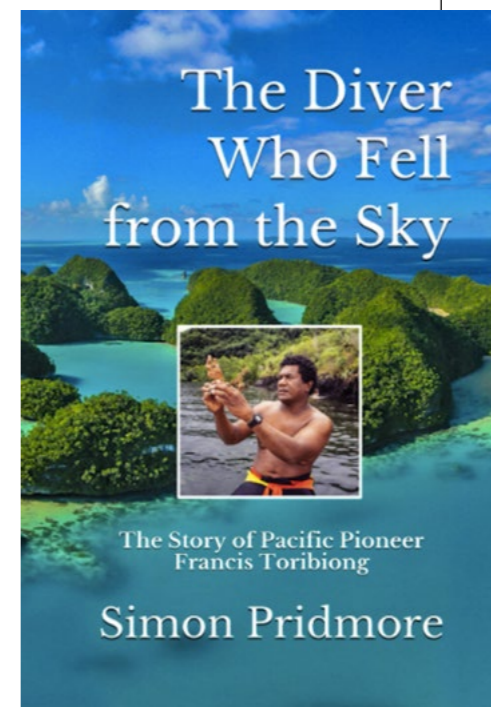
Wrecks of British Columbia

Published by the Underwater Archaeological Society of British Columbia, this book compiles the stories of 14 historic shipwrecks in the Southern Gulf Islands. It describes the history and loss of each vessel as well as what divers will see on the wreck sites. It is a must-have reference for anyone interested in the maritime history of British Columbia.



Hardcover : 104 pages
 Publisher : FriesenPress
 Date: 12 May 2020
 ISBN-10 : 1525570447
 ISBN-13 : 978-1525570445

Text by Peter Symes



Simon Pridmore has written another book. He is a good and inspiring writer, and there is always something valuable one can learn from him—that is also why he is a staple columnist in our magazine. This is another captivating opus from his pen. You should read it. Enough said, review done.

All right, this one is different. It is a biography of a man, Francis Toribiong, who was not only a truly great pioneer in scuba diving but also a captivating and inspiring personality, an innovator and entrepreneur. He is widely credited with putting Palau on the diving map, and he authored guidebooks. In Pridmore's words: "Francis is a Pacific Islander like no other. He is the father of Palau tourism, a scuba diving pioneer, and an effective, tireless ambassador for both his country and its abundant marine and land resources."

Toribiong was born poor and had no academic leanings. Yet, he arguably did more than anyone to build Palau's economy and help it develop into an independent, forward-looking nation. Toribiong founded Palau's first dive shop, Fish 'n Fins, and he owned and managed the Marina Hotel for ten years.

In this biography, I also learned that Toribiong was a sky diver, and at the age of 60, he was part of a team that navigated from Palua to Saipan in a canoe—a voyage that took 39 days—rowing in six-hour shifts and navigating by reading the stars, ocean swells and bird behaviour, among other things. Over the 41 chapters in this book, we are taken on a journey through many more surprising and always interesting twists and turns in Toribiong's fascinating life. Never a dull moment, it seems. ■



Edited by G. Symes

Mekong Irrawaddy dolphin numbers small but steady

A 2020 survey by the World-Wide Fund for Nature (WWF) and the Fisheries Administration found that the number of critically endangered Irrawaddy dolphins in the Mekong River in Cambodia has remained stabilized over the past three years. However, as there are only 89 in number, there is still a pressing need for immediate and more collective action to save the species from extinction.

WWF Country Director Seng Teak said, "Although the 2020 survey result confirmed that the species number is stabilized the population size of the animal is still small, thus stronger conservation action is needed."

More calves are reaching adulthood according to the survey's findings, revealing a trend in the dolphin population pointing to a gradual recovery. It is the first time a highest recruitment rate of 4.22% has been documented in surveys over the last ten years.

Further action needed

Despite protection under the Cambodia's Fisheries Law as a critically endangered animal on

the IUCN Red List, Irrawaddy dolphins (*Orcaella brevirostris*), which live along a 180km length of the Mekong River's main channel, still face threats from overfishing, gill nets, dam development and illegal fishing practices such as dynamite fishing, poisonous bait and electrofishing.

"To ensure this critically endangered species population can thrive, their habitats must be free from illegal fishing activities, with abundant availability of prey or food," said Teak. "Increasing law enforcement, accelerating livelihood development and addressing the transboundary issues including the water flows and climate

change are the must-do."

The WWF and the Fisheries Administration are working together, along with provincial authorities and local communities to carry out the 2020 survey report's recommendations. Deputy Director-General of the Fisheries Administration H.E. Srun Limsong said, "The Fisheries Administration acknowledge the law enforcement efforts by the river guards in cooperation with the provincial and local authorities in Kratie and Stung Treng provinces, which have contributed to prevent and stop illegal fishing in the protected dolphin habitat areas." ■

SOURCE: WWF



Critically endangered Irrawaddy dolphin in the Mekong River, Cambodia



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Edited by Peter Symes



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Transmission of Covid-19 from humans to other mammals such as the narwhal is likely, even though narwhals live in remote Arctic waters.

Marine mammals at risk from COVID-19?

Research is now underway to determine whether narwhals, which are known to have a high potential for viral infection, are susceptible to catching COVID-19.

Baleen and toothed whales, such as narwhals and belugas, could be susceptible to the new coronavirus that causes COVID-19, recent research indicates.

Coronavirus infections in cetaceans and other marine mammals are not new. Belugas, bottlenose dolphins, and harbor seals have had previous coronavirus infections as well.

A team of researchers at the University of California, Davis, have created a list of animals with ACE-2 receptors likely to bind closely to the coronavirus, officially known as SARS-CoV-2.

While this is how humans are infected with the virus, it is not clear whether animals are infected in this way. Scientists are focusing on narwhals because they have almost the same number of receptors as humans. This puts narwhals in a high-risk category of animals that could contract the virus. While both baleen and toothed whales are classified as having a high risk of potential infection, toothed whales have also lost a key gene that helps fight viruses.

Implications

Transmission from humans to other mammals such as the narwhal is likely, even though narwhals live in remote Arctic waters. Narwhals could contract the virus through wastewater, and the coldness of the water could allow the virus to live longer. SARS-CoV-2 can be detected in fecal material for weeks, although it is un-

clear how contagious it is during that time. One might assume immediate destruction of such viruses in the Arctic Ocean, it is important to bear in mind this body of water is unlike all others. The Arctic Ocean has multiple brackish-water inlets used by migratory marine mammals, as well as glacial runoff and summer ice melt adding to the freshwater system that can influence marine life, and likewise, viral survival.

In 2019, a study detected nearly 200,000 viruses in ocean harbours — and the Arctic Ocean in particular contained “virus diversity hotspots.”

If whales are susceptible to SARS-CoV-2, it also raises a number of questions about human-whale interactions. It could have implications for subsistence hunting and alter the way researchers interact with marine mammals. ■

SOURCES: CELL, NATURE COMMUNICATIONS

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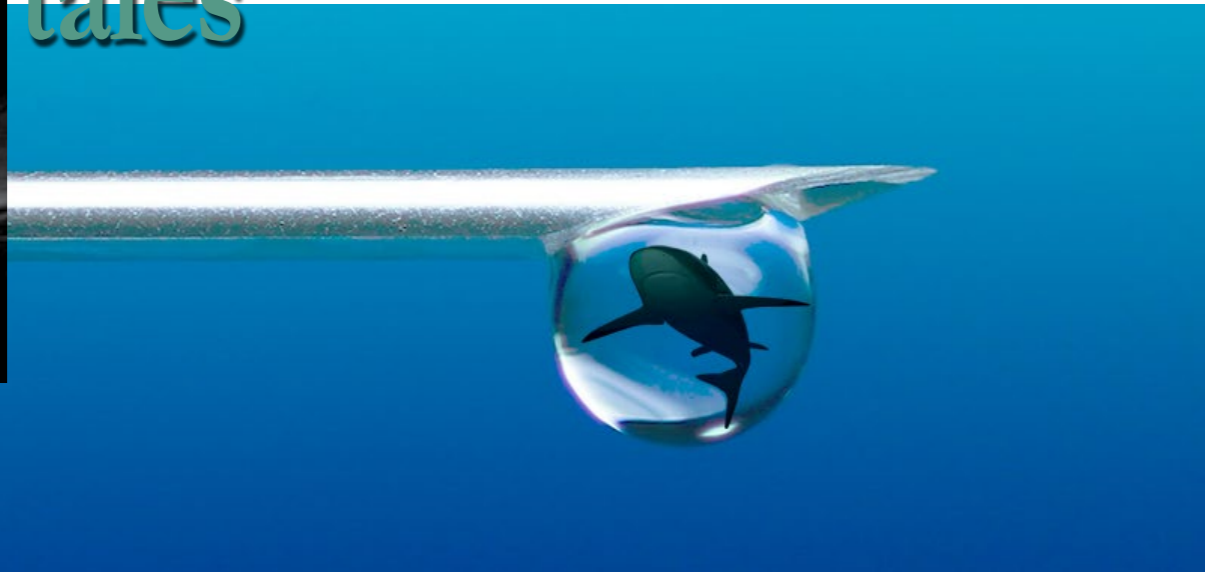
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Edited by Peter Symes



Sharks at risk from quest to develop vaccine against coronavirus

The practice of using shark-derived squalene as a booster to stimulate a stronger immune response to a vaccine has Miami shark researchers concerned.

Development of a vaccine against COVID-19 could come at the expense of sharks, researchers warn. A key ingredient used in vaccines to enhance immune response and increase effectiveness, squalene—an oily substance found in plants and even human skin—is particularly concentrated in shark livers.

The compound has been shown to be safe and effective in millions of doses of other vaccines, according to Liza Merly, a shark immunologist at the University of Miami's Rosenstiel School of Marine and Atmospheric Science. It is not exactly known what it is about this oil that allows it to work the way it does, but it is used in a handful of COVID-19 vaccine candidates.

If one of the vaccine candidates using this component proves to be effective, it could create a global demand for squalene that might threaten wild shark populations, according to Shark Allies, a non-profit dedicated to protecting wild sharks. The organisation estimated it would take about 500,000 sharks to produce squalene for the billions of vaccine doses needed.

Big Pharma

GlaxoSmithKline, the multinational pharmaceutical company, which manufactures a squalene-derived component for vaccines, pushed back against international headlines and bad press that ensued, arguing that the estimate is far too high. The company has, however, declined to identify the source of its squalene, but stated it is harvested from sharks that were fished for other purposes. In a statement to *USA Today*, the company said its committed to "exploring the potential for alternative sources of its raw materials when possible" and research into squalene alternatives, including non-animal-derived

sources of squalene, is ongoing. But there will not be an option within the time frame of the pandemic.

Though squalene can be derived from many other sources, say, olive oil, sharks are a favoured target for industries because it does not take much effort to purify the substance out of shark livers. In many shark species, 50 to 80 percent of the weight of their livers is squalene.

Under-regulated

With the shark-fishing industry being as under-regulated as it is and lacking in transparency, a sudden spike in squalene demand would be a cause for significant concern. Some fisheries associated with squalene production are targeting deep sea sharks.

According to Catherine Macdonald, a marine conservation biologist and ecologist at UM's Rosenstiel School, DNA from threatened shark species has been identified in cosmetic products using squalene, including products that claimed to be vegan. ■

SOURCES: UNIVERSITY OF MIAMI, USA TODAY, SHARK ALLIES

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tech talk

Cenote
Chac Mool,
Yucatán
Peninsula,
Mexico

Text and illustrations by Massimo Ardizoni. Underwater cenote photos by Larry Cohen

— *When in Rome, do as the Romans do.*

I started cave diving in Italy in 1990. At that time, the rules were very clear, codified and related to the kind of caves that were encountered in my region. Very often, they were resurgences with current (sometimes strong) or sumps inside caves, with water ranging from crystal clear to the color of coffee and variable visibility, depending on the rains. After years of cave diving, having acquired a certain level of experience, I thought I knew “the whole panorama” of cave diving procedures. But then I got involved in a new project in 2017, when I decided to move to Mexico to live and work there.

Once I arrived in the Yucatán Peninsula—more precisely, in Quintana Roo—I started working as a guide and dive instructor (an occupation in which I had been practicing for over 20 years). I realized that much of the knowledge and procedures in caves, which I had acquired over many years, had almost no value

here, because the needs in Mexican cenotes were not very compatible with the needs of “my” Italian caves.

I tried to make a comparison between the various major training agencies which offered cave training, and talked with various friends and colleagues. I realized that, in reality, the general

guidelines and basic rules were very similar to each other. But as far as procedures for navigation protocols were concerned, there was an aura of uncertainty, because many, if not all, notions were left up to the experience of the instructor and the place where the instructor dived.

This sort of “confusion” has prompted me to write this article—to try to describe clearly what methods of navigation we use here in the Mexican cenotes. The topic is important because the cenotes attract thousands of cave-diving fans all year round, from all over the world. This article is also the result of the fact that,

while going to the caves, meeting cave divers of different nationalities and backgrounds, I often found myself discussing and/or adopting different protocols from those I was used to. It must also be said that the Mexican cenotes are a world onto themselves, with their own peculiarities and “difficulty” in diving; therefore,



Full Cave Navigation Protocols

in Mexico

LARRY COHEN





LARRY COHEN

one has to have clear ideas on how to deal with this kind of diving.

Cenote characteristics

There are several factors that contribute to making diving in the cenotes quite "confusing." Foremost of all is certainly their labyrinthine formations, which make each cenote a maze in which one can get lost—an easy thing to do if you do not observe the right navigation protocols. Often (almost always), cenotes do not have consistent currents; therefore, divers accustomed to following the flow of the current (as in the caves of Florida) to guide one's exit, must realize this is an inapplicable method in the cenotes.

Another characteristic of the Mexican cenotes is the presence, in some cases, of unusual entrances and exits. If what is considered the cave's exit is actually a tiny hole in the limestone rock in the middle of nowhere in the jungle, it does not mean that it is passable and/or usable,

so it should not be considered a viable exit for safety reasons.

For those unfamiliar with Mexican cenotes, you will soon realize that navigating them is quite complex, precisely because there are different rules here than those found in the rest of the world. In addition, there is a problem with visitors frequently making changes to guidelines in the cenotes, moving line markers, and adding or removing intersections to various T's or jumps, without alerting the cave diving community. All of this, of course, generates further confusion.

It can also happen that during the navigation of a cave, the line markers change direction and start pointing inside the cave, because they are indicating another closer exit but not necessarily an easier or more direct one. In fact, to reach these exits, sometimes you have to pass some major restriction, which is not feasible for everyone, or you have to make one or more jumps to

reach this "nearer" exit.

It may happen that you will find, on the main line, double line markers, indicating the same direction, which, in other geographical regions around the world, often indicate the presence of a jump, but in a Mexican cenote, may indicate the nearest exit, in some cases, or a jump of particular importance. Sometimes, you may be looking for a hidden jump, which is not marked on the main line in order to protect sensitive or fragile areas. In the Mexican cenotes, there is almost a complete absence of distance markers—although, you may find some in a few cenotes that have been explored.

All of these factors contribute to creating a feeling of "insecurity" in those who "adventure" into the cenotes without proper knowledge of the caves and their rules. That is why it often becomes important to rely on local guides who can help you safely dive the cenotes or give you valuable advice on the spot. The fact that

Diver in Cenote Ponderosa (left); Cenote Chac Mool, Yucatán Peninsula, Mexico (bottom right)

Navigation

I have a better understanding of them now, and that I can transmit this information to whoever comes to dive the cenotes for the first time, is precisely the reason why I recommend that divers should never trust the markers present in a particular cave, but to rely only and exclusively on their own personal markers, and use those of the cave only as auxiliaries.

This is also true because a cave dive must always be planned first on the basis of a technical map, or contour map, and once in the water, one needs to know how to orient oneself with a compass and any natural references inside the cave. In general, make sure you plan properly; when in the water, be vigilant and pay attention to navigation; use your markers; take notes (mentally, or better yet, written) of the time and gas consumption required to reach a certain point, such as a T-junction or a jump; return by the same path from which you came—and all your dives will be fun and safe.

In Mexico, jumps on the main line are generally marked with a single line marker, and the connecting line can be 20cm away, or in some cases, even 10m to 13m away! Several cave diving guides and instructors encourage the use of these markers for tying your spool and making the jump. In my opinion, it is always best to place your own custom directional marker and tie the spool to it. In this way, regardless of visibility conditions and/or stress, recognizing your jump and its directional marker is easier.

Consider this: Don't blindly believe what you encounter on the line (main line, etc.), including line arrows, reference exit markers (REM), cookies, etc. They can be wrong (remember the human factor). Always follow your own navigational plot and your own markers—never follow the markers of other cave divers! They may come from another direction, or they may be wrong.

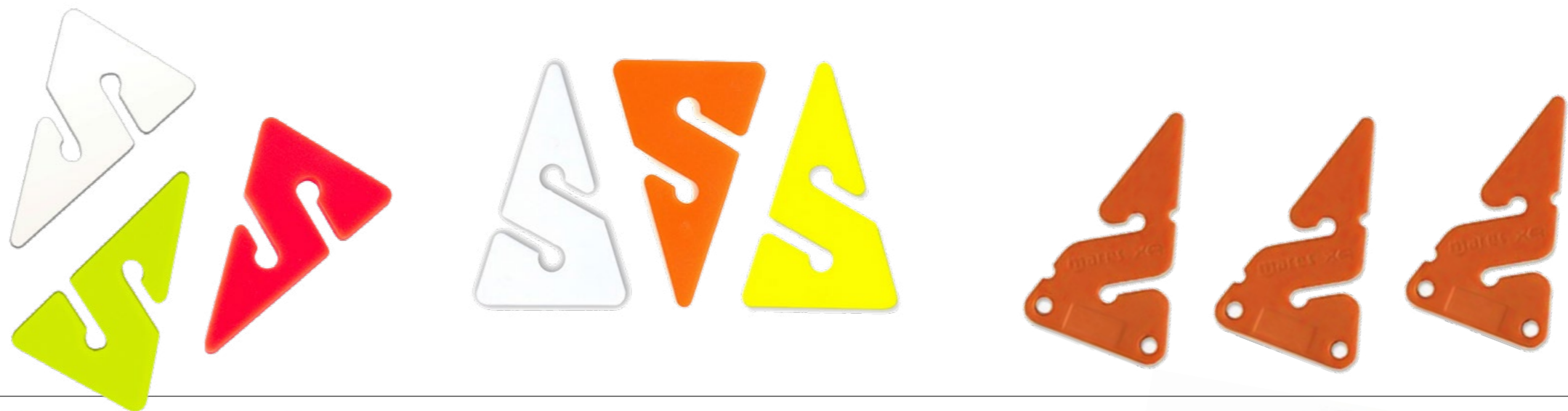


LARRY COHEN



tech talk

TOP ROW: Arrows or Line Arrows (uni-directional markers)
 MIDDLE ROW: Cookies (non-directional markers)
 BOTTOM ROW: Reference Exit Markers or REM (directional markers)



Types of markers

During a dive in the cenotes, you can find different kinds of markers:

Arrow or Line Arrow (unidirectional marker)

These line arrows may be of different colors, shapes or sizes, but they always uniquely mark a direction. In the beginning, there was a similar concept developed by Lewis Holzendorf, who made line arrows with cut tape. Later, they were perfected and manufactured by Forrest Wilson, in the form we know today (https://en.wikipedia.org/wiki/Line_marker).

Line markers ALWAYS indicate the direction of the exit and are normally always placed at a jump, gap, end of line or T. You can choose to use line markers of different colors, depending on whether the cave has very dark or very light limestone. The important thing is that they are clearly visible, marked with your name and customized, so you can recognize them by touch (in zero visibility), even with gloves on. When you buy them, check if they are positively or negatively buoyant in fresh water. It is better to have a negatively buoyant marker, so that when you drop it, it goes to the bottom, so you do not risk losing eye contact with the line. Imagine using one that floats, which slides away, upwards—what could go wrong?

Cookie (non-directional marker)

A cookie is used to mark a specific place on the line but does not give any information about the direction. Cookies are used to identify a person or a team, or to reference an exit or a direction. They are often used to mark circuits (loops) and



traverses, to understand where one has arrived. These also need to be customized and marked with your own name. Cookies were invented in the '90s by Daniel Riordan, a famous cenote explorer and active Full Cave instructor.

Reference Exit Marker or REM (directional marker)

The REM is a directional marker that

always indicates the direction of exit, as it has a shorter and a longer side. On the longer side, there is also space to write some notes. Usually, these markers are used during exploration, lost-diver procedures, or as personal markers instead of cookies or line arrows. These also need to be customized and marked with your own name. The REM was invented by the late Bill Phillips, a Full Cave instructor,

and above all, an avid explorer of the cenotes in Mexico.

How to use markers

At the start of a cave dive, the first two tie-offs or anchor points of the line (the primary and the secondary) are made as follows:

The first tie-off is tied within three turns from the entrance, in open water, if pos-

sible, and at a depth of 3m. The second tie-off is tied within the next two turns and possibly at 6m depth. The various turns of the ties (tie-off) serve to provide more safety in case of possible breakages, while the depths serve as a reference in case of decompression (programmed), or a possible safety stop, even with zero visibility.

Connect your line (usually a primary reel or spool) with the cave line, also

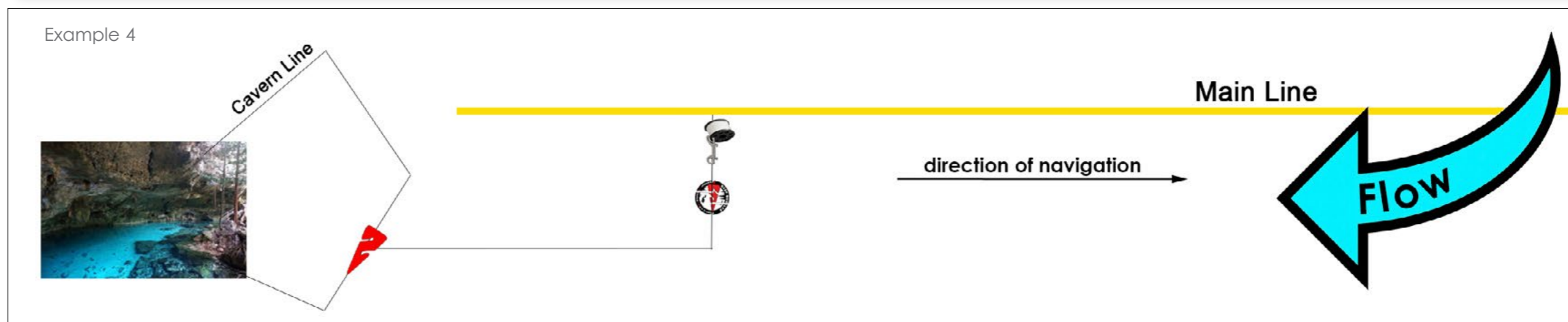
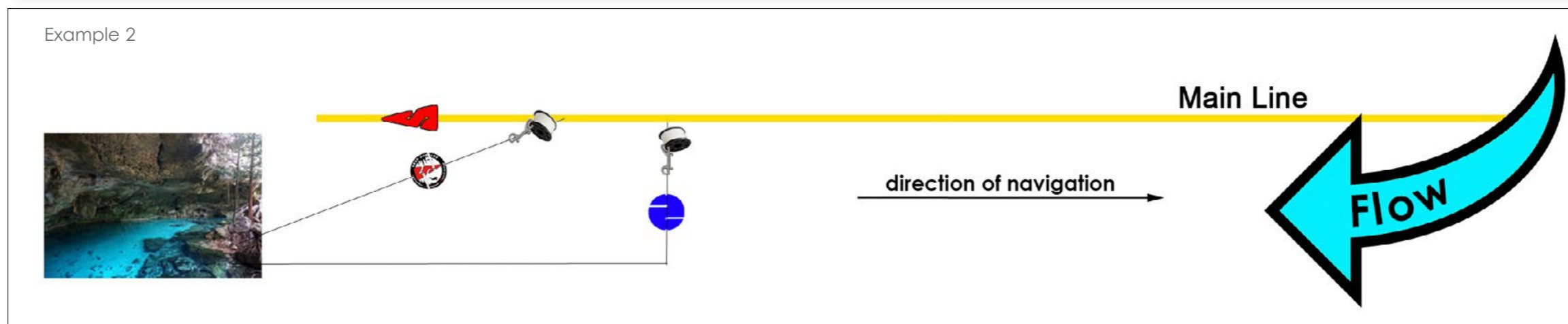
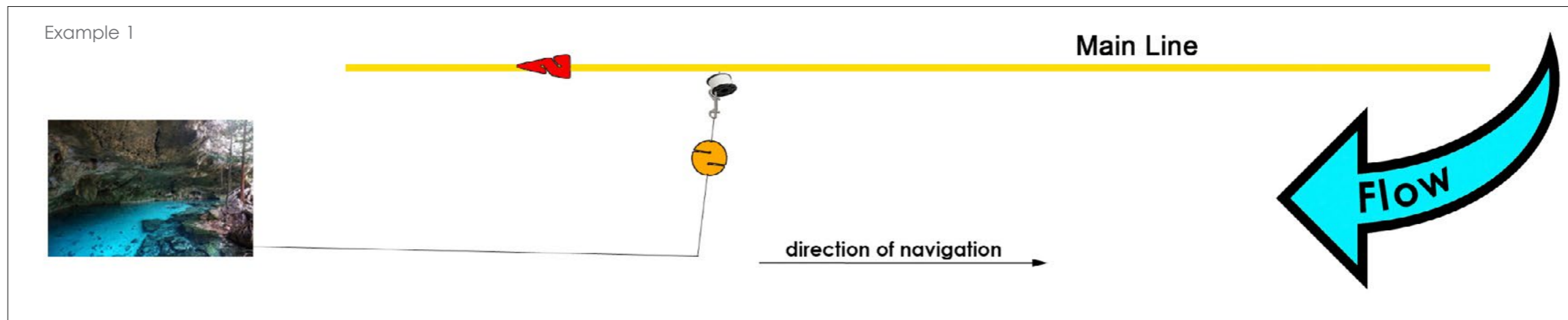


called the permanent line or main line. There are different ways to connect them, depending on which country you dive in. But generally, these are the classic examples:

If you are in the first team to enter, you can connect your primary reel directly to the main line (as in Example 1). But it is usually preferable to make a 90-degree connection before the main line (see Example 2) to prevent the primary reel from sliding on the main line. If there are system markers (line arrow) on the main line, avoid connecting your primary reel to the main line. Mind you, it is not a procedural error simply if the line marker points in other directions, but it could cause confusion in case of zero visibility output, or you could mistakenly disassemble it on output. Once you have tied the primary reel (or spool) onto the main line, ask the team to confirm it, and they will check it and give the OK to continue. Each team member then places his or her own cookie or REM (marked and/or customized) before the carabiner. In this way, each team member communicates to the whole team, confirming his or her presence.

See Example 3 for another way to tie your primary reel onto the main line. Usually, this system is used by other teams that enter after the first one. This way, you avoid interference with the various lines. The whole team has to confirm their presence with personal markers and check that everything is OK.

Connect your line from the cavern line to the main line (cave line). Sometimes, to reach the main line of the cave area, you have to navigate along the cavern line. Once there, place your directional marker indicating the shortest exit and connect to the main line as in the previous examples. Ask for confirmation from the team, who will verify, check and give the OK to continue. Each team member must confirm their presence with their personal markers. (See Example 4).



T or permanent connections

NEVER pass a T without placing your marker first!

Continuing our progression underwater, during navigation, we may encounter a T, which is simply a permanent connection with two or more lines, and you can find it in any part of the cave such as a secondary cenote exit, an important tunnel, a crossing to another cenote, etc.

When you get to a T, the first thing to do is to place your personal marker BEFORE the T. It can be a REM, indicating the exit, or it can be a cookie. So, ask for confirmation from the rest of the team, who will verify, check and give the OK. ALL must check their gases.

On the way back, when you arrive at the T, the team leader will

ask the team to confirm the exit direction, and the team will verify, check and give the OK. There are special situations, which can arise, in which you have to swim through a very thick halocline, which may become a distraction, so you do not notice the T (i.e. in the case of white rock and a white line), you pass over it and you're done! In this case, you have put yourself in an extremely dangerous situation, with an unmarked T, in the thick halocline, with your gas starting to get low. Some T's are marked with a line arrow indicating the exit direction. But this is not always the case, and it is always better not to trust what you find on the main line. (See Examples 5 and 6)

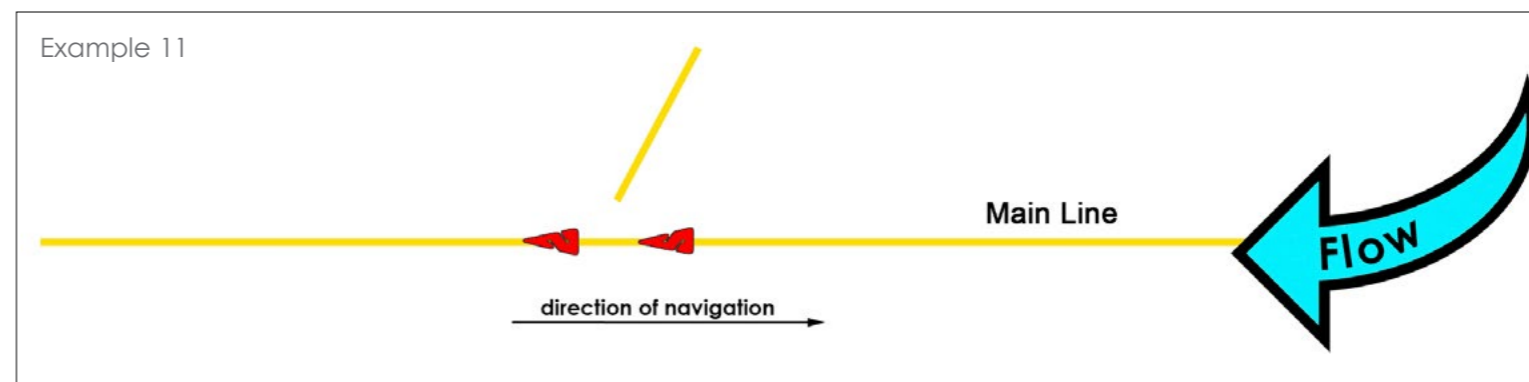
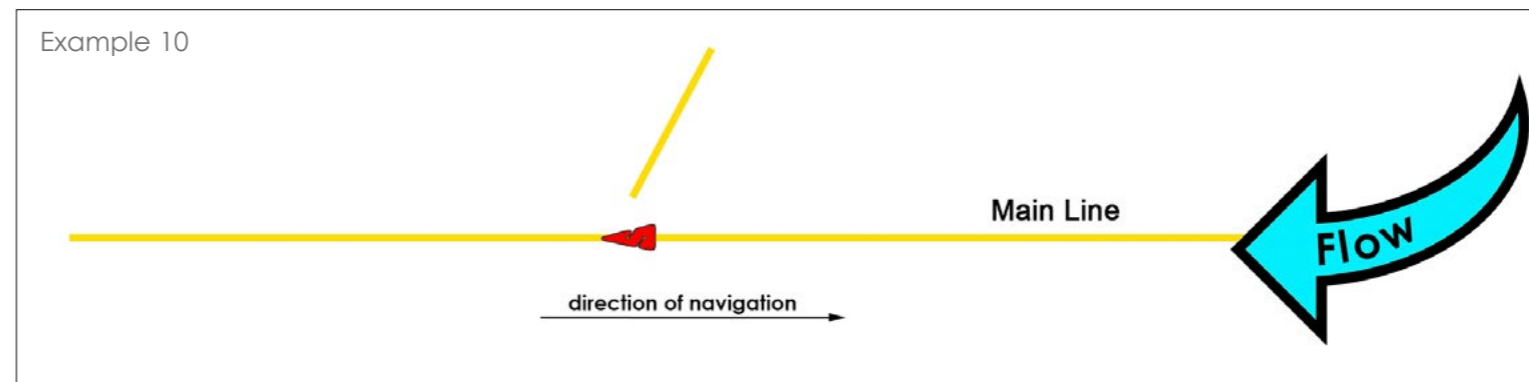
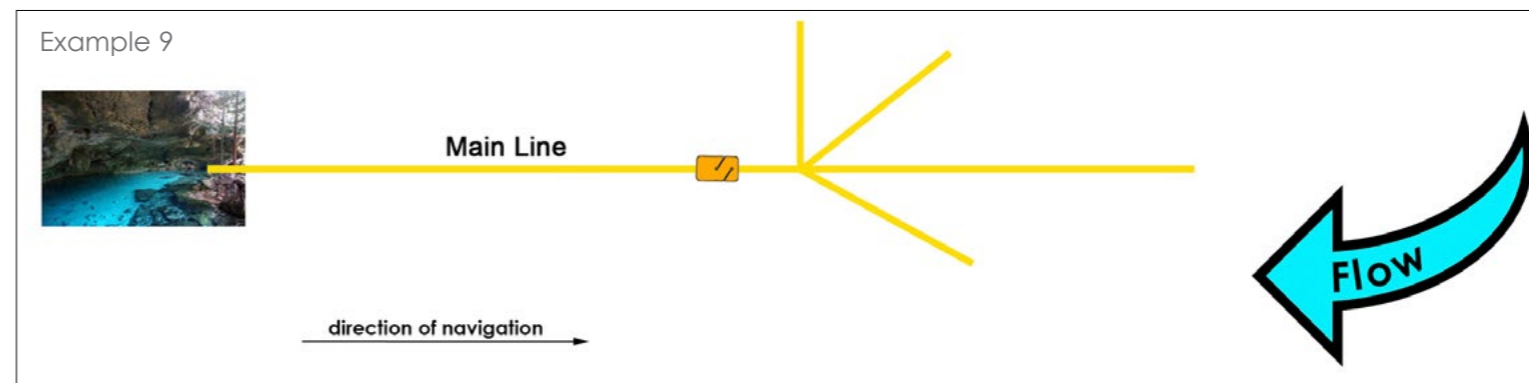
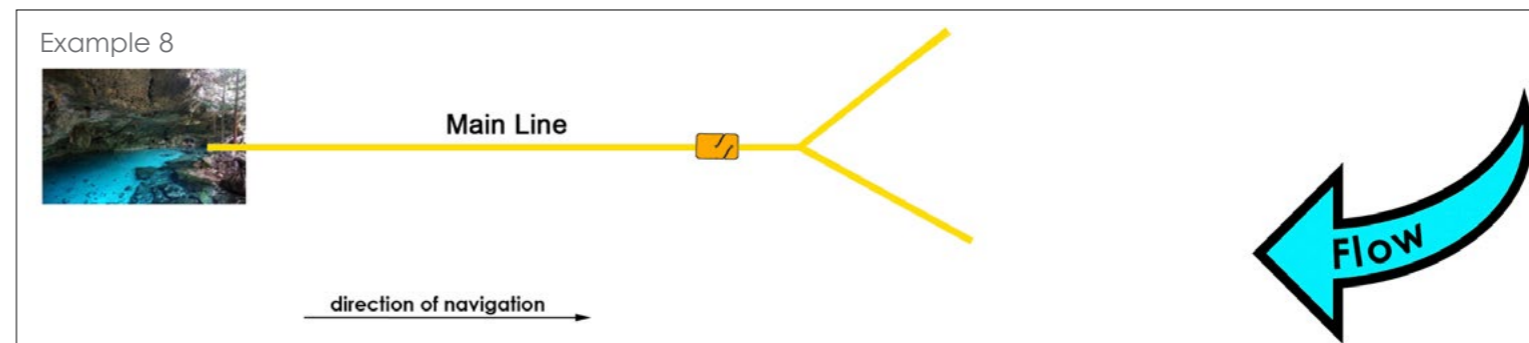
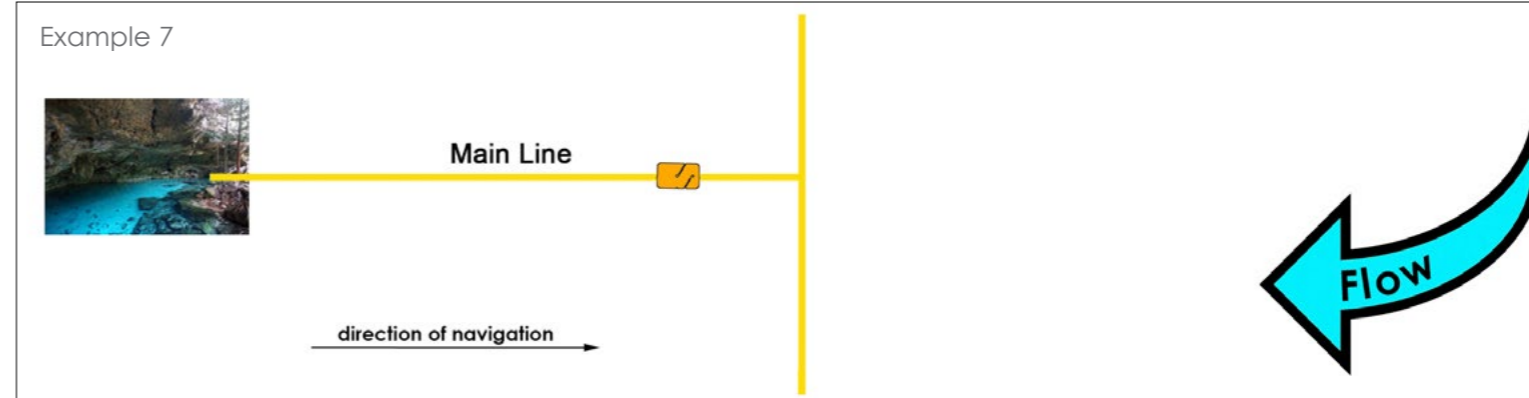
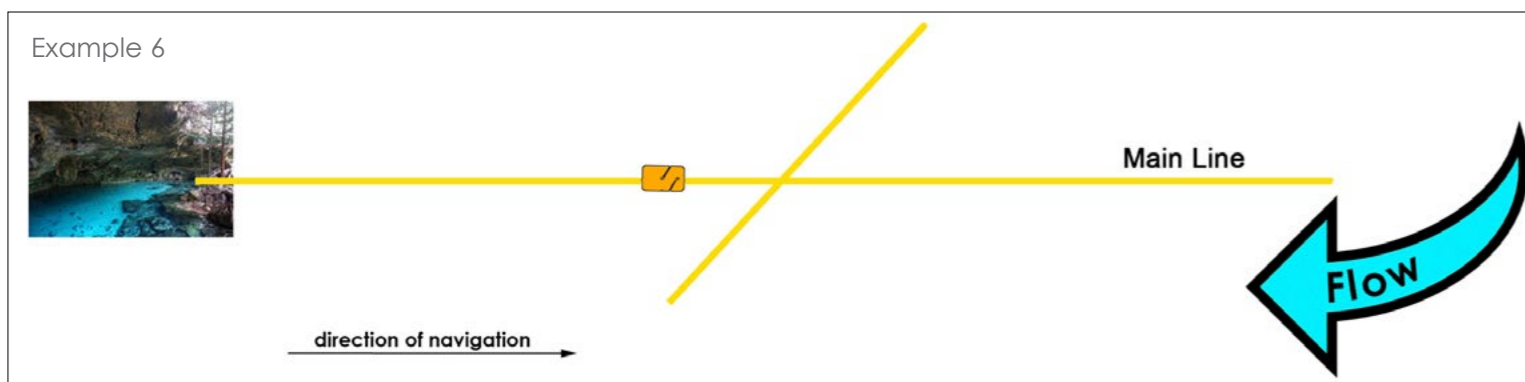
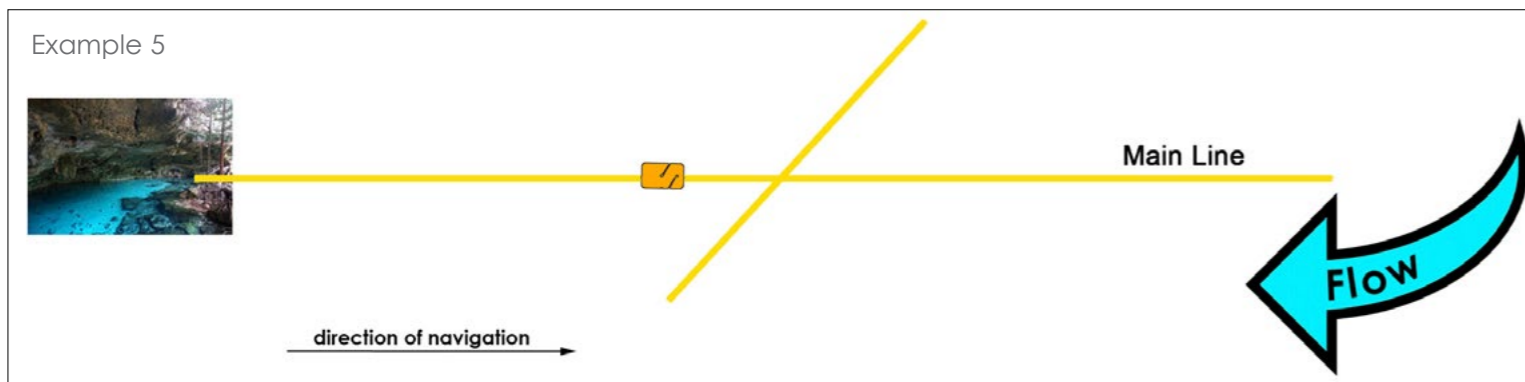
For some examples of different T's, see Examples 7, 8 and 9.

Jumps

NEVER pass a jump without having it marked and connected!

The Mexican cenotes never have a single tunnel (as sumps usually do). They are labyrinthine. So, it may be the case that to reach different parts of the cave, you have to take secondary detours (compared to the main line) that are not connected, these are jumps. Normally, in the cenotes, almost all the jumps are marked with a line arrow pointing towards the exit (see Example 10).

Sometimes, one may find two line arrows near each other, indicating the exit and the presence of a jump (see Example 11), or two line arrows touching their tips (see Example 12 on next page). But this is not common. It depends



on what country you are in. In other cases, the jumps are not marked on the main line. This is done to protect a very fragile and delicate cenote area, or for security reasons, or for exploratory reasons (see Example 13).

If you encounter a jump marked by two line arrows and you are the first team member to arrive, you must mark your direction of origin and attach your spool between or onto one of the two line arrows (see Example 14), or use your own personal markers,

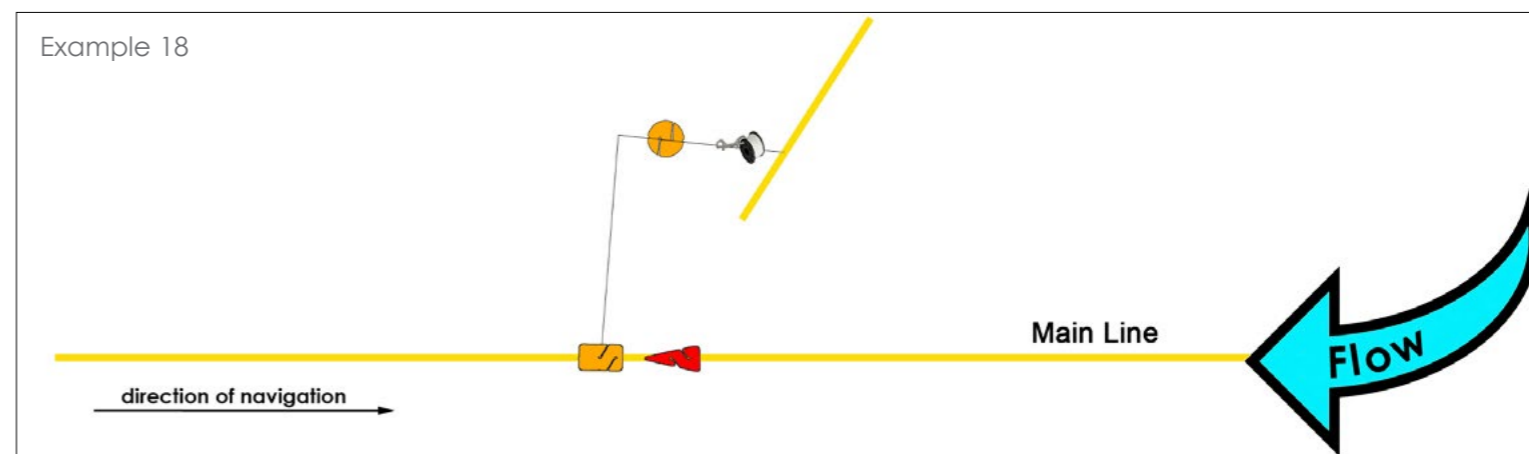
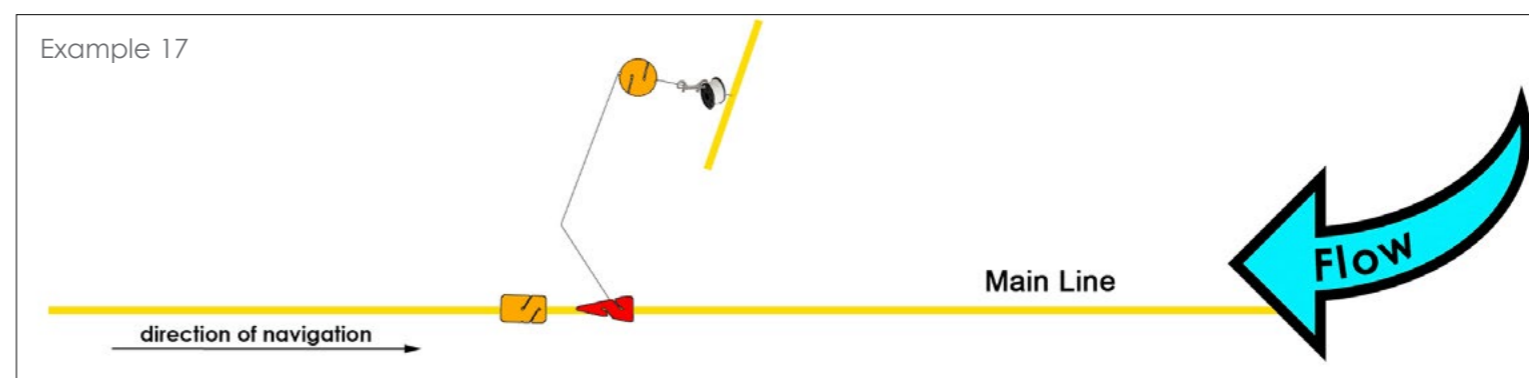
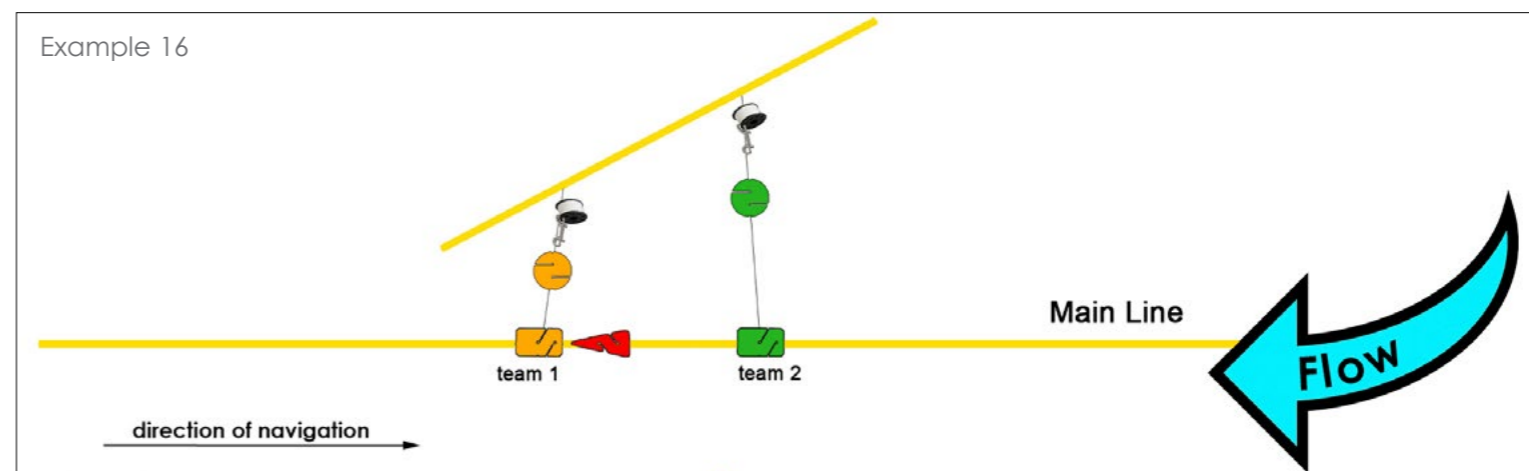
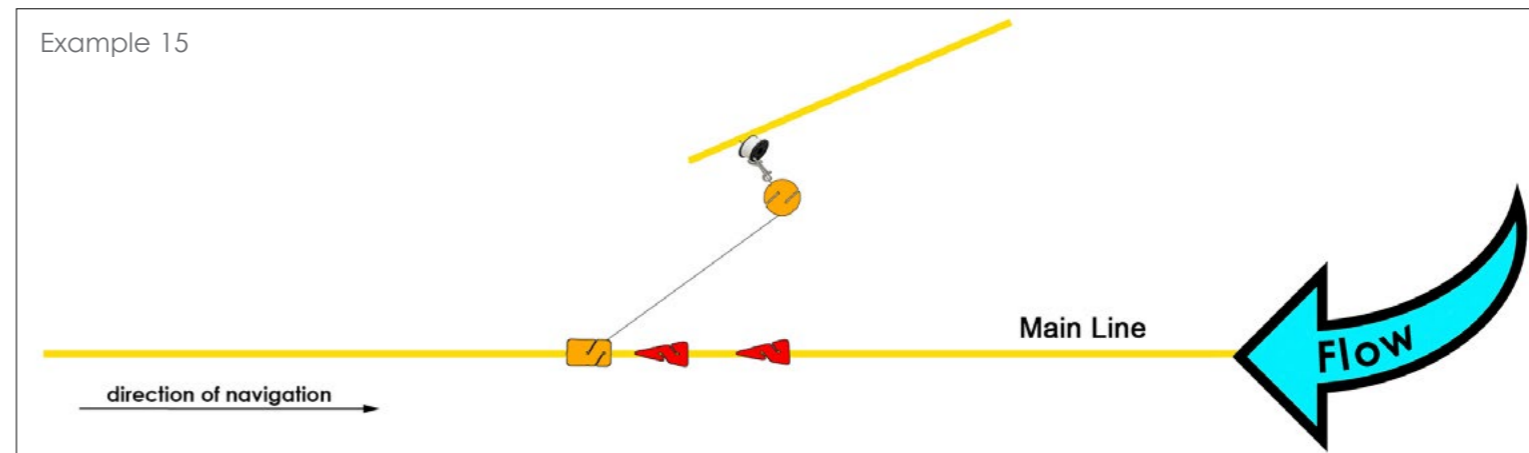
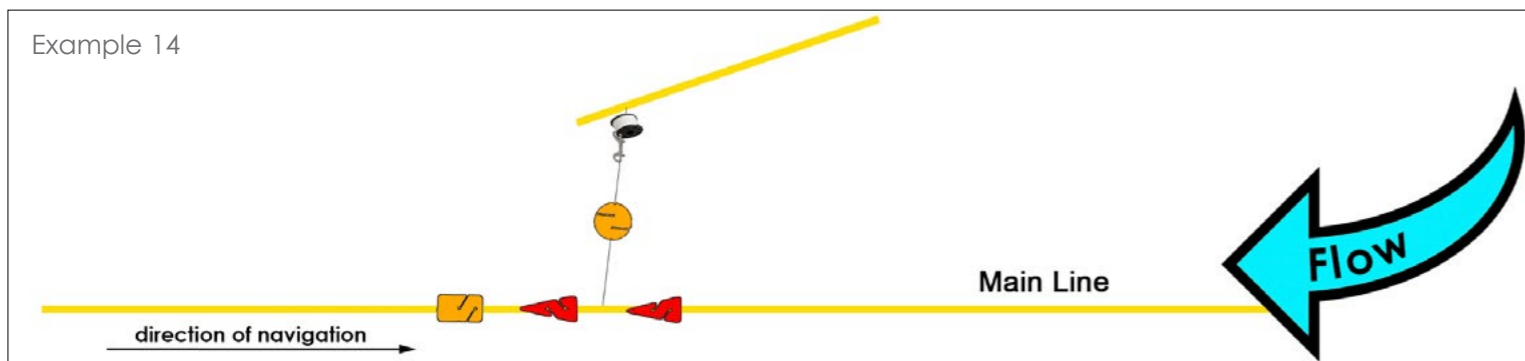
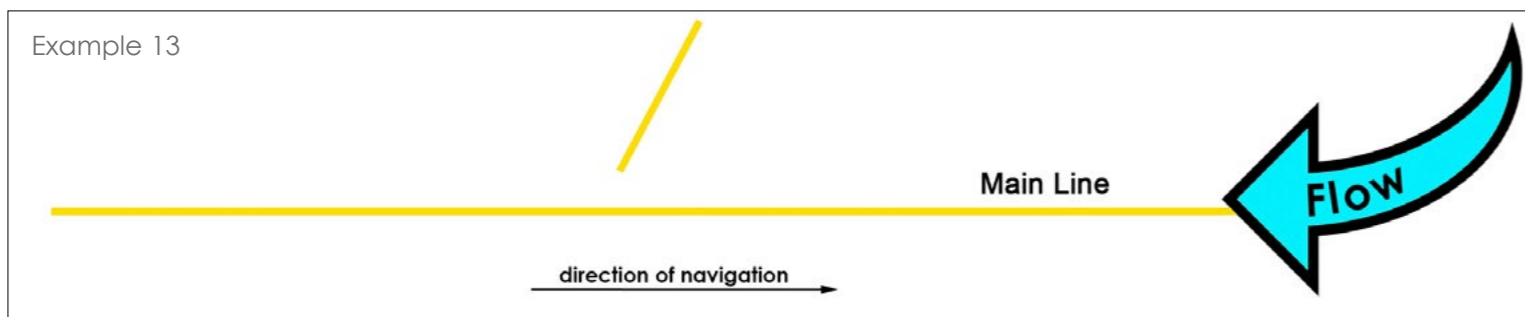
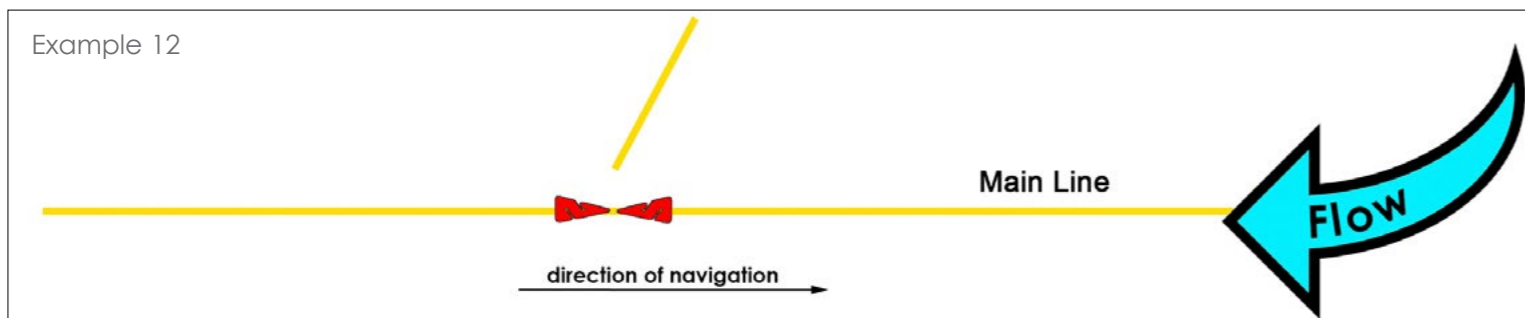
which is always preferable (see Example 15). The rest of the team must mark their direction of origin on the main line and their presence on the spool.

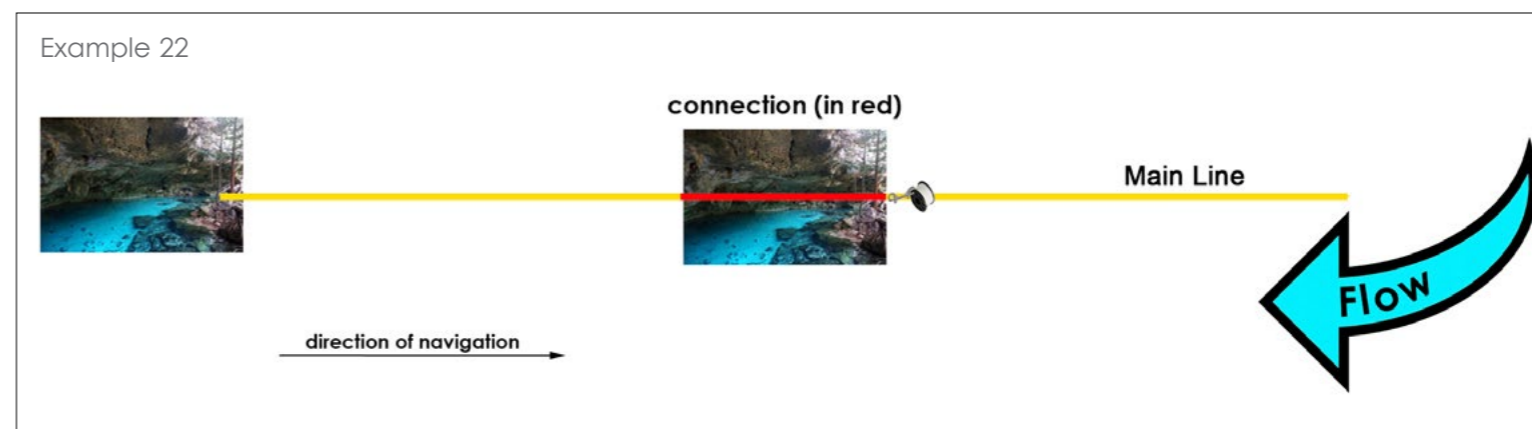
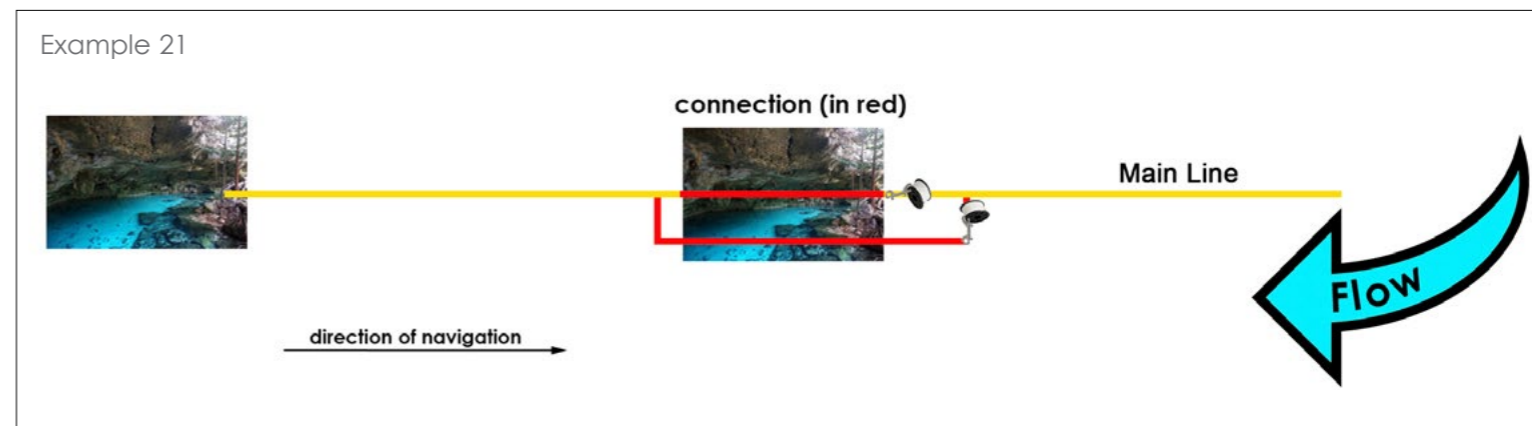
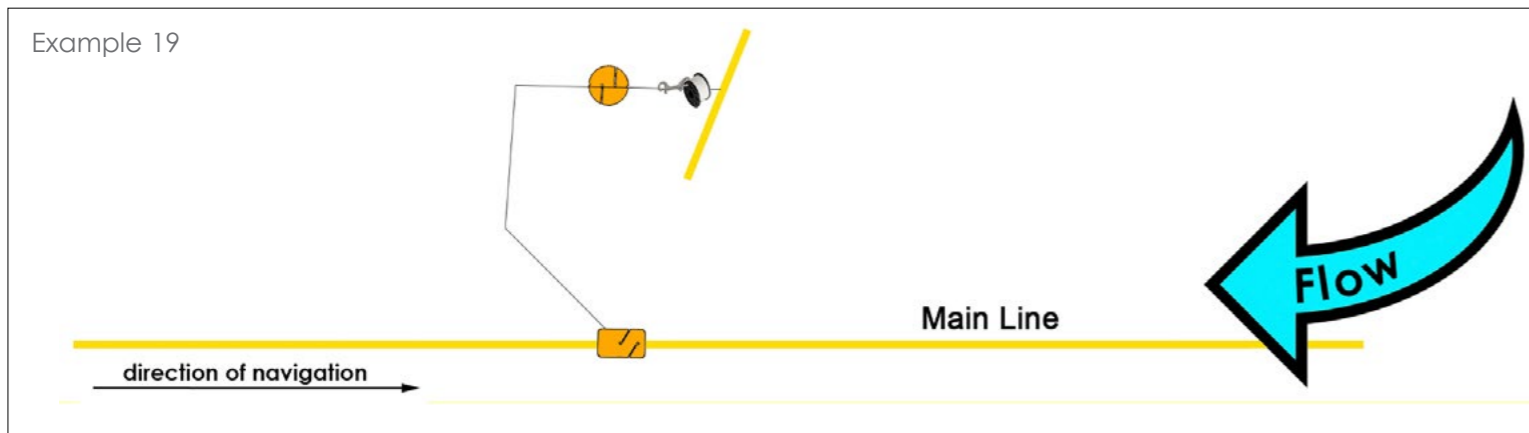
The second team that arrives marks its exit direction and ties their spool onto the main line, after the first team. This is done in order to always give priority to the first team, which has to exit (see Example 16).

When you meet a single line arrow, you have to mark your direction of origin, then tie your

spool onto the line arrow and connect to the new line (see Example 17), or use your own personal markers (both directional and not), which is always preferable. The rest of the team must mark their presence with personal markers (see Example 18).

Obviously, if you find an unmarked jump, you have to place your REM (or directional marker) and tie your spool (see Example 19 on next page). The same is true if you have to make an unmarked jump, on a parallel





line (see Example 20). Then the rest of the team has to mark their presence with personal markers.

In some cenotes, the jumps can be very close to the main line—even just a few centimeters. In these cases, always use the same rules of safety and common sense and do not underestimate the “ease” of the situation. Always follow the main line until you get to the jump. Do not try to “shorten” the road. It is possible that a stalagmite, a column, a rock or

something else can hide the view of the jump and make you connect onto a wrong line nearby.

Important considerations

When making a jump, only one spool (by the team leader) is used for each team. But each team member must mark his or her home direction on the main line and his or her presence on the jump with personal markers. When a jump is connected, the team leader will ask for confirmation

from the rest of the team, who check and verify that everything is OK. ALL must check their gas.

On the way back, once on the jump, the team leader will ask for confirmation of the exit direction and the rest of the team must verify that it is correct and give the OK. As the cave divers cross the jump, each member must remove his or her personal marker and wait on the main line to reference the exit, so that the last member of the team can recover and rewind

the spool, after which, the whole team will confirm the exit direction. In the case of separation of team members, everyone MUST always be self-sufficient to reach the exit.

The situation changes when you decide to use “Team Markers,” or group markers (instead of personal markers). You sometimes find “real stadium fans” of this method. In this protocol, the team leader places the markers for the whole team, both in the jumps and in the T intersections. The following divers will not have to do anything but check the positioning of the marker, eventually noting and confirming it among themselves.

Obviously, by doing things this way, less material is used, the main lines are less “crowded” with markers, and everything goes faster. It is a choice best left to the team’s most experienced cave diver or the cave dive guide/

instructor. I personally prefer using personal markers, because, in any situation and circumstance, each diver is responsible for himself or herself, and at the same time, is independent from the rest of the group—a very important factor in case of a return with zero visibility or a lost diver. But, like everything else, these are personal choices.

Gap

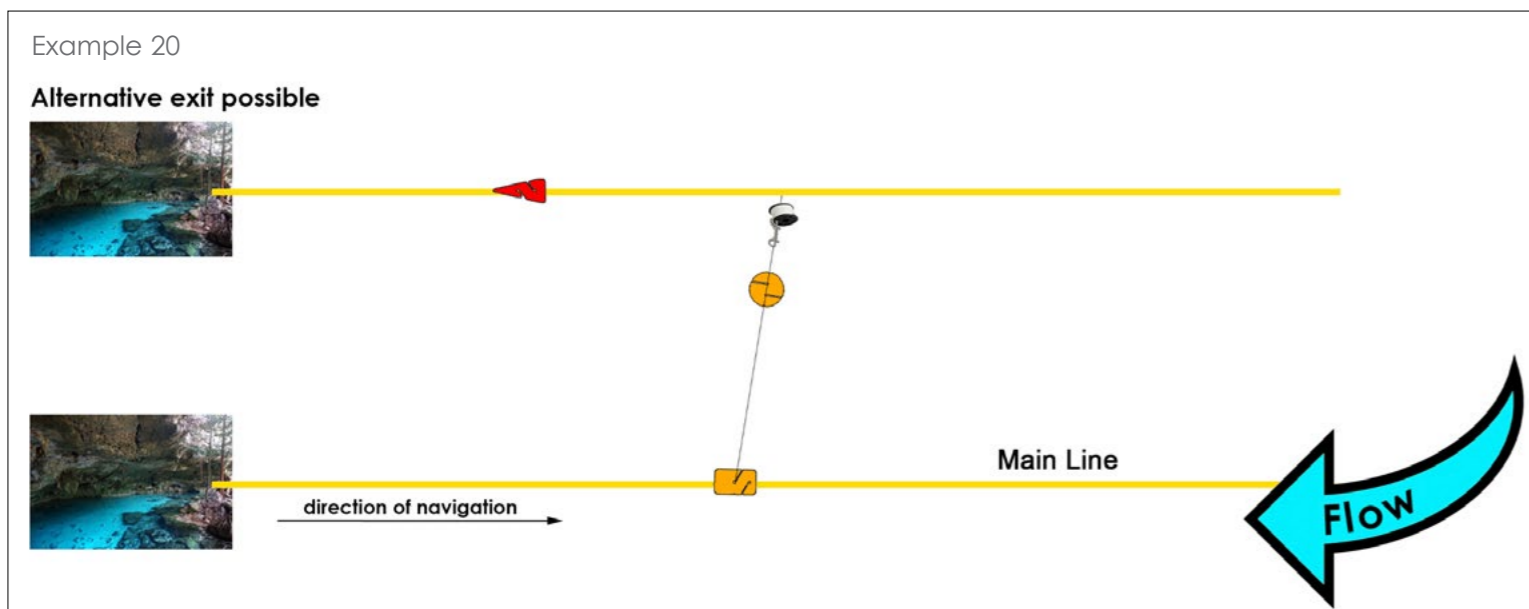
You will find the gap when you arrive at the end of a line, at a possible exit, or in free water. In this case, if you want to continue farther, you have to connect this end of line with the continuation, which is usually on the other side of the possible exit or free water. The gap serves to prevent recreational divers from misunderstanding and following the cavern line and following the wrong line.

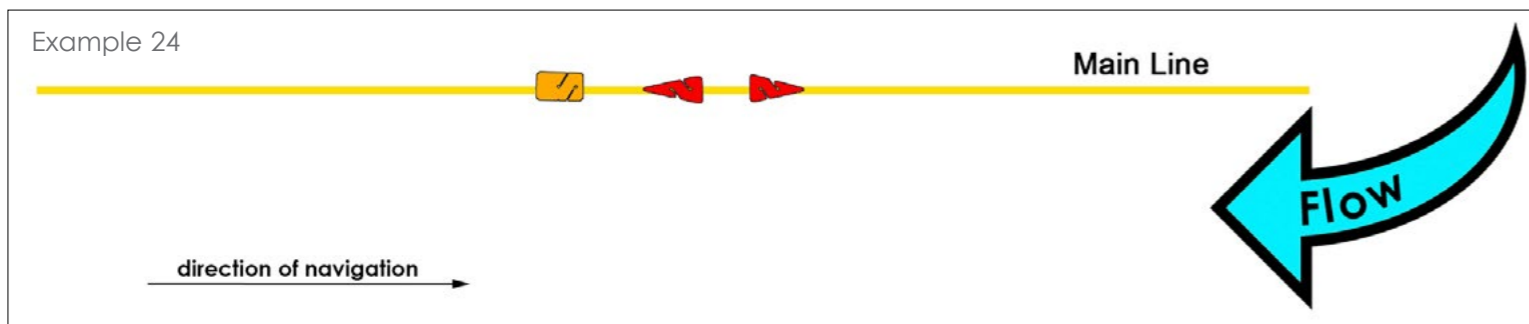
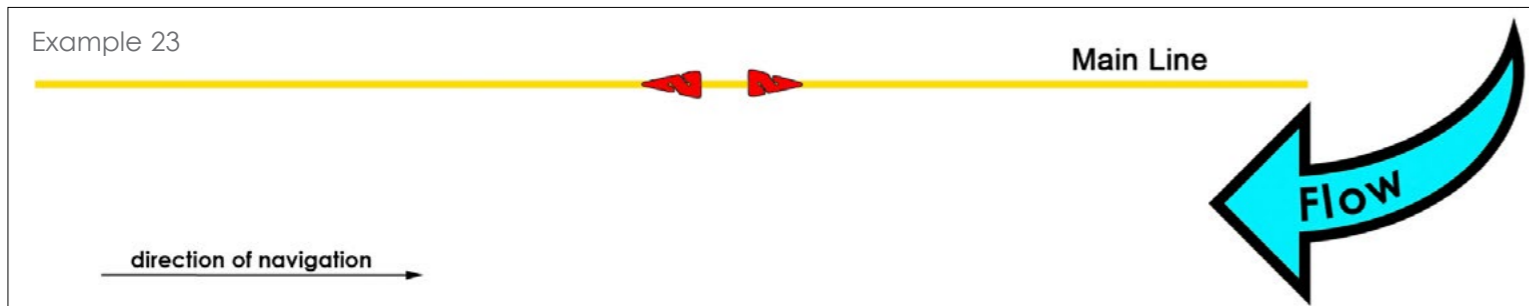
A primary reel, or gap reel, is normally required to perform

the gap because of the long distances. To connect a gap, it is not strictly necessary to use markers, as there can be no navigation errors. It is an end of line. The procedures always remain the same: There is a gas check, then a request of confirmation by the team, who then check and verify that everything is OK (see Examples 21 and 22).

Halfway on the main line

When the length of the main line is equidistant from one exit side and the other exit from where you are, it is normally marked with two Line Arrows pointing in opposite directions. Place a marker in front of the first arrow to reference the exit, check the gas, ask for confirmation to the team, who will do the same thing, after the OK, go ahead (see Examples 23 and 24 on next page).





Line markers pointing in the opposite direction to your navigation
 Sometimes, during navigation, you may come across one or more line arrows pointing in the direction of your navigation. This happens when you have passed the halfway point on the main line (not marked) and continuing, you find the exit of another cenote. In this case, before you pass the line arrow, you have to reference your exit direction with a marker, ask the team to confirm, then they do the same,

check and give the OK to continue (see Example 25).

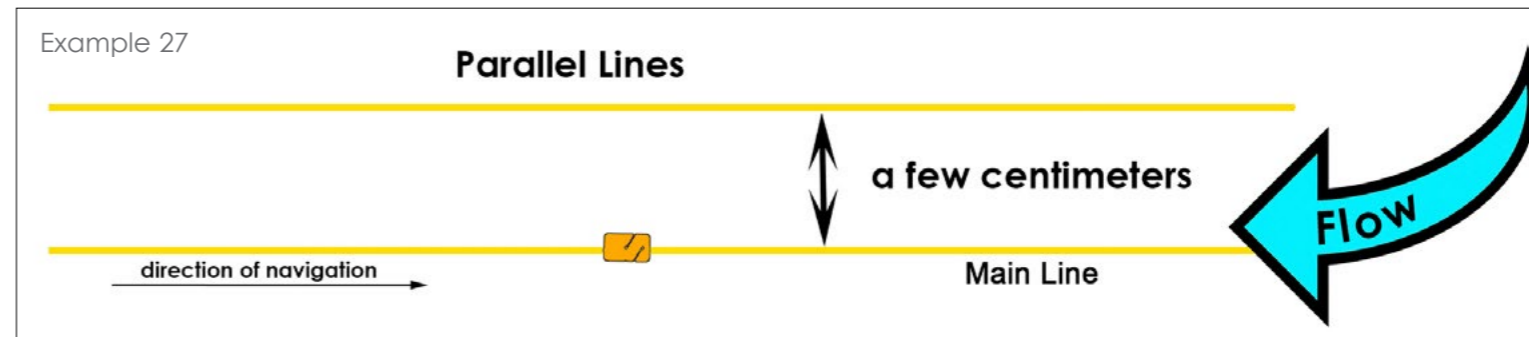
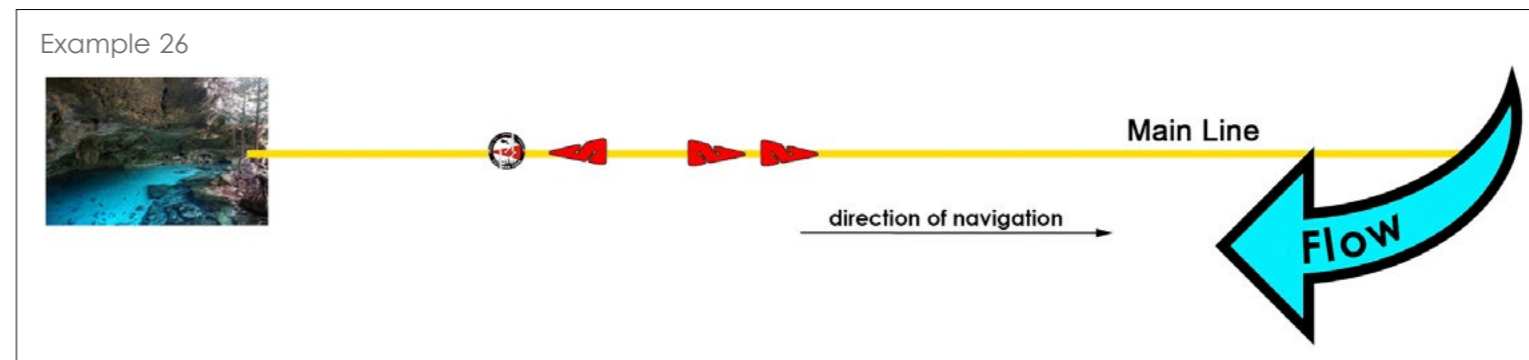
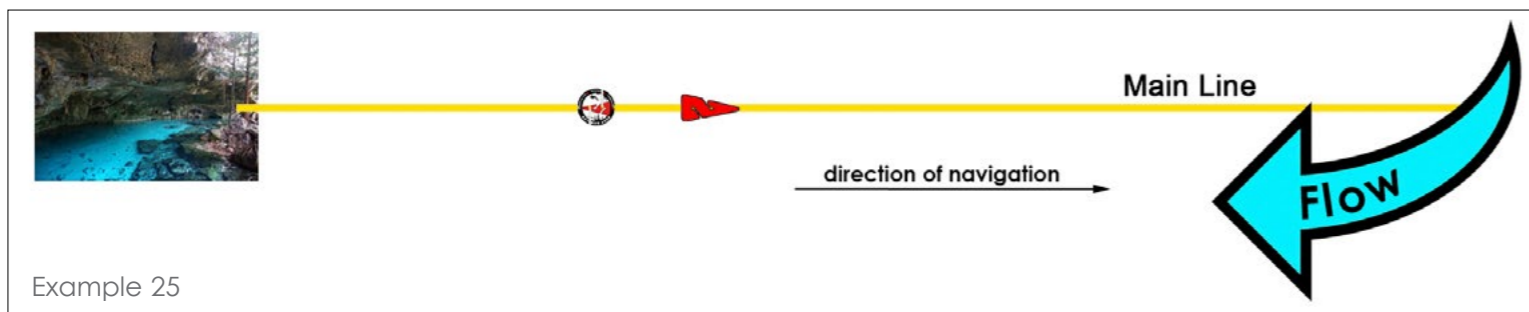
Nearest exit

During navigation, you may encounter a line arrow pointing towards you and two pointing in the opposite direction on the main line. In this case, the two line arrows indicate the exit, which is faster than the one you are on. But remember, they do not necessarily indicate the shallower and/or easier exit (i.e. restrictions, current, etc.). As in the previous situations, you must reference your exit

direction with a marker, ask the team for confirmation, then they do the same, check and give the OK to continue (see Example 26).

Parallel lines

In some cenotes, you may encounter a line parallel to your main line. These two lines may be very close, but they do not touch or meet. In this case, it is highly recommended that you place a marker on your main line in order to avoid any navigational errors during an exit with zero visibility (see Example 27). ■




About the author

First certified in 1987 with NAUI, Massimo Ardizzoni is an avid cave and technical diver, NAUI Course Director and TDI Technical Instructor based in Mexico. He served as a volunteer technician and team leader for CNSAS (Corpo Nazionale Soccorso Alpino e Speleologico) and as a professional dive instructor for major dive tour operators in the Egyptian Red Sea, where he began using rebreathers, starting with Powerbreathe's Infinito IAMT 444 and many other models since then. He opened his own dive center OceanoMare (focusing on technical dive courses), which became an important Sicilian center for deep diving, trimix, deco gases, rebreathers and cave diving. In winters, Ardizzoni worked for a premier Italian dive tour operator in the Maldives, where he developed the use of rebreathers and technical diving on site. He soon started using sidemount, before it was known in Sicily, and during his years in the field, he dedicated his time to deep diving on wrecks, exploring new wrecks and revisiting known wrecks, where he photographi-

cally documented everything. He has contributed to several photographic books on Italian underwater wrecks as well as video documentaries on unpublished wrecks and has assisted the Soprintendenza del Mare (government office for the protection of archaeological properties) in Sicily for the protection, study and enjoyment of important underwater archaeological sites in Italy. He also contributed to the

revision of the first underwater Italian manual for technical diving with trimix mixtures for rebreathers (mixed gas CCR), and wrote articles for NAUI's magazine, Sources. In 2017, Ardizzoni moved to Quintana Roo, Mexico, working under the Deep Bubbles brand, focusing mainly on knowledge, training, discovery, protection, documentation and exploration of Mexican cenotes, with various equipment configurations.

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photo & video

Image 1. The original photo of a squid used in this tutorial, with a few slight corrections to contrast and highlights made in Adobe Photoshop

Text and photos
by Rico Besserdich

Adobe Photoshop is the number one tool for image editing and provides a large number of editing tools and options—far too many of them actually. But the good news here is that, for editing our underwater images, we only need a few. There are some real gems hiding in the depths of this software, and one of them is great for giving underwater images a final “color kick.” This tutorial refers to Adobe Photoshop CS6 but works with older versions as well.

Let's get started. Here, I have a photograph of a squid (see Image 1), as taken in 2008 with a Canon 40D camera, a 60mm macro lens and one single strobe. As always, I did the white balance and a few slight corrections of the



Vivid Color with Lab

in Postproduction of Underwater Images





Vivid Color

Image 2. Vibrance adjustment layer applied to tutorial image (far left)

Image 3. Saturation slider applied to tutorial image (left)

contrast and highlights in Adobe Camera Raw. That took less than a minute, and the rest I will do in Photoshop itself.

In Photoshop, I used advanced retouching techniques to get rid of a few bits of backscatter and applied a Curves modification by setting a black-and-white point, just to fix a very subtle cyan color cast.

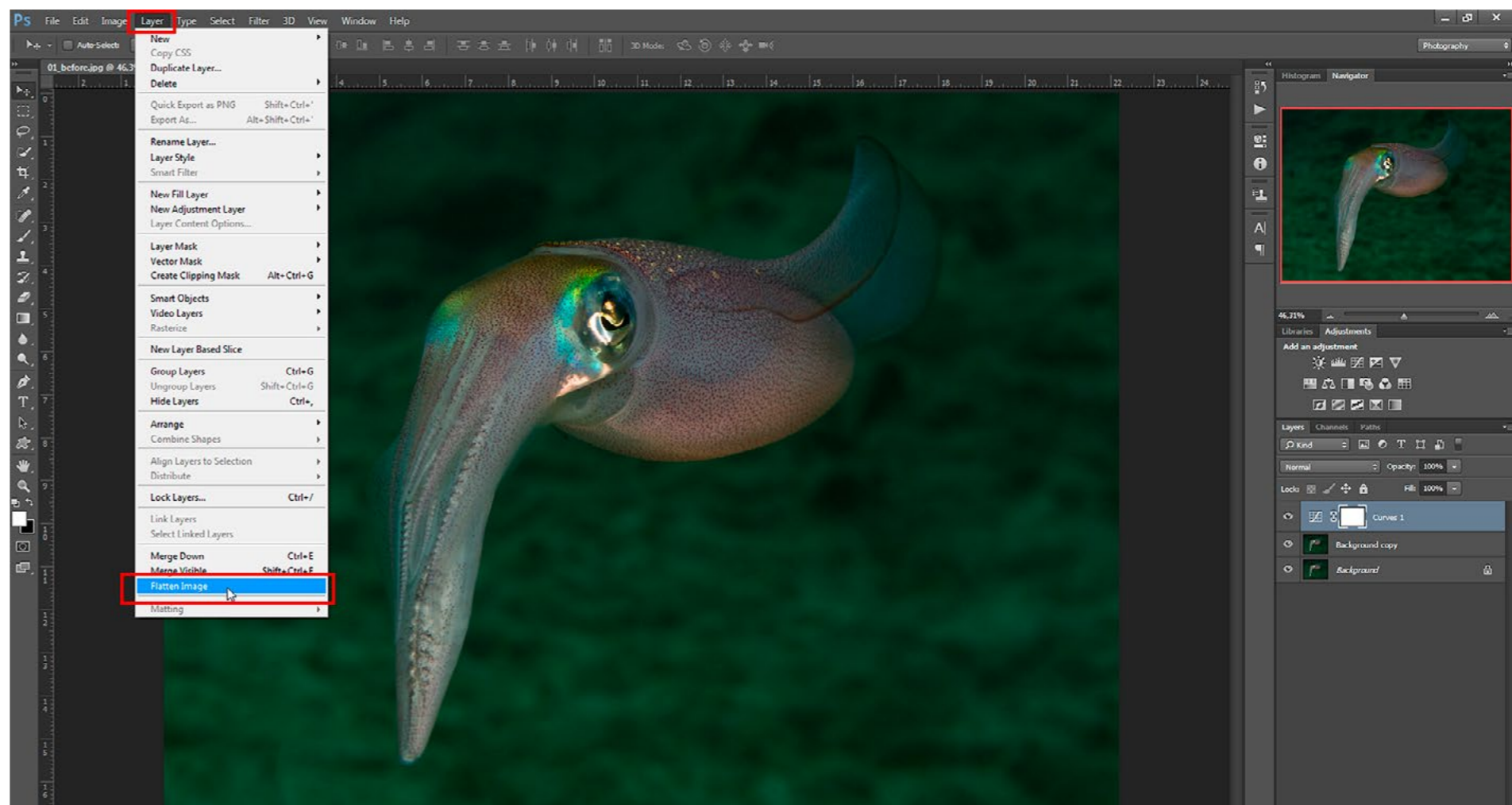
So far, so good, and the image is almost ready. But what I would love to do is make the colors pop a bit more—just as a “final touch.”

Some of you might say that it is the easiest thing to add this final touch, and you might have the Vibrance adjustment layer in mind. Let’s have a look at how that works (see Image 2).

Well, it works... but not so well. Let’s try it again but this time with a saturation boost, using the Saturation slider (see Image 3).

It’s not getting any better—it’s getting worse! All the colors look very artificial now, and I believe that this squid deserves something better. In editing underwater images, I tend to say, hands off of those Vibrance and Saturation sliders. So, let’s delete those nasty Vibrance and Saturation adjustment layers. But before we proceed, in case you did any adjustments or modifications to your image in Photoshop and want to keep the PSD file for later use, now is the time to save it onto your hard disk.

Now, it is time to enter the Lab color mode. 1. Merge all layers into one by selecting Layer, and then, Flatten Image (see Screenshot 1).

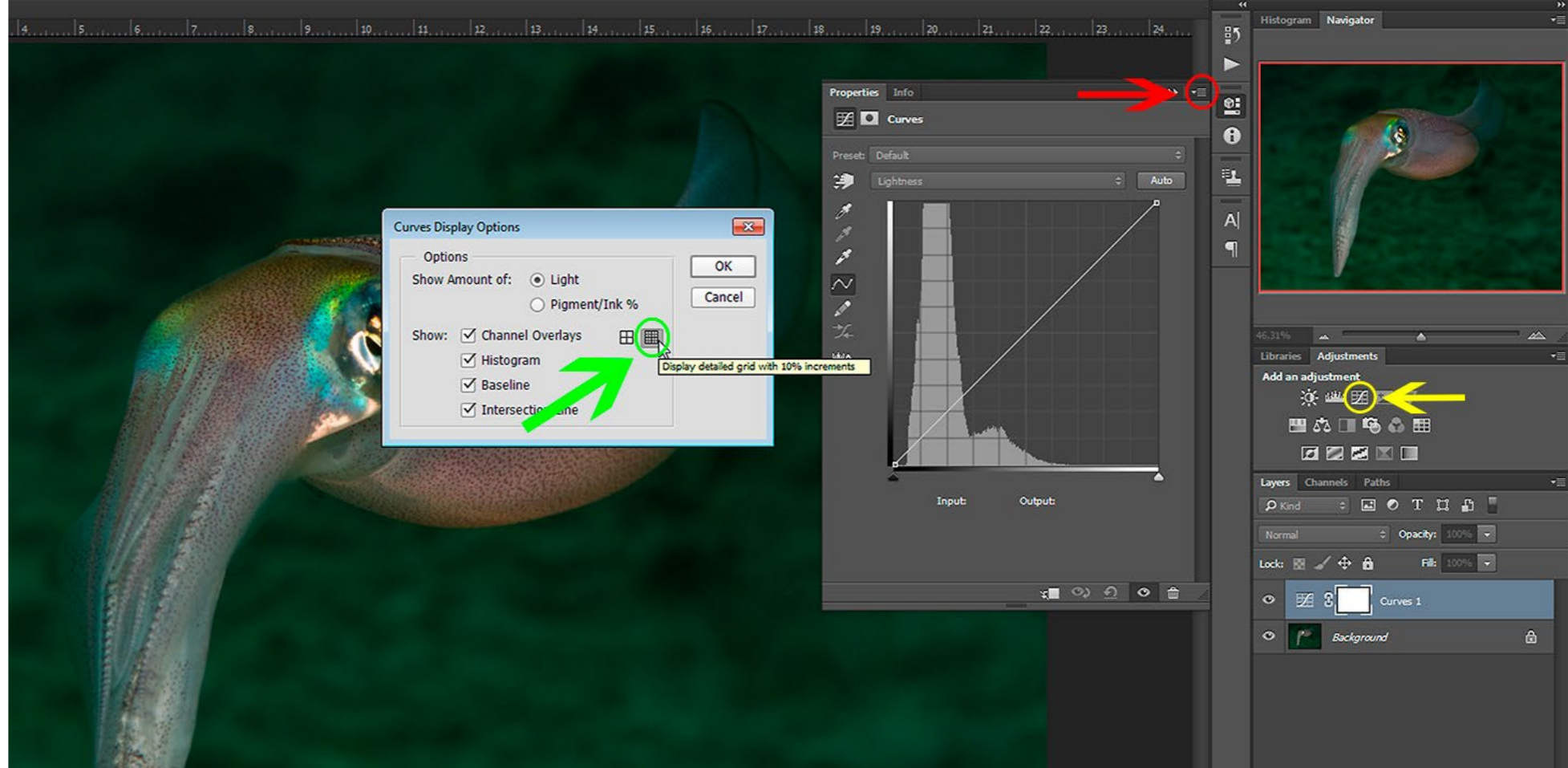


Screenshot 1. Merge all layers by selecting Layer, and then, Flatten Image.





Screenshot 3. The Curves layer symbol is highlighted in yellow; the Curves Display Options is highlighted in red; and the "Display detailed grid with 10% increments" icon is highlighted in green.



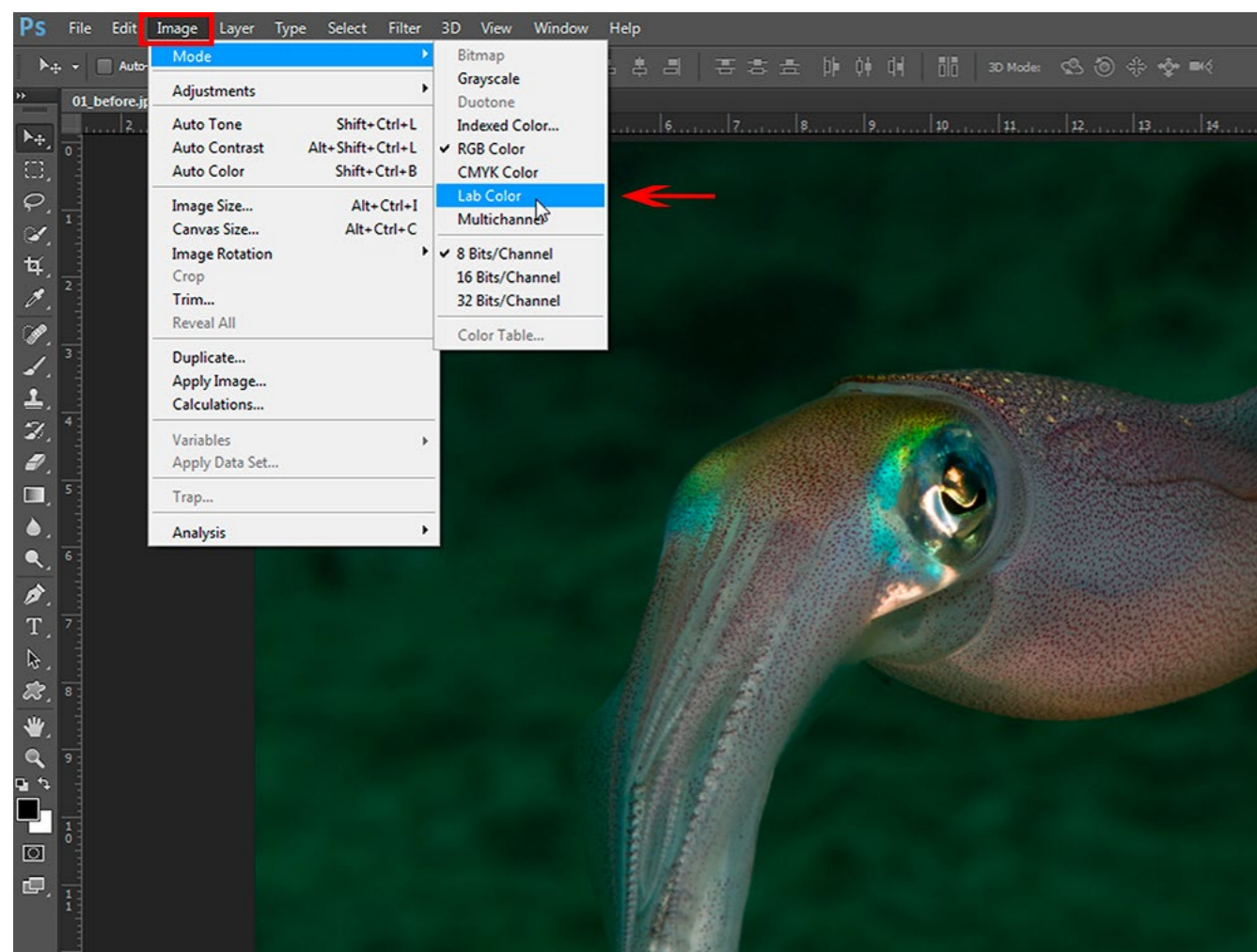
2. Go to Image > Mode and select Lab Color (see Screenshot 2).

Ok, there is no change in sight... but just wait, it will come in a short while. Until then, here is a quick explanation of Lab. A Lab color space is a color-opponent space, with dimension L for lightness, and A and B for the color-opponent dimensions.

Let's keep it simple: The Lab color space includes all perceivable colors, which

means that its gamut exceeds those of the RGB and CMYK color models. Lab color is designed to approximate human vision. And this little trick helps us give the colors in our image the "final touch."

3. Create a new Curves layer by clicking on the Curves layer symbol (in yellow). For more precise work, we will need to open the Curves Display Options (in red) and activate the option "Display detailed grid with 10% increments" (in green). See Screenshot 3.



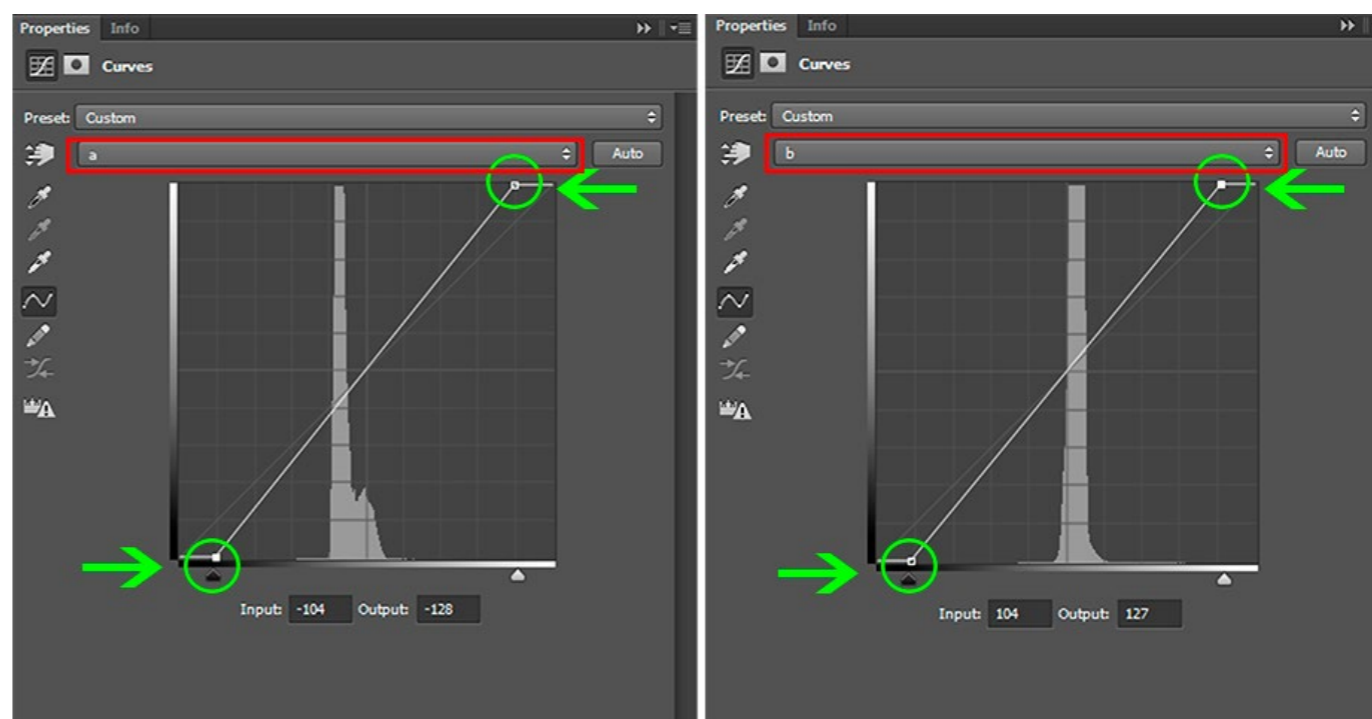
4. First, select the "A" channel in the dropdown menu on top of the Curves histogram. Then, pick the little black triangle symbol (directly below the histogram on the left) and move it slightly to the right. Gentle steps, please. Something close to the grid's first vertical line is often enough. After that, move the little white triangle

symbol (bottom right) to the left, until the first line of the grid.

Select the "B" channel in the dropdown menu and do exactly the same there. The important thing is that each triangle symbol (in both channels A and B) is moved to the same position. Look at Screenshot 4 below.

Using this technique, it is important to make the adjustment to both channels. We do not need to touch the "L" (Lightness) channel.

To see the result of your work, you will need to complete all the steps shown above. If you like what you see, then that's great. If you want a stronger or



Screenshot 4. Adjusting the "A" channel (left panel) and the "B" channel (right panel) in the Curves histogram, by sliding the little triangle symbols

Screenshot 2. The Lab Color mode can be found in the dropdown menu under Image > Mode





lesser effect, then move all four triangle symbols to a different position. Again, if you move the black triangle to a specific position, you will need to do it with the white one as well.

Not all underwater images require this adjustment in the Lab color space, but if you want to check if it is possible to squeeze a bit more out of an image, or if you are a fan of warm and smooth colors, just try this method. But please remember to take gentle steps—do not overuse it!

5. Once you are done and happy with the result, merge all layers (Layer > Flatten image). Go to Image > Mode and switch from Lab Color back to RGB Color. This is it. Congratulations! (See the final result in Image 4.) ■

Rico Besserdich is a widely published German photographer, journalist and artist based in Turkey. For more information, visit: Maviphoto.com. See his latest book at: Songofsilence.com.

Image 4. The final result, after adjustments in Lab Color mode





photo & video

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Backscatter FLIP Filter System for GoPro HERO 9

The One Filter Kit includes one color-correction filter and an aircraft-grade aluminum "flip-frame" system that is compatible with the new GoPro Hero 9 action cam (older GoPro Hero models are supported as well). Depending on the location of the dive, different filters can be used, correcting the underwater colors in blue and green waters. Additionally, a "double flip" system (two mounted interchangeable filters) is available as an extra feature. backscatter.com



The Reflector for Retra Strobes

The Reflector made by Retra can be mounted onto a strobe head (via the separate reduction ring), increasing the power output of the gun by +1 *f*-stop (in water) and narrowing the beam angle—which is perfect for macro and CFWA photography in manual or TTL mode. The new light-shaping device is made from a single piece of aluminum treated with a highly reflective finish, doubling as a corrosion- and scratch-resistant coating. The Reflector is available for shipping at the end of October 2020. retra-uwf.com

the flash- and narrowing the beam angle—which is perfect for macro and CFWA photography in manual or TTL mode. The new light-shaping device is made from a single piece of aluminum treated with a highly reflective finish, doubling as a corrosion- and scratch-resistant coating. The Reflector is available for shipping at the end of October 2020. retra-uwf.com



Keldan Spectrum and Ambient Filters

The Keldan Spectrum Filters for cameras are scientifically engineered color-correction filters based on spectral measurements of the lighting conditions found underwater. In order to restore correct colors, Keldan Spectrum Filters convert ambient light into a daylight spectrum, while optimizing white balancing. The filters are available in blue- and green-water versions, and as threaded or gel/film-filter versions.



The Ambient Filters by Keldan convert the white video light into the same spectrum as the ambient light underwater. This, according to the manufacturer, helps to avoid mixed light problems when the camera's inbuilt white balance is set to ambient light. Keldan Ambient Light Filters are available for the 4X, 8X, 18X and 24x series of underwater video lights by Keldan. Available versions include blue, blue-green and green-water correction filters as well as filter versions for 6m or 12m of depth. keldanlights.com



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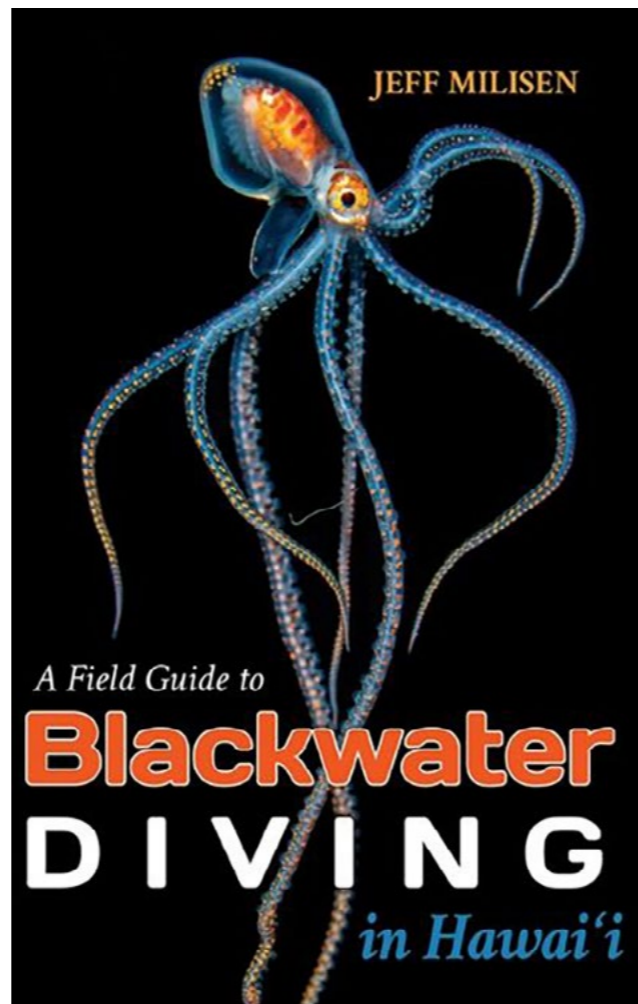
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Blackwater field guide

Curious ocean lovers will enjoy *Blackwater Diving in Hawai'i* by marine biologist and underwater photographer Jeff Milisen, who presents beautiful photos and information on over 300 weird pelagic creatures not often found in standard reef guides.

Published by Mutual Publishing on 22 October, this 288-page softcover book aims to provide insights into the kinds of critters one might find at night in the open ocean.

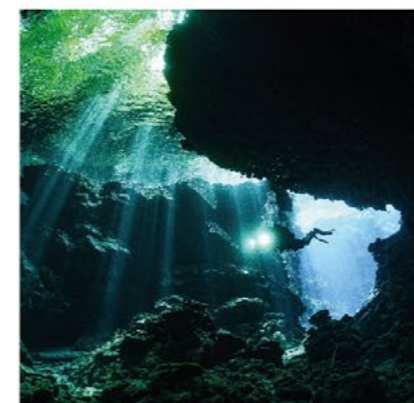
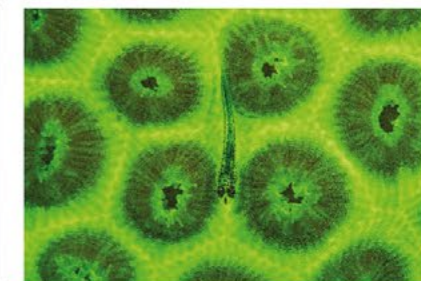
A spotlight is placed on each epipelagic creature to present what is currently known about them. ISBN-13: 978-1-949307-14-6. mutualpublishing.com



Ikelite Underwater Housing for Canon EOS R5

The Ikelite 200DL is a full-featured and durable waterproof housing made for the new Canon EOS R5 full-frame mirrorless digital cameras. It is made of PC-ABS (an advanced form of polycarbonate), is depth-rated to 60m, features Ikelite's own "dry lock," has a valve for a vacuum pump, weighs only 5.4 lb (~2.4kg) with tray and handle, and is compatible with Ikelite's DL system lens

ports. The included manual hotshoe, with Ikelite ICS-5 bulkhead, supports manual strobe exposure with a wide variety of strobes, including Ikelite, Sea&Sea, Inon, Retra and others. For Ikelite strobes, an optional TTL converter can be added. ikelite.com



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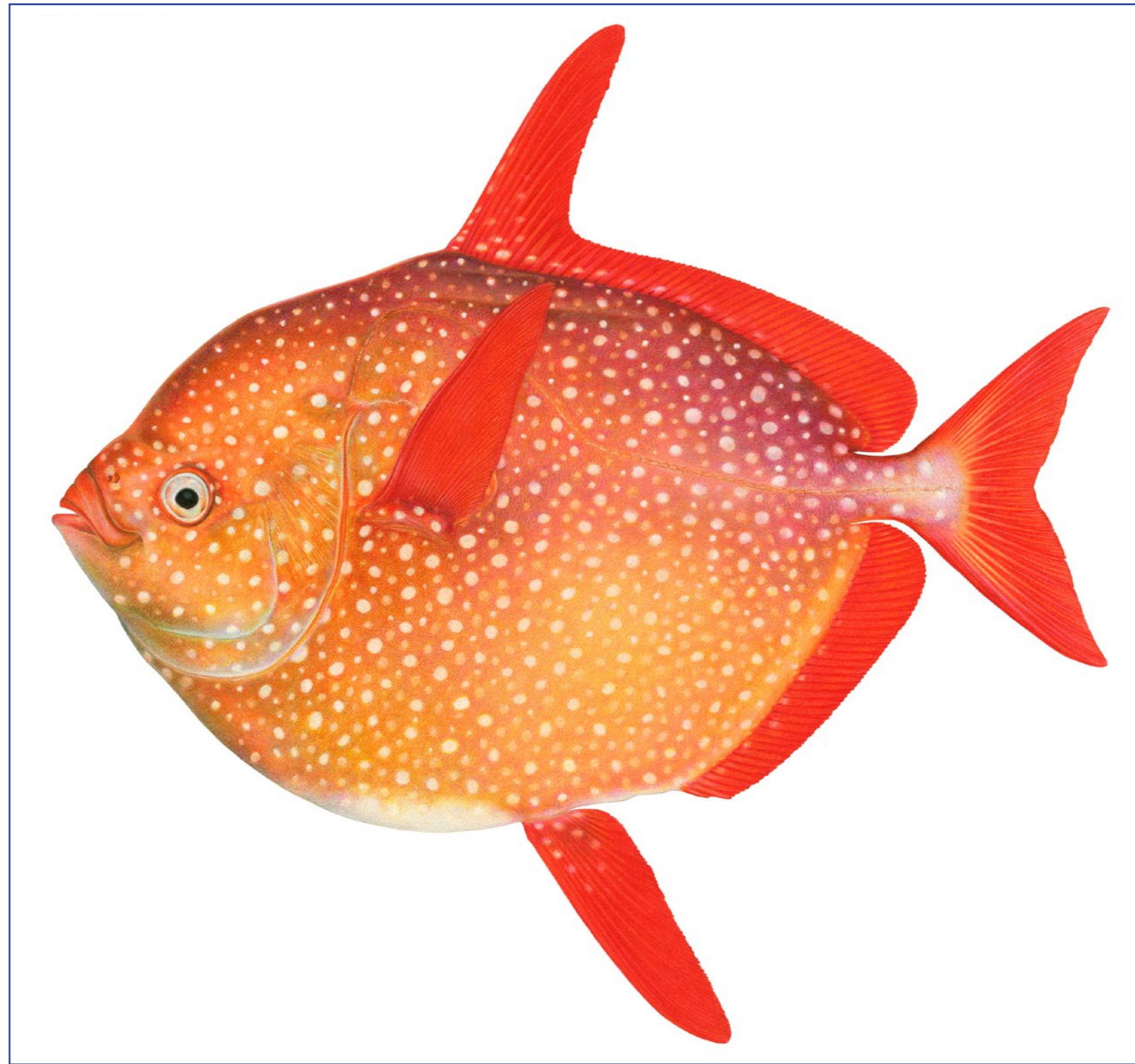
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Joseph R. Tomelleri



P O R T F O L I O



Rendered for scientific accuracy, the brilliantly detailed and colorful illustrations of fish by American artist Joseph R. Tomelleri have appeared in over a thousand publications. *X-Ray Mag* interviewed the artist, who is based in Leawood, Kansas, to learn more about his artwork and his perspectives.

X-RAY MAG: Tell us about yourself, your background and how you became an artist, and why fish? How did you come to this theme in your artwork and how did you develop your style of painting?

JRT: I was a master's candidate at Fort Hays State University in 1984 (Master of Science in Biology), when several graduate students and I decided to publish a small book for the university about the creek

that flowed through campus—*Big Creek and its Fishes*. Fishes can be somewhat problematic to photograph and ours were no exception. To avoid the irregularities of photography, I decided to try and solve the problem by illustrating all the species. Prior to that time, I had dabbled a bit in art, but not seriously.

Being an artistic neophyte, I approached the owner of a local art supply store about what medium might work best. He suggested colored pencil (Berol Prismacolor). I guess it took about 100 illustrations, maybe 2,500 to 3,000 hours to become proficient. I do not like to look much at my early work; meaning, hopefully, that I have gotten better over the years.

X-RAY MAG: Who or what has inspired you and your artwork and why?

Pumpkinseed, by Joseph R. Tomelleri. Giclée print, 8 x 10in (~20 x 25cm), signed and numbered limited edition of 200. This freshwater sunfish typically measures 4in (10cm) in length.



Yaqui Trout, by Joseph R. Tomelleri. Giclée print, 10 x 17in (~25 x 43cm), signed and numbered limited edition of 200. This Mexican trout was found in Arroyo Yenquin in northwestern Chihuahua.

PREVIOUS PAGE:
Opah, by Joseph R. Tomelleri. Giclée print, 18 x 19in (~46 x 48cm), signed and numbered limited edition of 25. Drawn for *Fishes of the Salish Sea: Puget Sound and the Straits of Georgia and Juan de Fuca* by Theodore Wells Pietsch and James Wilder Orr. Opahs are solitary endothermic ocean fish that can reach up to 6.6ft (2m) in length and weigh up to 600 lb (272kg).



Plateau Orangethroat Darter, Male,
by Joseph R. Tomelleri. Giclée print,
8 x 10in (~20 x 25cm), signed and num-
bered limited edition of 200. Drawn for
Kansas Fishes, edited by Mark Eberle.
This darter was found in Spring River in
southeastern Kansas. These small fish
can grow up to 2.4 to 2.75in (6-7cm).

JRT: My aunt, Donna Aldridge, is a well-known Kansas City artist. She gave me a few art lessons when I was a little shaver, encouraged me and gave me confidence in my work. Almost all my fish art is done as “left-lateral” view, which is a scientific standard that was developed in the 1800s. Fishes were drawn on their left side (facing to the left) because by convention, any scale work or tissue samples, etc., were always taken from the right side, leaving the left intact. There are a number of artists that paint fish whom I admire; among them are Al Agnew, Larry Tople, Mark Susinno, Jon Wright—to name a few. They are doing “in habitat” work, which I think is more difficult than what I do.

X-RAY MAG: What is your artistic method or creative process?

JRT: The process of illustration typically begins with collection of the fish—by seine, angling, or electroshocking, etc. The fish is photographed live upon collection to preserve natural colors, then preserved in 10% formalin or frozen in the case of larger fish (they lose almost all color upon preservation in formalin). After at least a week in formalin, the specimen is washed in water, then transferred to 70% ethanol. For drawing, the “alcoholic” specimen is measured and an outline is freehanded onto a six-ply cotton-rag museum board (cold-press surface is best for colored pencil).

Colors are layered one upon another to arrive at the best approximation of color for the fish. The specimen is being constantly referenced during drawing to get the scale counts, fin-ray counts and other diagnostic characters correct.

X-RAY MAG: What is your relationship to the underwater world? Are you a scuba diver or a snorkeler and how have your experiences underwater influenced your art? In your relationship with fish and aquatic ecosystems, where have you had your favorite experiences?

JRT: I have only dived twice with scuba gear, so most of my time underwater has

been snorkeling, and much of that in gin-clear Ozark streams—another world ENTIRELY from that of the air-breathing world. The clarity with which one can view the fishes is incredible. Thus, there is no question that photographing fishes for color is better if a specimen is held under an inch or so of water, or if it is viewed live in a “Photoquarium.” This is especially true of darters, which if held in hand often appear much darker than they would if observed underwater.

My favorite spot would be any number of Ozark streams and the myriad of species in those clear waters. My most memorable experience, however, would be snor-

keling with golden trout in the Golden Trout Wilderness—with no wetsuit, mind you, under some spotty surface ice; I lasted maybe 30 seconds.

X-RAY MAG: What are your thoughts on the conservation of oceans and aquatic ecosystems, and how does your artwork relate to these issues?

JRT: My illustrations are often used for ID guides, fishing regulations in many states, signage, and sometimes as fundraisers for environmental groups—Patagonia and Western Native Trout Initiative are two conservation-oriented groups that come to mind. Some of the fishes I illustrate are

threatened or endangered. In those instances, I will typically draw from a previously preserved museum specimen but will still photograph a live fish, occasionally from a captive population, or ideally in the wild—the wild fish requiring a special catch-and-release permit from the US Fish and Wildlife Service. Several times, I have received specimens of extinct fish from the Smithsonian collection, and recreated color scientific illustrations from descriptions and the actual specimens. Some of those include yellowfin cutthroat, harelip sucker and whiteline topminnow.

X-RAY MAG: What is the message or experience you want viewers of your artwork to have or understand?

JRT: My illustrations are really a blend of science and art. The science portion is more the exacting nature of the work, as fishes are a bit more than just correct coloration. They will usually have a certain number/pattern/size of scales, spiny and soft fin-rays, certain body propor-



Tiger Rockfish, by Joseph R. Tomelleri. Giclée print, Giclée print, 14 x 20in (~36 x 51cm), signed and numbered limited edition of 100. Drawn for *Fishes of the Salish Sea*, written by Pietsch and Orr. This species can grow to 24in (61cm) in length.



China Rockfish, by Joseph R. Tomelleri. Giclée print, 14 x 20in (~36 x 51cm), signed and numbered limited edition of 100. Drawn for *Fishes of the Salish Sea*, written by Pietsch and Orr. This species can reach up to 18in (45cm).

tions, etc. That is where the actual specimen is indispensable. The artistic portion (and illustration is just art with tighter strictures) is my interpretation of the color, the shading, the spotting, the disposition or spread of the fins, reflection of the scales, etc. It is always going to be a bit stylized because it is not a photograph, but I am always trying to minimize the stylization the best I can, in favor of an overall look that really describes that species, i.e. a look that still shows the many diagnostic details of that species, which may not be evident in a photo.

X-RAY MAG: What are the challenges or benefits of being an artist in the world today? Any thoughts or advice for aspiring artists in ocean arts?

JRT: The biggest challenge I would guess is marketing, as the Internet is absolutely flooded with fish pictures; digital photography being a vast source of those. Another problem is keeping bootlegged images off the Internet, many of which appear on products for sale. The best advice I could give aspiring artists is to see "it" for yourself, be it landscapes, fishes, crustaceans, or what-have-you. If it is not possible to see that animal alive, try to find museum specimens to work from if you feel the need to do exacting work. I had to work from museum specimens for most of the pictures in the *Fishes of the Salish Sea* books. Not ideal, but necessary.

X-RAY MAG: How do people, adults and children respond to your works?

JRT: People mostly want to know how long it took to draw a particular fish. Maybe they are calcu-

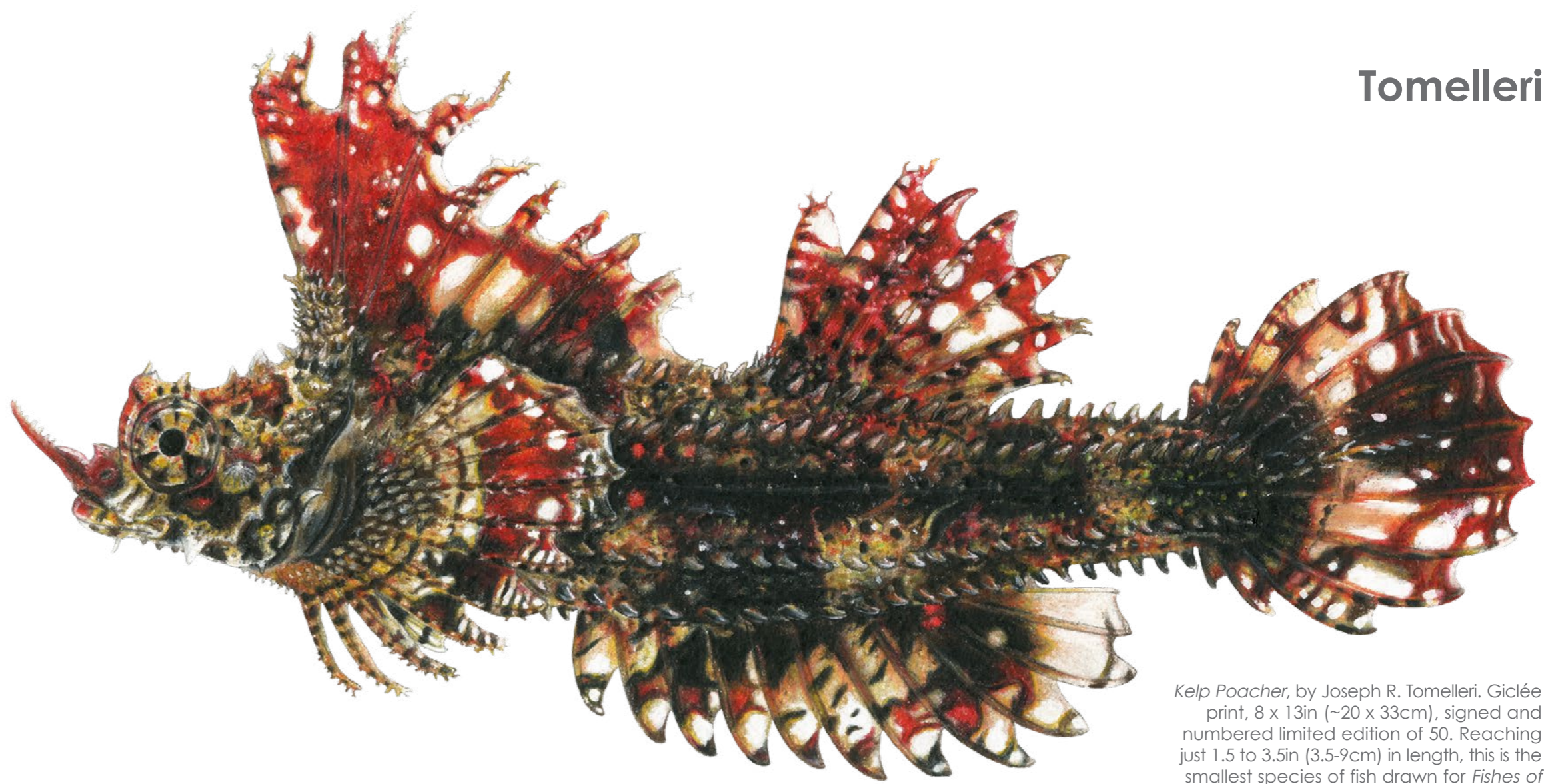
lating how much per hour for that original artwork! Lately, I just tell them it took me 62 years, which is my current age.

Inevitably, when I do a demonstration, kids are more interested in the preserved fish that I might have sitting in water on the drawing table. They will want to know if it's real, and often want to know if it's alive!

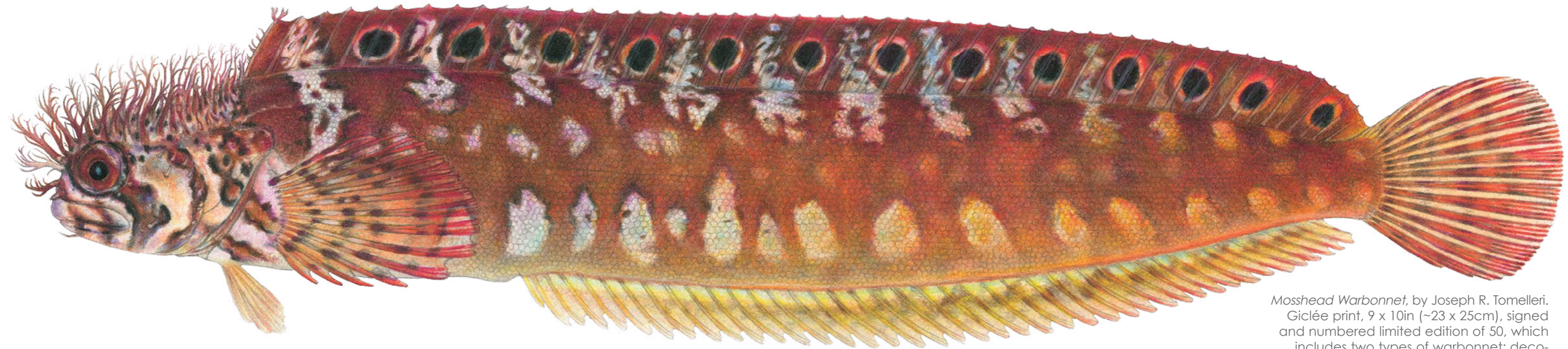
X-RAY MAG: What are your upcoming projects, art courses or events?

JRT: In 2019, University of Washington Press released *Fishes of the Salish Sea: Puget Sound and the Straits of Georgia and Juan de Fuca*, a three-volume set that I started in 2005 and finished in 2018. Ted Pietsch and James Orr are the authors.

Currently, I am finishing a salmon/steelhead/coastal cutt project for a British Columbia publication. It includes parr, smolt, post-smolt, adult, spawning male and females of all the species, and interestingly has top-down views of all the smaller forms, which are useful for field ID (I hope!). Sean Godwin and Marty Krkosek are authoring, and the Pacific Salmon Foundation is funding the project.



Kelp Poacher, by Joseph R. Tomelleri. Giclée print, 8 x 13in (~20 x 33cm), signed and numbered limited edition of 50. Reaching just 1.5 to 3.5in (3.5-9cm) in length, this is the smallest species of fish drawn for *Fishes of the Salish Sea*, written by Pietsch and Orr.



Mosshad Warbonnet, by Joseph R. Tomelleri. Giclée print, 9 x 10in (~23 x 25cm), signed and numbered limited edition of 50, which includes two types of warbonnet: decorated and mosshad. This eel-like saltwater fish can grow up to about 6in (15cm) long.



Smoothhead Sculpin, by Joseph R. Tomelleri. Giclée print, 10 x 17in (~25 x 43cm), signed and numbered limited edition of 25. This species typically measures 5.5in (14cm) in length.

COVID-19 has slowed us a bit. Otherwise, I am always working in a Mexican trout here and there, as there seems to be an almost endless number of native forms from Chihuahua and Durango, known and unknown!

X-RAY MAG: Lastly, is there anything else you would like to tell our readers about yourself and your artwork?

JRT: Colored pencil is a slow and measured medium to work with (but probably not as difficult to master as say watercolor). The actual time to illustrate one fish, of course, depends on the size they are drawn, which might be from four inches in length to as long as 26 inches, smaller fishes usually go two or three times life-size, and for larger fish like salmon, maybe 70 percent of life-size. I work probably somewhere between 12 hours and 80 hours or more for one illustration. Time depends on the coloration too, with darker fishes being more time-consuming. A lot more time, effort and money are spent chasing those fishes though. But that is the best part of my job and it is tax deductible. ■

For more information or to order originals and prints, visit the artist's website at: americanfishes.com.



Scalyhead Sculpin, by Joseph R. Tomelleri. Giclée print, 10 x 17in (~25 x 43cm), signed and numbered limited edition of 25. This species is usually 4in (10cm) long.

CAPTION FISH FACT SOURCES: FISHBASE, WIKIPEDIA

