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New Georgia
Solomon Islands

Wrecks
Frankenwald

Indonesia
Bunaken

Profile
Doug Allan

UWPhoto
Fluorescence

CUBA
Gardens of the Queen

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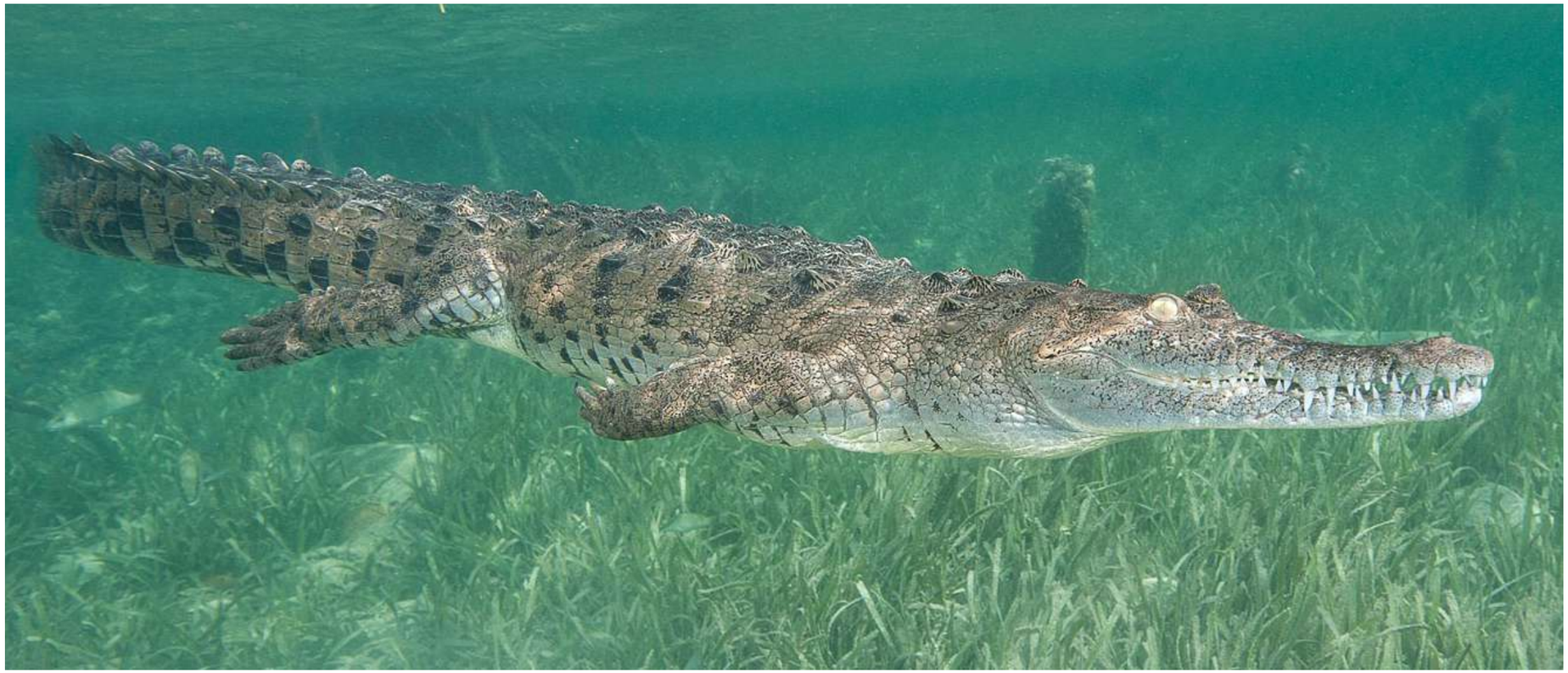
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COVER PHOTO: School of Manta Rays, Su Su Hitu, Solomon Islands
Photo by Don Silcock

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American crocodile, Gardens of the Queen marine park, Cuba. Photo by Matthew Meier



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Respect the signs

It is late Sunday night—the 29th of December, 2013, if you want me to be precise—and I am writing this editorial with my head and heart full of mixed emotions. I keep on thinking back to a dive that took place a mere four days ago. It was not a special or significant dive. It was not carried out by a leading explorer nor a diving personality. No one found a new species of fish or discovered a wreck, yet this dive has made international headlines. It has been discussed around the world on many newspaper and diving forums. Leading members of our community have spoken out and commented about it, just because of the outcome of this dive.

On Christmas morning a 35-year-old man took his 15-year-old son for a dive. They were trying out new scuba equipment excitedly unwrapped earlier that day. It all sounded quite normal until you added in the fact that the father was not an instructor, the son had no scuba training, and neither of them had cave diving training. Why do I mention this? The site chosen was Eagles Nest.

Eagle's Nest is a deep, 94m (310ft) sink cave based in Florida, USA. The NACD (National Association for Cave Diving) and the NSS-CDS (National Speleological Society Cave Diving Section) clearly state that this is a very advanced dive, and the minimum qualification to dive this site is a 'Full Cave' certification, a Trimix ticket and the diver should have appropriate experience with deep cave dives. Neither diver met these key criteria.

It was a 'Silent Night'. The two bodies were recovered before midnight on Christmas Day. This day will never ever be the same for the family, the officials who attended this scene and the cave divers who were called out to do the body recovery.

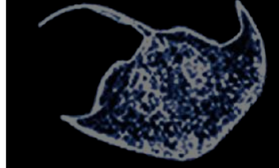
The cave and diving community is currently suffering two conflicting emotions—huge anger and deep sorrow. These were two needless and unnecessary deaths. They should not have happened. Eagles Nest has a number of signs above and below water graphically warning of the dangers of diving the site without proper training, equipment and experience. Unfortunately, it seems that certain individuals go through life believing that the rules just do not apply to them. Now the family is commenting that the site should be closed to prevent further deaths.

I can understand the family's grief, but this knee-jerk reaction will not make one jot of difference to safety. It will merely restrict access to a quality cave diving site that took a long time to gain. Cave divers in the main are responsible and disciplined. They take their sport very seriously and respect site access. They plan, they are properly equipped, and they are trained. Closing Eagles Nest will not make it safer, because the people likely to break into this site to dive it will be the ones who think the rules don't count. They will probably be ill-equipped, have little or no relevant training and also end up in a body bag.
If people truly want to make a positive difference to stop unnecessary deaths, perhaps they could campaign to remind divers of the dangers of diving beyond their training and experience.

A little good has already come about as a result of these deaths. In 1997, the cave community wrote and filmed a short documentary called *A Deceptively Easy Way To Die*. Because of the Eagles Nest fatalities, this film is once again being watched. Please Google it up; you will soon find it.

I hope that the double fatality will make open water divers tempted to 'check out kit', or 'just see what is down there', think twice before entering a cave for which they are not equipped—that they will read and respect the signs saying 'there is nothing in this cave worth dying for'. So pass the message on into the New Year. Please watch *A Deceptively Easy Way To Die*, then share it, and talk about it with new divers and remind them that we are not setting rules to ruin their fun, but to keep them safe so they can enjoy many more Christmas Days.

— Rosemary E Lunn



News edited
by Peter Symes

from the deep

NEWS



MATHEW MEIER

Reef off Fiji. Forest protection can prevent changes in amount and composition of river runoff impacting reefs

In Fiji, coral reef health is linked to management of terrestrial ecosystems

Downstream ecosystems such as coral reefs can be hugely affected by land-based activities that cause increases in runoff and associated sediments, nutrients and chemicals.

In 2008, a national Protected Area Committee was created by the Fiji government in part to achieve the goals of protecting 20 percent of the country's land and 30 percent of its coastal waters by the year 2020.

In a study conducted by the Wildlife Conservation Society and the University of Queensland evaluating the effects of terrestrial protected area designs on Fiji's coral reefs, it turns out that what's best for land ecosystems is also best for coastal corals.

When designing terrestrial protected areas, the key is to consider not only how much they benefit terrestrial biodiversity but also how much they benefit coral reef ecosystems.

Multiple benefits

When achieving terrestrial conservation goals was the primary objective, the potential benefits to coral reef condition were 7.7–10.4 percent greater than benefits from the existing network of protected areas.

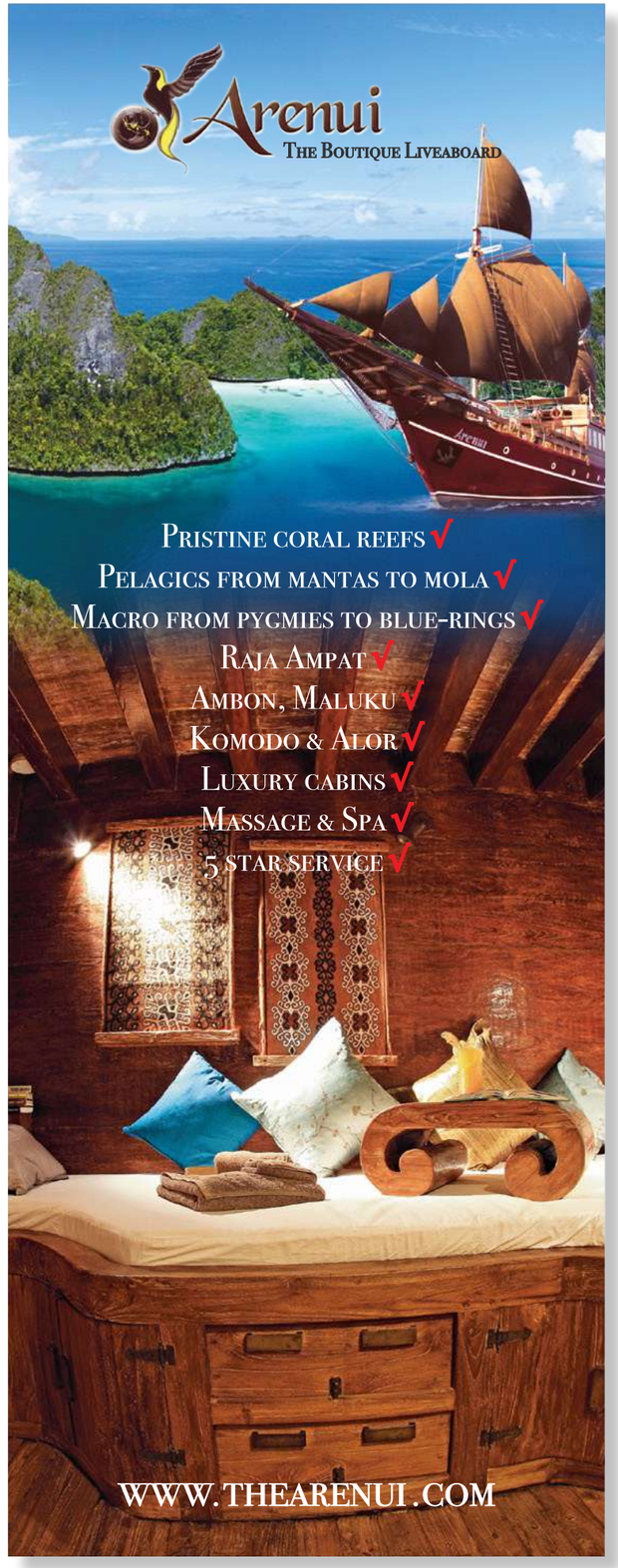
When benefiting reefs was the primary objective, benefits to coral reefs were 1.1–2.8 times greater per unit area than networks designed to only achieve terrestrial conservation goals, but 31–44 percent of the terrestrial conservation goals were not achieved.

Results put to use

These results are already being used by Fiji's Protected Area Committee to modify the boundaries of existing priority places to deliver outcomes that better meet terrestrial conservation goals while offering greater benefits to coral reef condition through prevention of run-off.

"When designing terrestrial protected areas, the key is to consider not only how much they benefit terrestrial biodiversity but also how much they benefit coral reef ecosystems," said lead author Dr Carissa Klein. "Thinking about the connections between the land and sea is rarely done when designing protected areas—Fiji is leading the way globally." ■

SOURCES: WILDLIFE CONSERVATION SOCIETY, SCIENCE DAILY AND MARINE POLICY (JOURNAL)





Partners did not simply follow the attacker but deviated around coral formation to block the prey's escape routes.

Reef fish live and hunt in teams

Goatfish work together to catch their dinner.

When an individual chases its prey around a coral formation, others gather around to block escape routes. The unusual co-ordinated behaviour was observed by scientists in the Red Sea, off the coast of Egypt.

Solitary or in groups

Adults in the study area lived either solitarily or in relatively stable groups formed of similar sized and most likely unrelated individuals. The solitary life style was associated with searching for hidden immobile prey on sandy areas while group living was associated with collaborative hunting of mobile prey in corals. Any member of a group could initiate a hunt by rapid acceleration. Partners did not simply follow the attacker but deviated around coral formation to block the prey's escape routes. Prey that escaped into a coral crevice was typically encircled with maximal inter-individual distance and pried on by insertion of the barbels into the crevices.

Size not family

The fish are known to live in groups that are based on their size rather than family relationships, with similarly sized fish forming groups. Scientists have suggested that this strategy might improve co-ordination for shoals of fish, making them more streamlined and better synchronised.

Similar behaviour has only been identified in a handful of species—primarily mammals including chimpanzees, orcas, lions and dolphins, but also birds. Very few fish have been seen to "work together". In some species, each individual carries out the same role during each hunt, but, the goatfish had a flexible approach. ■

Young parrot fish roam, older ones stay put

Researchers in Australia mapped the movements of individual parrotfish from very young juveniles to mature adults. They found that small parrotfish quickly expanded their range as soon as they settled on a reef.

This expansion stopped when the fish matured, and their final home range was unrelated to adult body size.

Juvenile parrotfishes displayed rapid home range growth until reaching approximately 100–150mm length.

Thereafter, the relationship between home range and body mass broke down. This shift reflected changes in colour patterns, social status and reproductive behaviour associated with the transition to adult stages. ■





THIS PAGE: Scenes from the relief effort in the Philippines after Super Typhoon Haiyan hit the region in early November 2013, killing over 6,000 people in this country alone
SOURCE: AFP

Philippine relief effort

Text and photos courtesy of Anne Paylor

In the wake of the devastation left by the passage of Super Typhoon Haiyan through the central Philippines, liveaboard dive boat operator Worldwide Dive and Sail (WWDAS) was quick to weigh into the relief effort, ferrying supplies to remote communities inaccessible by land.

The first 'mercy mission' was to the island of Malapascua, a dive location renowned for interac-



tion with thresher sharks, which took a direct hit from the storm. Local dive centre operators Sun & Fun and Sea Explorers requested the Siren Fleet's help in getting supplies to the island, and sponsored the trip, working closely with global charity Medecins Sans Frontieres (MSF).

One of WWDAS' 40-metre wooden phinisis (traditional Indonesian two-masted sailing ships) duly left Mactan on Thursday evening, arriving off Malapascua early the following morning carrying 15 tonnes of food, 16 tonnes of fresh water, blankets and clothing. The trip was undertaken while awaiting official approval for a more substantial mission to Leyte Island at the behest of MSF.

WWDAS' new boat—SY *Philippine Siren 2*—which just arrived from the boat yard in Indonesia where it was built, was enlisted to help with the relief effort.

WWDAS representative Paul Collins accompanied the expedition and said: "Malapascua was severely damaged by the storm, but amazingly, the people we met there were in good spirits



and already working hard to restore their homes and businesses. Local banca (outrigger boats) and dive centre boats came to help us unload the supplies and water into an assortment of containers."

Philippine Siren 2 then returned to Cebu in preparation for the more extensive relief mission to Leyte Island in conjunction with MSF. She arrived in Guiuan on the southeastern coast of Leyte Island, carrying medical supplies, a small generator, gasoline and diesel supplies, and propane gas tanks as well as food and water to support the MSF operation there. In addition, the boat is equipped with two water desalination units capable of supplying some 12 tonnes of fresh water a day.



Tourists wanted

WWDAS Director Frank van der Linde said: "What the Philippines needs right now is tourism! Tourist dollars are an economic mainstay for this country and crucial for the maintenance of its infrastructure. Much of the country was not damaged by the typhoon and remains open for business as usual. As the devastated areas of the Philippines start the slow process of recovery, the whole country needs tourist dollars more than ever and we urge people not to put off planned visits to the country."

It is a sentiment echoed by the Philippines Department of Tourism (DOT). In an open letter to the European tourism industry, Venus Q. Tan, DOT Region Director Europe said: "Tourism for the Philippines continues to be one of the major contributors to the economy making up approximately 8% of the GDP. It plays a significant role in rebuilding lives and businesses in communities. The eventual business brought towards the country goes a long way in providing jobs and infrastructure support in numerous regions. Tourism is a multiplier industry. Encouraging more travel and tourism to the country now will provide much needed jobs and livelihood for our people; and indeed put meaningful contribution to survivors of this disaster."

To that end, for sailings between now and 31 January 2014, WWDAS has committed to donate 50 percent of the trip price for all remaining berths booked on both Philippine Siren boats to MSF and the Philippine Red Cross.

Diving is still good

As far as diving is concerned, Frank said: "For the Siren Fleet the majority of our trips remain unaffected. Reports of good weather and diving conditions have been coming in from Cebu, Bohol and Negros (Dauin) as well as the all clear given for diving in Anilao and Puerto Galera. Whilst Leyte Island has been the most affected by the typhoon, the area of Sogod Bay is far south of the main path and all trips planned from February 2014 will be going ahead as scheduled. The Tubbataha reefs were not in the path of the typhoon so we can still expect great diving there when the park opens in February. The region around Donsol and Ticao was thought to be in the direct path of Haiyan but the typhoon moved south leaving dive centres and resorts with very minor damage. And thresher sharks have been sighted around Malapascua, where many of the deeper reefs remain unaffected." ■



Damaged reefs can recover

Coral reefs are damaged by natural disturbances and local and global anthropogenic stresses such as global warming and ocean acidification. As stresses intensify, so do debates about whether reefs will recover after significant damage.

From 1999 to 2012, scientists from the University of Florida studied reefs around Little Cayman Island. They wanted to see how well the reefs stood up over time under a variety of stresses that included, for example, increased sea surface temperatures. During the 13 years, warm ocean temperatures led to bleaching and infectious disease that reduced live coral cover by more than 40 percent between 1999 and 2004.

Corals rebounded

However, seven years later, the amount of live coral on the reefs, the density of young colonies critical to the reefs' future health, and the overall size of corals all had returned to the 1999 state, the study showed. ■

SOURCE: PLOS ONE



PETER SYMES

In Florida, mangroves have begun to expand further north along the Atlantic coastline, invading salt marsh habitats

Mangrove expands in Florida

Mangrove forests have been expanding northward along the Atlantic coast of Florida as cold spells are becoming rarer.

This expansion is associated with a decline in the number of days where temperature dips below -4 °C, or 25°F. That, not coincidentally, is a physiological temperature limit of mangrove survival.

"The explanation people would most probably point to is an increase in mean temperature," said co-author Assistant Professor James Kellner. But the analysis ruled out increases in mean annual or winter temperatures as well as changes in precipitation and changes in nearby urban and agricultural landcover. It also ruled out sea level rise.

In a state where mangroves enjoy environmental protections, it might appear at first blush that more mangrove habitat could be a good thing. But researchers caution against any celebration of this apparent consequence of climate change.

"The expansion isn't happening in a vacuum," said lead author Kyle Cavanaugh, a postdoctoral researcher at Brown University and at the Smithsonian Institution. "The mangroves are expanding into and invading salt marsh, which also provides an important habitat for a variety of species."

The next question is to understand how these changes affect the lives and interactions of the species in each ecosystem. ■

SOURCE: PNAS



wreck rap

We have a winner! Readers of Norway's dive magazine, *Dykking*, voted on Norway's best wrecks in April 2009. *Frankenwald* won with 112 votes against the wreck, *Consul Carl Fisser,* which won second place with 78 votes



A World-Class Wreck Dive

Frankenwald

Text and photos by Christian Skauge

On 6 January 1940, the German freighter *Frankenwald* was caught in a treacherous current on the Norwegian west coast. With a deafening noise, German steel met Norwegian rock, and ship and cargo was lost. All that's left now is a world-class wreck dive.



Deck of the *Frankenwald*

Captain Alexander Moritz Otto Erich von Frankenberg is staring out the window. He is on the bridge of the 122-meter-long German freighter *Frankenwald* with his First Officer Georg Güttler and two Norwegian pilots—Lorenz Schjønning Warholm and Christian Haarvik. It is almost 6 P.M. and the winter darkness shrouds the cold, barren landscape. A south-easterly breeze is blowing, and there it is raining slightly, but visibility is still decent.

Perhaps the captain takes a moment to think about his homeland, which just a few months earlier was plunged into war. He is safe here inside the Norwegian fjords; but, in international waters just off the coast, the Royal Navy is looming.

They would not have let him pass, could they have done anything to stop him; *Frankenwald* is carrying 7,971 tons of fine-ground magnetic iron ore known as magnetite from the mines in Kiruna, which will feed the hungry German war machine.

Treacherous passage

Frankenwald left Narvik on 31 December 1939 at around 3 P.M. The passage along the Norwegian coast was eventful, and they had to halt several times due to bad weather and heavy snow. Now the heavily loaded freighter was closing in on the treacherous passage between Brattholmen and Fengskjæret in Ytre

wreck rap

Frankenwald offers many exciting experiences both inside and outside—simple swim-throughs accessible to everyone

BELOW: Sinking below the stern truly reveals the giant proportions

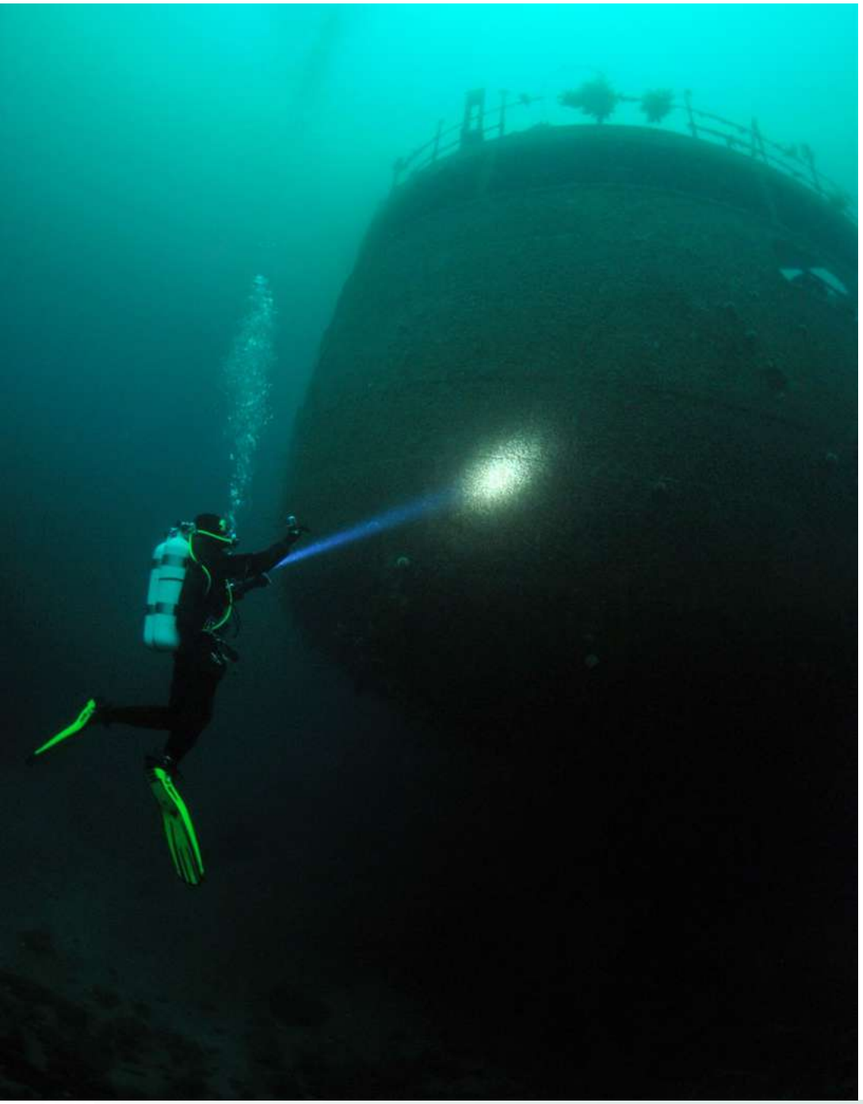


Steinsund, just north of the mighty Sognefjord.

The captain orders slow speed on the engine room telegraph as they draw closer. The atmosphere on the bridge is presumably tense, and von Frankenberg later stated that he was having doubts about the pilots after taking them on. Before making his way to the chart room to check their position one extra time, he notes that they are in the correct sector of the lighthouse ahead.

Von Frankenberg had not wanted to pass through the narrow strait at this hour, but their intended anchorage at Larsråholmene further north was filled up with about a hundred or so fishing vessels because of bad weather during the last few days. He had no choice but to continue south and head for Bergen, running through the night.

When von Frankenberg returns to the bridge, he discovers that the light from the lighthouse has changed. The current must have pushed the freighter slightly off course to starboard, and now they are in the wrong sector. Suddenly, lights from a small vessel travelling in the same direction appear in the darkness ahead.

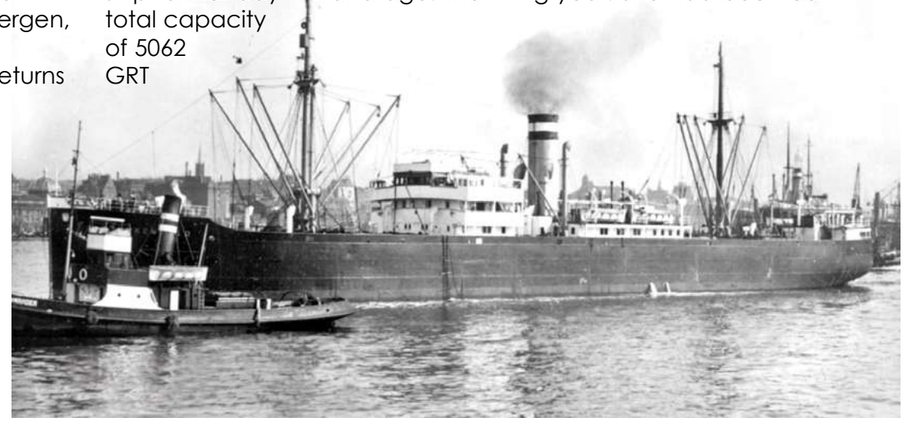


Frankenwald was a proud ship, and the wreck is in such good condition that one can easily recognize virtually every detail that can be seen in historical pictures of the ship, even after nearly 70 years on the seabed. No wonder it's a favorite top pick!

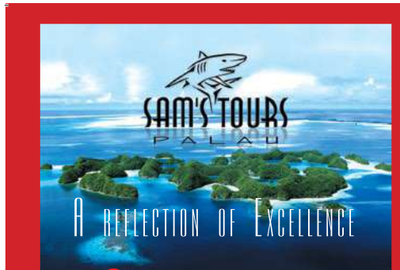
The Wald class

Measuring almost 400 feet, *Frankenwald* was a big ship for her day and age. The total capacity of 5062 GRT meant she could take a lot of cargo in her four main holds. She even had a number of passenger cabins in the superstructure amidships. She was built in steel and equipped with a triple expansion steam engine giving her a speed of 11 knots.

The freighter was launched in 1921 as build number 36 from Deutsche Werft in Hamburg, and went into service the following year. She had been com-



Historical photograph of the *Frankenwald*



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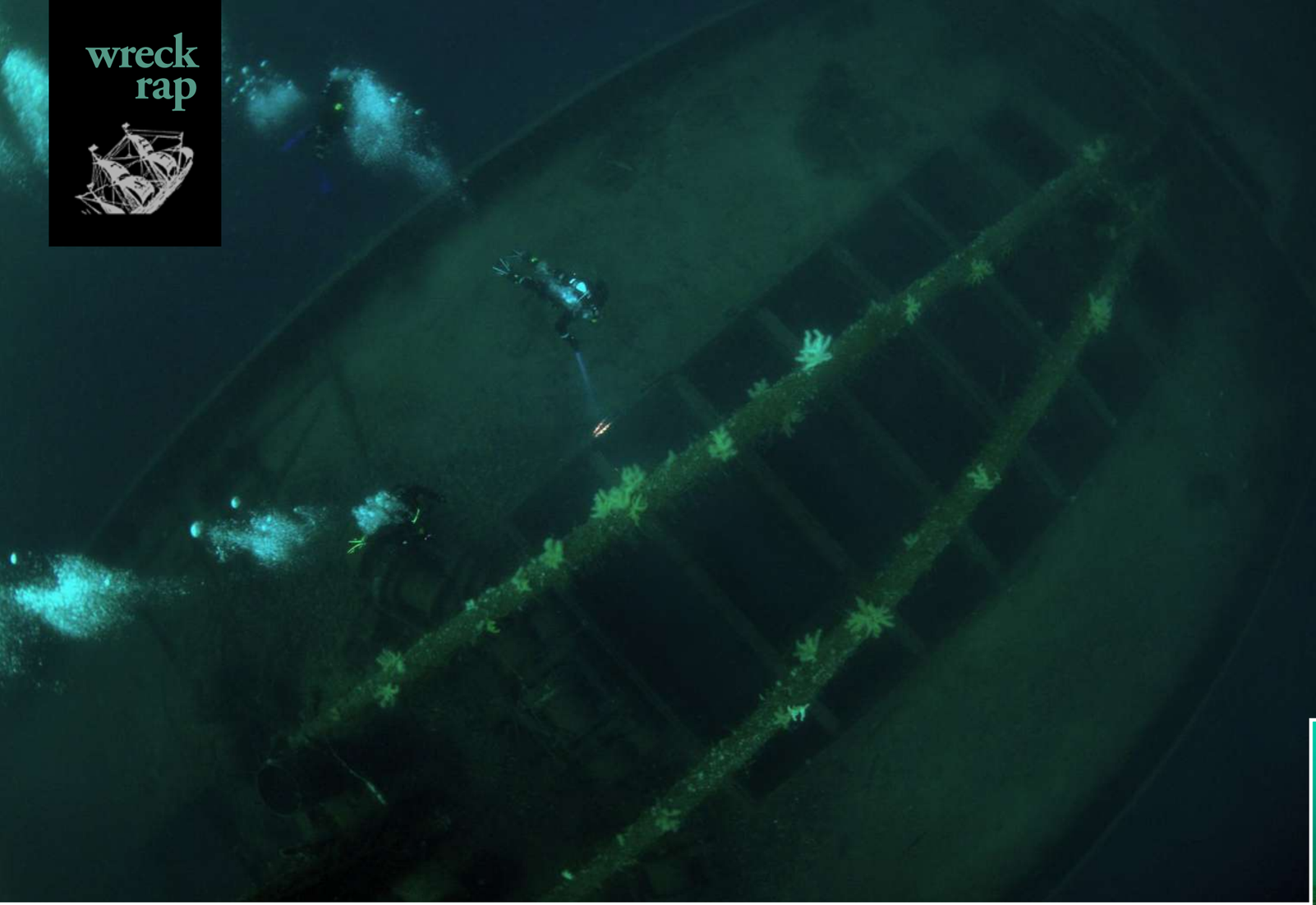
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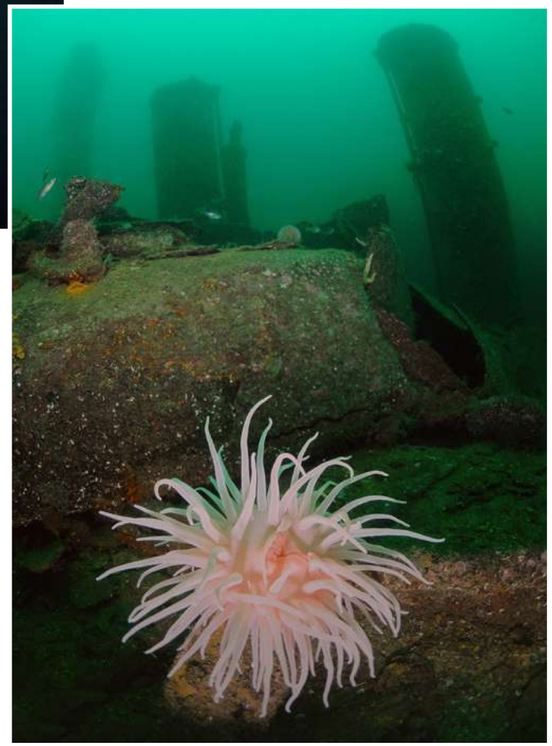
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Seen from above, the huge dimensions of *Frankenwald* dwarf the divers. On deck, there are a number of interesting details to be found all over the wreck, including some big, pink anemones (below)





missioned by the German shipping company HAPAG (Hamburg Amerikanische Paketfahrt Aktiengesellschaft, or Hamburg-America-Linie) in 1918. They had a very close relationship with the shipyard, being one of the investors along with the engine manufacturers Gutehoffnungshütte and AEG.

From 1921 to 1923, Deutsche Werft built no less than ten freighters in what was to become known within HAPAG as the Wald class. The shipyard was remarkably efficient, and during WWII, they turned out a total of 113 Type IX and XXIII U-boats for the German Kriegsmarine.

Apart from *Frankenwald* the Wald class consisted of the ships *Niederwald, Steigerwald, Westerwald, Wasgenwald, Idarwald, Kellerwald, Schwarzwald, Spreewald* and *Odenwald*. They were all similar in construction and tonnage, even though only two of them were actual sister ships. HAPAG also incorporated two ships they had bought abroad in the Wald class—*Sachsenwald* and *Grünewald*.

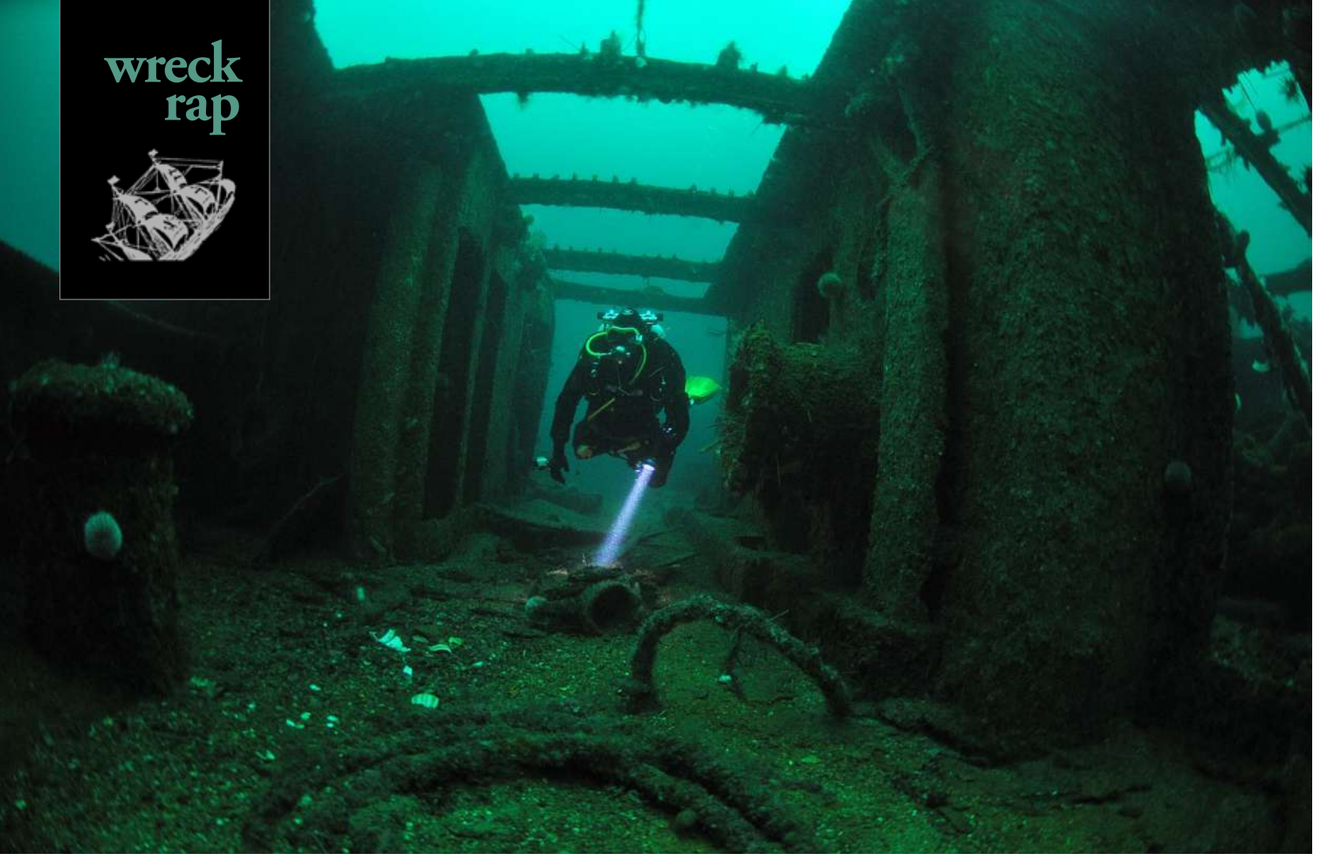
Only two of the Wald class ships were to survive WWII. *Odenwald* and *Schwarzwald* were scrapped in 1949 and 1963. The others fell victim to submarine attacks or mines.

Seconds from disaster

Back in Steinsundet, Captain von Frankenberg, the First Officer and the two pilots are intensely focused. On a northern approach the narrow strait makes a sharp turn to port, and *Frankenwald* needs the entire shipping lane to make it safely through. Not wanting to overtake the smaller vessel in front of them—a fishing boat—at the narrowest point, half speed is ordered. Not only does the presence of another vessel limit *Frankenwald's* room to maneuver, but the heavily loaded freighter is also more exposed to wind and current at low speed.

The pilots and officers had anticipated a northerly current through the strait, but





Swimming through the galleries on the stern is exciting, and there are plenty of things to see. There are good opportunities for wreck penetration, but there's a lot of silt inside. Be careful and remember your bottom time

instead it was pushing hard to the west. Captain von Frankenberg suggests to the pilot that they should turn ten degrees port, surprised they have not already done so. He is worried about the turning radius and the heavy cargo, which gives *Frankenwald* an average draft of eight meters. Only then does the pilot react and calls out the order—port rudder.

For a few seconds nothing happens. The ship does not come around! Von Frankenberg assumes command, and ignoring the pilots, he orders full port rudder. The command is repeated correctly by the 53-year-old helmsman, Emil Förster, but again nothing happens. Pushed further by the current, they are getting dangerously close to Brattholmen on the starboard side. Von Frankenberg realizes what is about to happen and orders full speed ahead in an attempt to regain control of the ship. It is too late.

German steel meets Norwegian rock

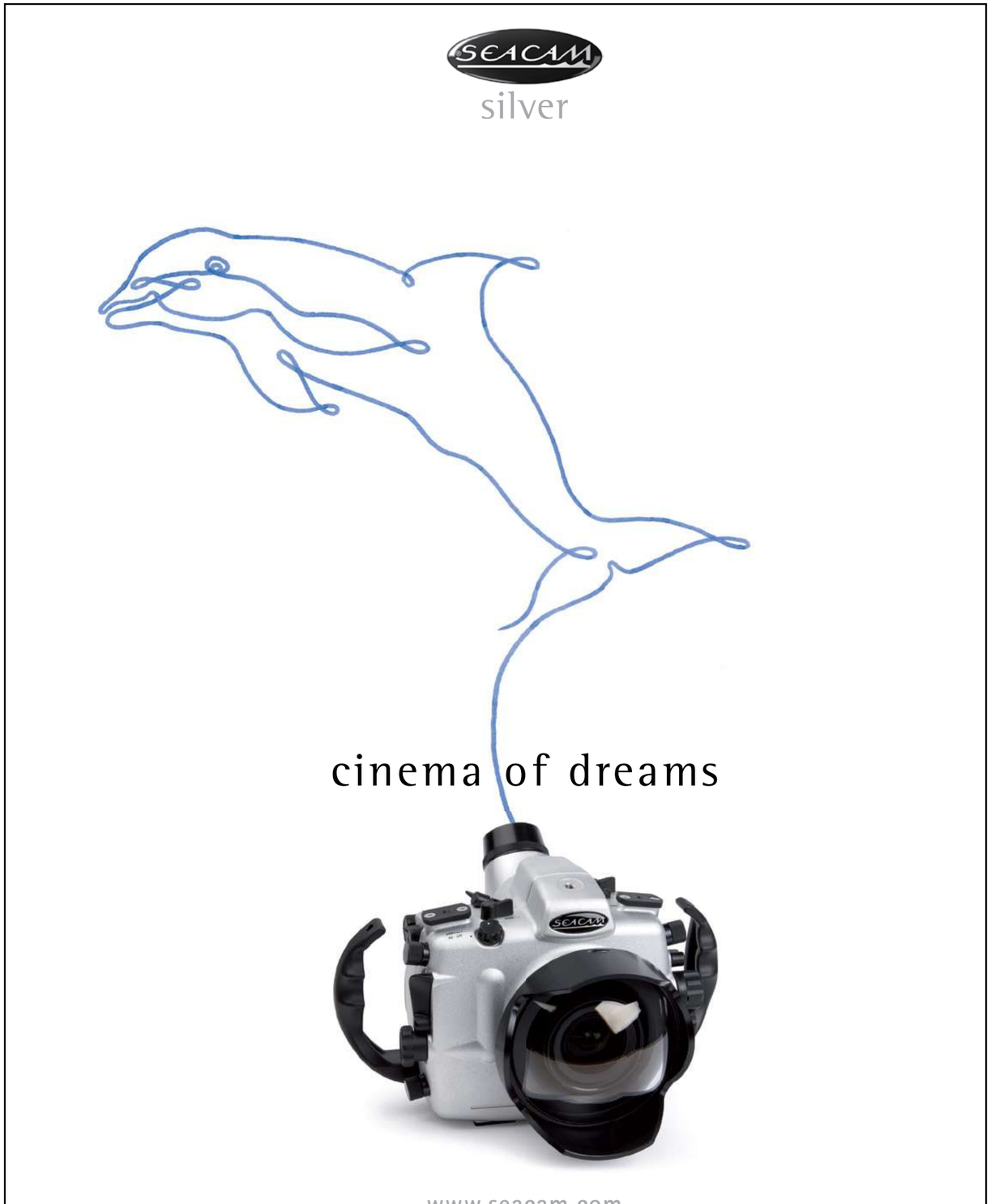
Frankenwald runs aground on Brattholmen, and her belly is torn up, not far behind the bridge. She is slowly starting to come around, but then she hits bedrock for a second time. It is severe, and the freighter is doomed. The sound of German steel crashing into Norwegian rock must have been deafening, and the entire ship shakes violently.

The engine room immediately reports that water is flooding in. A wireless SOS signal is transmitted and picked up by Bergen Radio about 50 miles (78 km) further south; the torpedo boat *Brand* is dispatched to the stricken freighter.

About ten minutes later, the lights goes out. Fearing the boilers might explode, Captain von Frankenberg sounds the alarm—one long and three short bursts. Three of the four lifeboats are lowered (one has been damaged in a collision earlier), and the crew of 48 leaves *Frankenwald*. They are picked up by nearby fishing boats.

The first officer later reported that the ship was left in “good order”. A radio transmitter, a suitcase and a seaman's bag were the only things salvaged, along with the ship's log, bridge log and engine maneuver log.

Frankenwald drifts into a calm bay and sinks in deep water (40+ meters) about one and a half





AFT AND FORE: The stern (below) is very much intact, while the bridge (right) and wheelhouse have partly collapsed over the years



hours later.

When the torpedo boat from Bergen arrived at the scene, it was all over. They returned with the *Frankenwald* crew, who shouted, "Long live the torpedo boat crew!" when they were safe at the dock and under the care of the German consul. Captain von Frankenberg later wrote that all Norwegians they were in touch with were extremely helpful and accommodating. The relationship between Norwegians and Germans probably was a lot better than three months later, after the German attack on Norway.



Local suspicion and rumors

A maritime inquiry was held in Hamburg on 16 January 1940, under the watchful eye of Oberlandesgerichtsrat Dr. Reinbeck and no less than five captains and an administrative assistant. In short, the pilots were blamed for the ship running aground. In the eyes of the inquiry board, they should have anticipated that the ship might be pulled off course by the current.

The captain and officers of Frankenwald were acquitted, and the shame remained in Norway. There was no mention in the maritime report that any of the pilots were present at the proceedings, which seemed to have been an all-German affair.

The Norwegian newspaper

Bergens Tidende reported two days after the accident that *Frankenwald* also had rudder problems earlier on her journey, and icily stated that they understood it was the same helmsman responsible at the time *Frankenwald* ran aground.

After the accident, rumors soon started to circulate. It was speculated that *Frankenwald* was actually heading north, and that the route, ship and cargo seemed mysterious. Locally, it was said that *Frankenwald* possibly had unloaded somewhere in the Sognefjord, but no evidence to support this was produced.

When looking at the position of the wreck, it is indeed very difficult to understand how *Frankenwald* could have ended up where she is. It seems much more likely that she was heading north, but the statements made in the maritime inquiry firmly contradict this. The data given on the direction of winds and currents



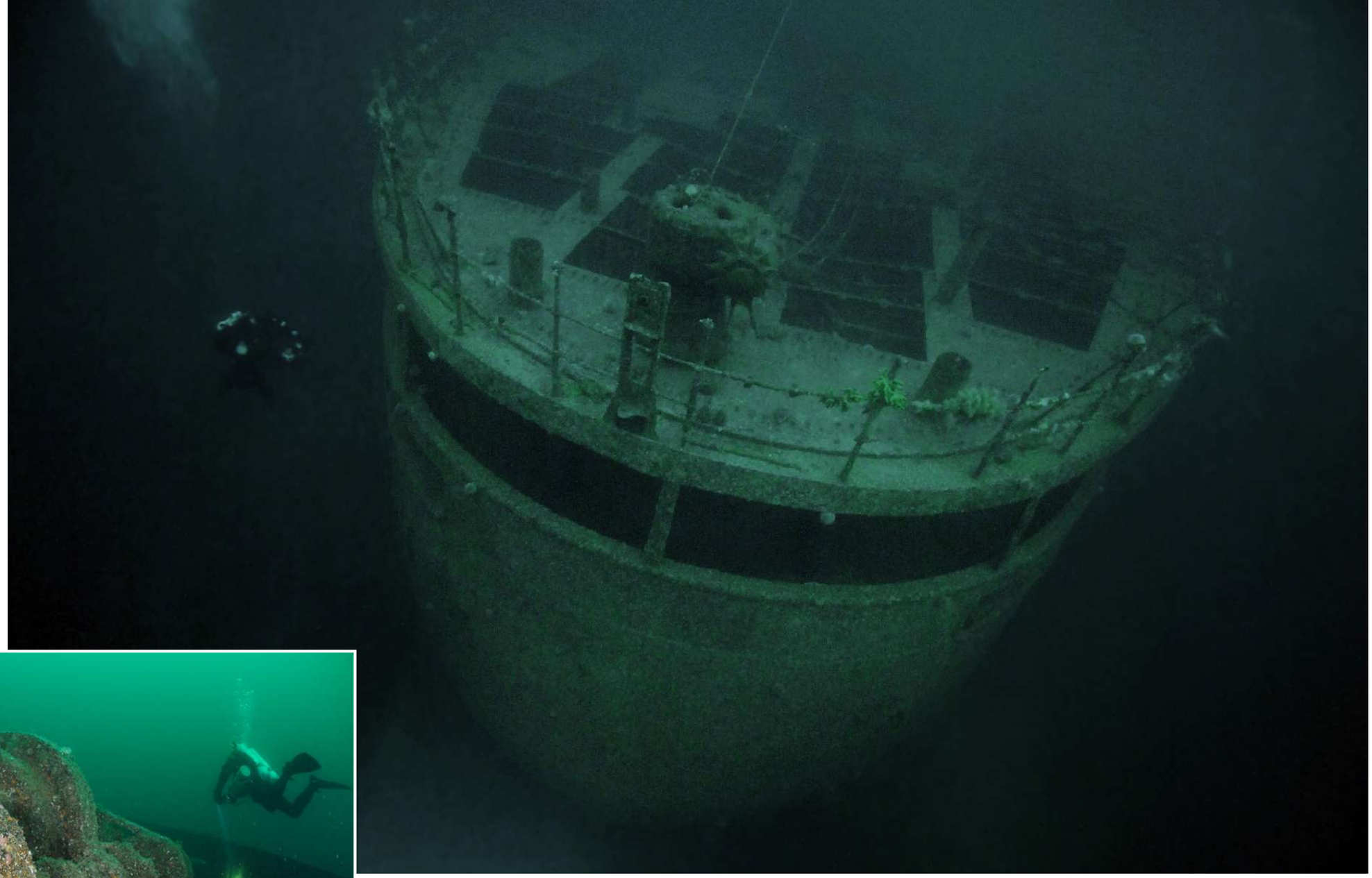
The stern is a magnificent sight, almost resembling the conning tower of a giant submarine

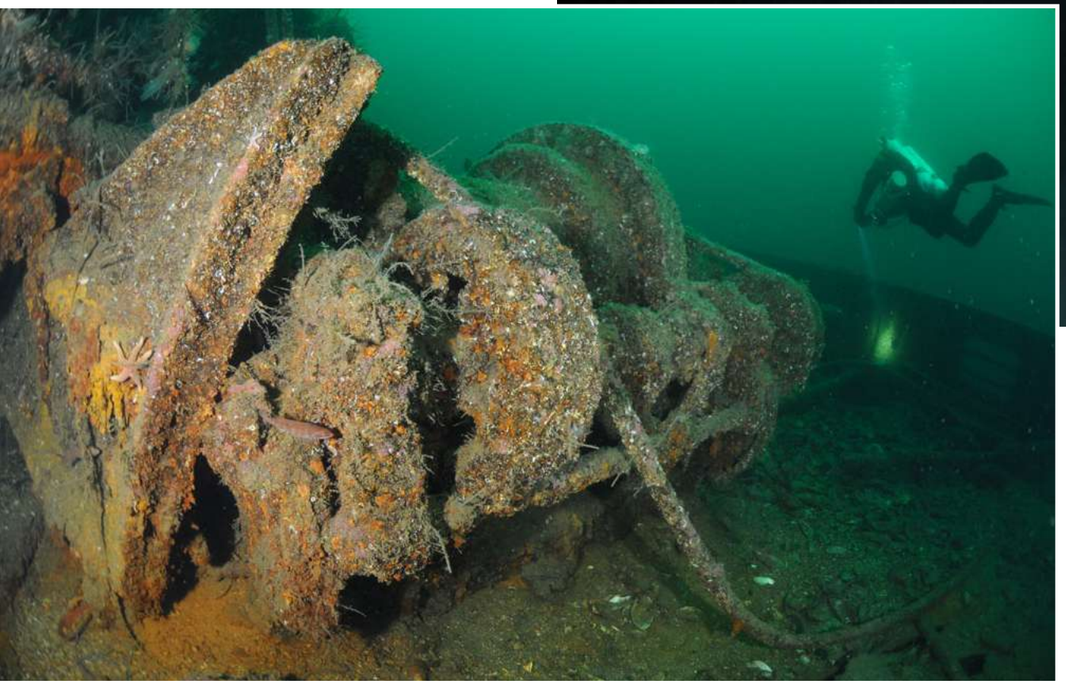
BELOW: Huge winches are found at the foot of both the masts. They were used to operate the 12 loading booms, which are still on the wreck

support the location, and there seems to be no misunderstandings or discrepancies in the captain's report.

Locally, questions were also raised regarding the cargo *Frankenwald* was carrying. Today, the holds seem mysteriously empty—in fact, divers who have been down there to investigate state that there is nothing to be found.

The salvaging company Brødrene Anda raised the steel propeller and the anchors in the 1950s, but there is no record of them salvaging any cargo. Still, this would have been entirely possible; the magnetic iron ore was fine-ground and could have been sucked up with pumps and hoses. This would not have been a high-paid job, but good enough during times of little work. It would also explain the total lack of damage on the wreck—the booms are still in place over the open cargo holds.





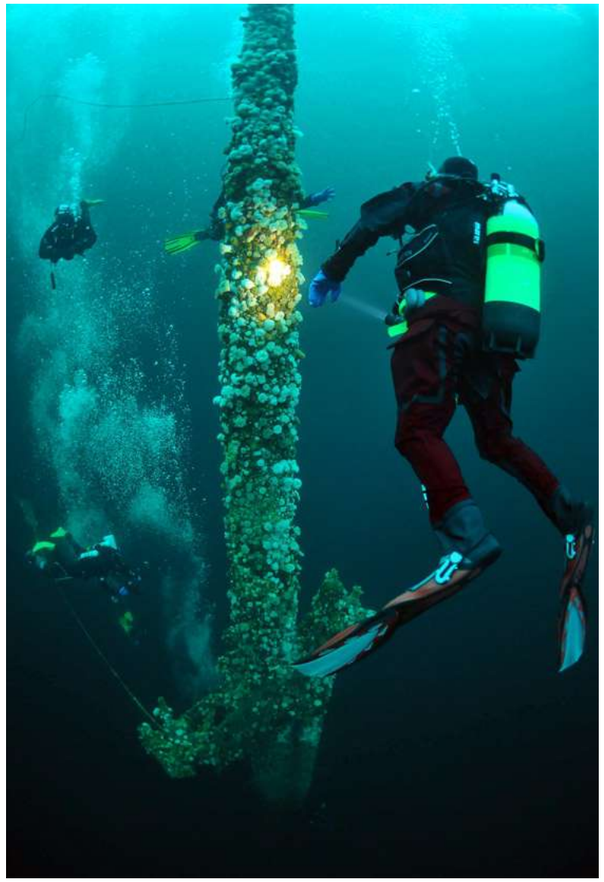
Voted "Norway's Best Wreck"

Even if the story of *Frankenwald* may be somewhat mysterious, there is no doubt as to what happened three months later; war broke loose in Norway on 9 April 1940, and both Norwegians and Germans had other priorities. *Frankenwald* was left to her own devices in her wet grave, and with the exception of the salvage work, she was left alone until sport diving gained popularity a few decades later.

In the last 30 years or so, *Frankenwald* has been visited by thousands of divers. Some of them were souvenir hunters who unfortunately have helped themselves to some of the treasures—but there are still many interesting things to see.

The wreck is in remarkably good condition, even after 70 years on the bottom. *Frankenwald* actually looks largely intact, and even the masts are still standing. This is due to the wreck being in a very sheltered location, and the fact that she is upright on the bottom.

In 2009, *Frankenwald* was voted "Norway's Best Wreck" by the readers of the Norwegian dive magazine, *Dykking*. Competing with wrecks all



The aft mast on *Frankenwald* is completely covered in anemones and stretches to just 7m below the surface

along the Norwegian coast, *Frankenwald* was well ahead in the vote, and many people were expressing the great experiences they had diving the wreck.

Frankenwald truly is a majestic shipwreck—some even say it is a world class dive. Having visited her several times, it is hard not to agree.

To dive the *Frankenwald,* it is necessary to have a boat and surface support. There might sometimes be strong current at the surface, but usually it's calm down on the wreck itself. The nearby Gulen Dive Resort, a PADI and BSAC center, runs regular trips to *Frankenwald*.

A world-class wreck dive

The easiest access is to descend and ascend along the aft mast, which starts just seven meters below the surface. This provides an excellent starting point to dive both the stern and midship, and you might even reach the bow—but this might cause bottom time problems unless you dive on something other than air. Although a little more challenging, it is possible to start and end the dive on the foremast.

In any case, *Frankenwald* is so big that several dives are required to explore the entire wreck. The huge dimensions that come into view when you sink down along the mast are truly impressive—a giant shadow below you, big as a mountain.

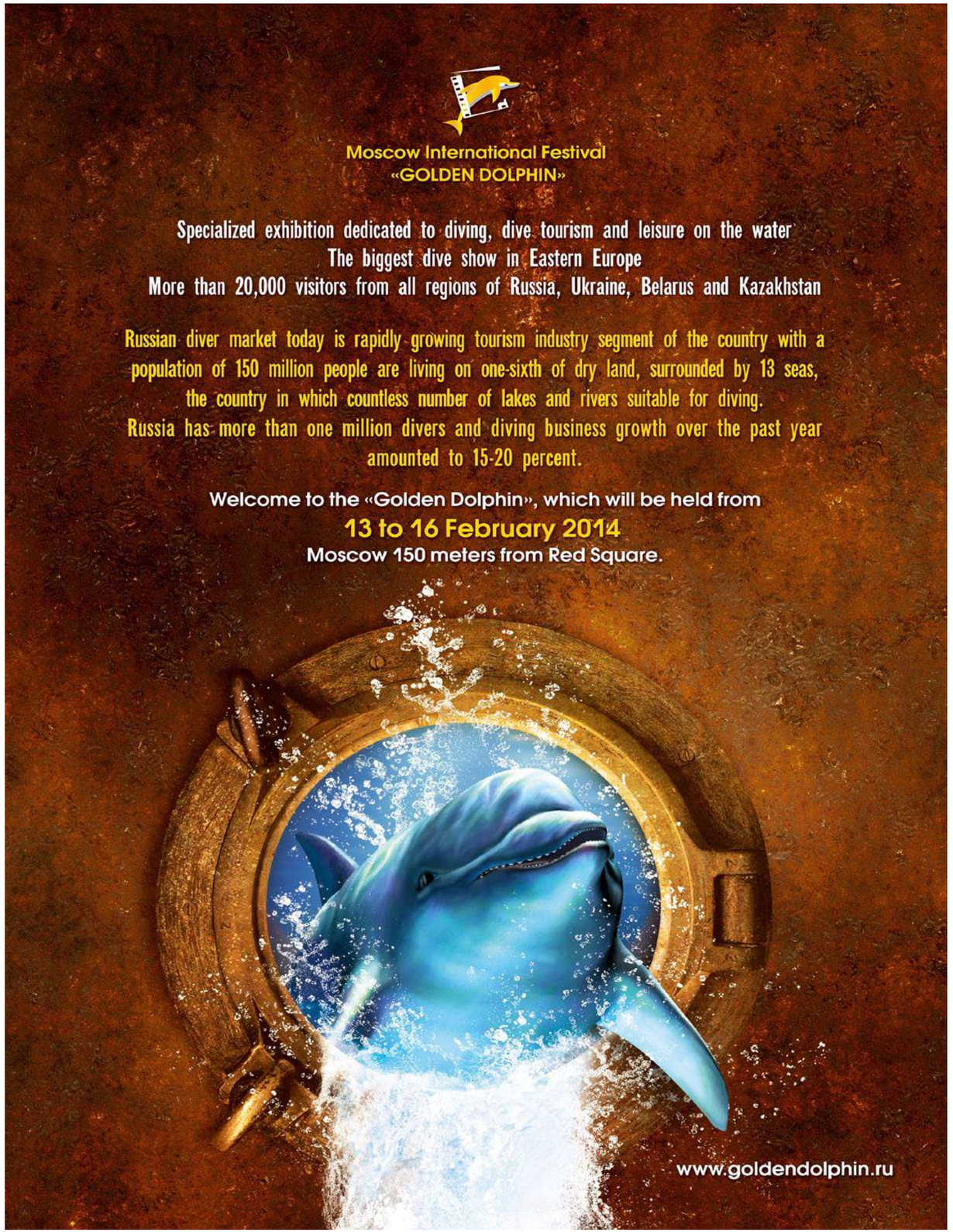
The stern is at about 24 meters depth, and all the way aft, you will find the remains of the jury rudder. The railings are embellished with colorful dead men's finger soft coral, and the stern is beautifully intact, apart from the wooden deck, which is all but consumed by shipworm. This is not a disadvantage—it provides an excellent view to *Frankenwald's* innards.

The enormous steering gear can be seen below the remains of the upper deck, and the different compartments and passageways almost form a labyrinth. Several gas tanks are leaning up against one of the walls, and it is easy to penetrate what is left of the superstructure without any great risk—there is no roof.

Swimming through the galleries on either side of the aft superstructure is a great experience. After you pass the huge bollards, you should swim through one of the openings aft and out into the water. When you turn around, you are met by what is perhaps the most stunning view of the whole wreck. The stern looks almost like the conning tower of a giant submarine, with two elongated openings at the top.

Another great way to get to this spectacular sight is to sink down along the side of the hull just in front of the aft superstructure and swim through the opening between the hull and the rudder where the propeller used to be—all that remains is the cut-off axle. It is deep, but when you are heading back up, you get to see the majestic stern in all its beauty.

Sometimes pollock are schooling above the stern and around the aft mast. The current can sometimes be quite strong, but normally it is just a slow drift. The mast that stretches towards the light on the surface creates a fairytale-like ambience, a taste of a lost world. It is not hard to understand why some divers come back again and again. *Frankenwald* is simply magical.



wreck rap

Even after 74 years on the bottom of the ocean, *Frankenwald* is still largely intact. Even the railings at the stern are still standing



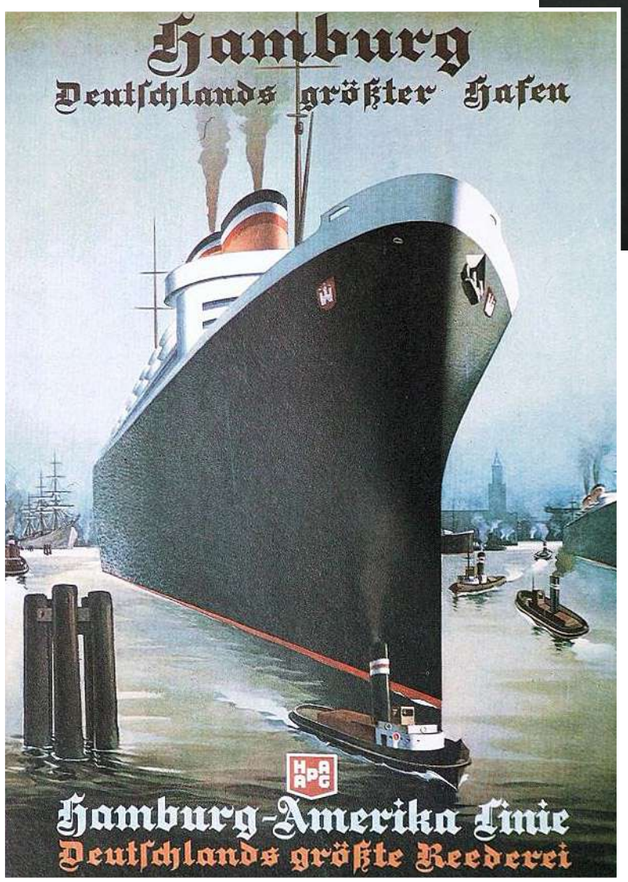
Huge holds, but no cargo

In front of the aft superstructure, ladders on either side of the ship lead down to the main deck where two of the four main holds are located. Huge winches are placed below the mast, which is fitted with six booms—three pointing forward and three towards the stern.

The loading booms are intact and lay over the ghostly, open holds. Looking down only reveals empty darkness, even when aided by a powerful torch. Where is the iron ore? If it was not salvaged, there could be some truth to the old rumors about the *Frankenwald* mystery.

It has to be said that iron ore is very heavy and does not fill much—and *Frankenwald* has huge holds. The 17m (54ft) width combined with an 8m (27ft) depth gives a total volume of 8,000+ cubic meters, if you assume that the four holds make up about half the length of the ship.

Iron ore weighs about two tons per cubic meter (according to online sources) which means *Frankenwald* should have had about 4,000 cubic meters of cargo—almost half her volume capacity. This means there must have been a salvage operation at some point. If not, the rumors surrounding *Frankenwald's* cargo and direction of travel might have some truth to them.



Historical poster featuring the *Frankenwald*

Galleries and penetration

When swimming further forward on the wreck passing the second hold, the superstructure amidships soon comes into view. The ladders lead up to the second deck, and you can choose to swim above the superstructure or go through the gallery on either side along the main deck. On the second deck, the empty davits of the lifeboats are standing as silent witnesses to the drama that was played out here on a Saturday evening in 1940.



Most divers choose to do the deepest swim along the main deck first, and then go shallower along the second deck when they return. The superstructure can easily be penetrated, and this is where access to the boilers and engine room is found. There is a lot of silt inside the wreck, so penetration must be done with extreme caution—and naturally, only by

FACT FILE: S/S *Frankenwald*

SUNK	6 January 1940
DIMENSIONS	122 x 17 x 8 meters (399,6 x 54,2 x 27,4 ft.)
TONNAGE	5062 GRT (4478 tons below deck, 3013 net tons)
BUILT	1922, build no. 26 from Deutsche Werft AG, Hamburg, Germany
ENGINE	3-cylinder triple expansion steam engine yielding 346 NHK (nominal horsepower) or 2.850 IHK (indicated horsepower) delivered by Gutehoffnungshütte Sterkrade AG in Oberhausen. Steel propeller, speed 11 knots. T3cy 26 3/16" & 43 3/8" & 70 15/16" stroke = 47 5/15"
CALL SIGN	RDBP, changed to DHTB in 1934, according to Lloyd's register of shipping.
OTHER	Built in steel, 2 masts with 6 booms each, 2 decks, 5 holds. The length of the fo'c'sle (forecastle) is 40ft. *Frankenwald* was equipped with Wireless DF, Sub Sig, electric lights and was fitted for oil.
DEPTH	7–44m (the deck is at 24-34m)
LEVEL	Intermediate to advanced
POSITION	By Brattholmen in Ytre Steinsund, Sognefjorden on Norway's west coast.
DIVE CENTER	Gulen Dive Resort
WEBSITE	www.divegulen.com



View from above of the bow of the *Frankenwald*

BELOW: The bow of the *Frankenwald* is also a majestic sight. It's a little deeper than the stern, giving divers less bottom time. Still, it's worth a visit!

divers with proper equipment, experience and training.

Further forward is a third, smaller hold that was used for the coal needed to keep the ship running. In front of this is the main superstructure. The bridge and wheelhouse has collapsed, and only about half of the walls remain on the upper deck. The main deck is still in good shape as well as the cabins for the crew and captain. If you penetrate one of these cabins, there is an amazing sight waiting for you—a bathtub, a toilet and a mirror that is still hanging on the wall.

On the fo'c'sle

The forward part of *Frankenwald* is just as interesting and beautiful as the stern. In front of the wheelhouse, there are two more open holds, and the foremast is still standing. Even here the loading booms are intact, laying over the holds as if they are just waiting to be hoisted by the deck crew. There is no sign of any cargo or salvage work here either.

On the 40ft-long fo'c'sle (forecastle) everything is intact, and it is difficult to grasp that the ship ran aground and sank; from above, everything looks perfectly all right. The bollards are ready to accept mooring lines, the hatch to the chain locker up front is open, and the windlass and powerful winches seem to be ready to spring into action.

If you have the time and opportunity, *Frankenwald's* bow is also a majestic sight. If you sink all the way to the bottom at 45+m, she towers over you just like on those old HAPAG posters. It is not hard at all to imagine the waves foaming at the straight bow while the crew is making ready on the deck. *Frankenwald* must have been a great sight in her heyday.

It is important to mind your time when exploring the bow section. The deck lies at 34m, and bottom time passes quickly. Before you know it, you may have serious decompression commitment, especially if you took your time getting here. It is wise not to try and explore all of *Frankenwald* on one dive. You will get a much better experience by splitting it up into several dives and concentrating on smaller parts of the wreck. You can easily do four to five completely different dives on *Frankenwald*—that is how big the old lady is.

An explosion of life and color

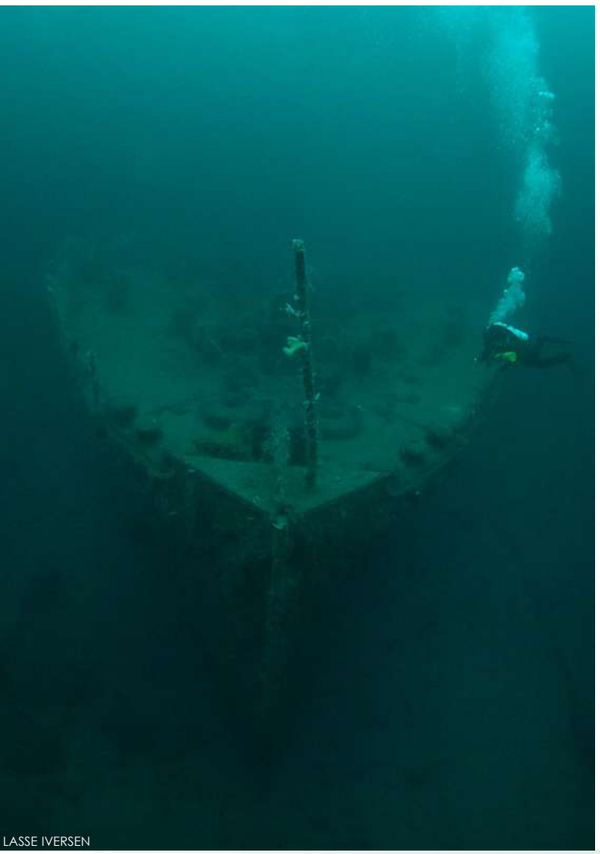
The wreck lies just deep enough for it to have relatively little fouling. Apart from some huge, pink anemones, sea squirts and some dead men's fingers, it is relatively untainted. Bright red starfish and sea urchins have made galleries, railings and other features their home, and the little white tubes of bristle worms are everywhere. I have even found scallops on the deck several times, and I still wonder how they get there.

When you are leaving the wreck along the aft mast, you only have to ascend a few meters before anemones are blooming, completely covering the huge pole. It is a beautiful sight in itself, and it also creates hiding places for a multitude of little fish and other animals.

Blennies, pipefish and decorator crabs are just a few of the species divers regularly encounter on the mast, and if you are lucky, you might even come across a bright red lumpfish steadfastly protecting its orange-yellow ball of eggs. Tiny ghost shrimp fence with their claws to catch food in the current, and incredibly colorful nudibranchs also find their way up here, far above the deck.

Many underwater photographers have been agonizing over that fact that it is impossible to change lenses underwater when they discover the teeming life on the mast. But let me leave you with no doubt—*Frankenwald* is most definitely a wide-angle dive! ■

Christian Skauge is an award-winning underwater photographer based in Oslo, Norway. For more information, visit: ***Scubapixel.com***



LASSE IVERSEN



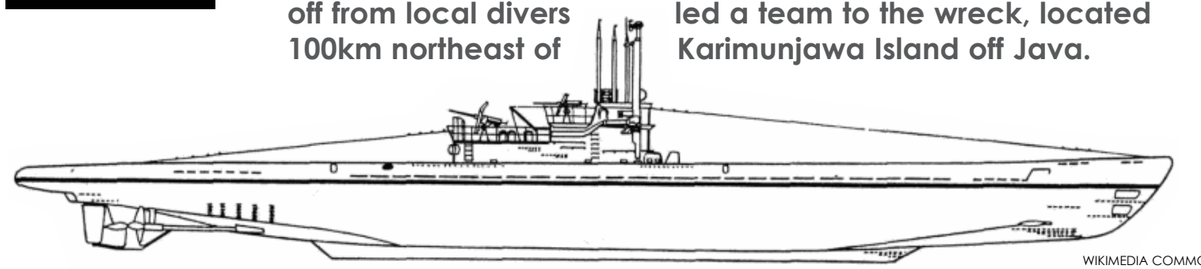
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wreck rap

WWII German U-boat discovered in Java Sea

Indonesian divers have discovered the wreck of a WWII German U-boat, with 17 skeletons of its crew still aboard. A tip-off from local divers led a team to the wreck, located 100km northeast of Karimunjawa Island off Java.



WIKIMEDIA COMMONS

Initial research concluded the sub to be a U-168, a hunter-killer of the German 'Kriegsmarine' that claimed several Allied vessels before being sunk by torpedoes in 1944. Numerous artifacts were also recovered including dinner plates bearing swastikas, batteries, binoculars and a bottle of hair oil.

"This is the first time we have found a foreign submarine from the war in our waters," said Bambang Budi Utomo, head of the research team at the National Archaeology Centre that found the vessel. "This is an extraordinary find that will certainly provide useful information about what took place in the Java Sea during World War II." However, he said it was unlikely to be raised due to its sheer size and the cost involved.

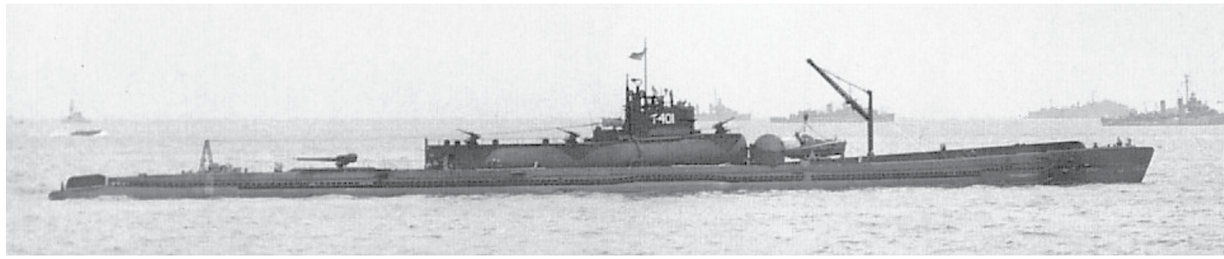
Commanded by Captain Helmuth Pich, it sunk three Allied vessels in three missions—one British, one Norwegian and one Greek freighter. Coming under fire from Dutch submarine HrMs *Zwaardvisch* on 6 October 1944, it was lost around 1:30 A.M. with 23 German submariners aboard. Captain Pich survived, along with 26 other crew hands.

The sub was a type IX C/40 launched in March 1942. Monsun U-Boats operated out of the Dutch East Indies, Jakarta and Sabang between 1943 and 1945. The subs were utilized in the region to cut supplies from Asia to Britain by attacking allied ships along trade routes. Japan occupied Indonesia during World War II, which was then known by its colonial name of the Dutch East Indies. ■





Last Japanese WWII mega-sub located



WIKIMEDIA COMMONS

The WWII-era Japanese submarine I-400, scuttled in 1946. The Hawaii Undersea Research Laboratory at the University of Hawaii discovered the I-400 by chance in 2,300 feet of water off the southwest coast of Oahu, according the school

The Japanese submarine was among the largest submarines of World War II, able to carry aircraft and could travel one-and-a-half times around the world without needing to refuel.

The I-400 was one of five Japanese submarines captured by the U.S. Navy at the end of World War II and sent to Hawaii for examination. After the Americans completed their inspections, the submarine was scuttled in the waters off Kalaeloa near Oahu in Hawaii to prevent the technology from being made available to the Soviets who were demanding access to them.

The submarine was only relocated agin in August 2013 by the Hawaii Undersea Research Laboratory at the University of Hawaii, but the laboratory did not notify the public until after informing the U.S. State Department and the Japanese government, the university said.

UW aircraft carriers

The Sen Toku I-400-class Imperial Japanese Navy submarines were submarine aircraft carriers able to carry three Aichi M6A Seiran bomb-carrying aircraft underwater to their destinations. The submarines were designed to surface, launch their planes, then quickly dive again before they were discovered. They also carried torpedoes for close-range combat. The I-400-class was designed with the range to travel anywhere in the world and return. ■

travel news



Edited by
Scott Bennett

Archaeological diving parks to open in Greece

Both parks located near Pylos in the southwestern Peloponnese. Wrecks date from Roman, Byzantine and medieval periods.



After a joint decision between the Ministries of Culture and Mercantile Marine, Greece has announced the creation of its first two diving parks. Located near Pylos in the southwestern Peloponnese, both will enable visitors the opportunity to explore ancient shipwrecks and underwater archaeology.

The first park is located at the islet of Sapientza, where archaeologists discovered the remains of ancient trading vessels dating to the Roman, Byzantine and Medieval periods. Although the ships' hulls have long since disintegrated, their cargo remains scattered across the seabed, including granite pillars from the Middle East, amphorae and stone sarcophagi.

The other is situated to the north in the Bay of Navarino and features a number of 19th century shipwrecks. These include the remains of three Turkish ships sunk by allied British, Russian and French forces during the Battle of Navarino in 1827. The battle was a vital engagement in the Greek War of Independence and the last major naval engagement to be fought entirely with sailing ships. In addition, the tanker *Irene Serenade* sunk here in 1980 and is one of largest shipwrecks in the world accessible to visitors.

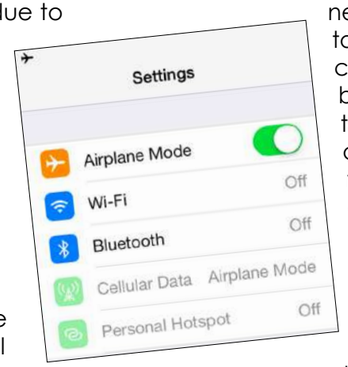
According to Marketing Greece, a representative for the Greek tourism industry, the parks are due to be open by the summer of 2014. ■

Now you may also use your electronics during take-off and landing

The U.S. Federal Aviation Administration (FAA) and the European Aviation Safety Agency (EASA) have both recommended that most devices should be allowed as long as they are in airplane mode.

The European Aviation Safety Agency (EASA) approval of the use of electronic devices during take-off and landing follows United States' Federal Aviation Administration's ruling in October that personal electronic devices such as e-book readers, tablet computers and portable games consoles could be used "during all phases of flight". Mobile phones will also be allowed, as long as their cellular radios are disabled or they are put into "airplane mode".

Larger electronic devices, such as laptop computers, will need to be stowed during taxiing, take-off and landing due to their bulk.



The devices will have to remain in 'Flight Mode' or 'Airplane Mode' and transmitting capabilities will have to be disabled. It will be to the discretion of each airline to use this guidance and change its policy. In this case, the airline will have to inform the aviation authority of the country in which it is registered.

Next – Bluetooth, wi-fi, mobile phones

EU Transport Commissioner Siim Kallas has asked the EU's Aviation Safety Agency (EASA) to accelerate the review of the safe use of transmitting devices on board - with new guidance to be published in the coming months.

In general, airlines do not currently allow phone or Wi-Fi connection from the time the aircraft doors have closed until the aircraft has arrived at the gate, and the doors are open again.

Connecting to the network is, today, only possible in specially equipped aircraft that are able to connect you with a network (this can be permitted at cruising altitude). In those cases, a passenger does not connect to the ground network, but to a safety certified onboard system. There are only few aircraft equipped at the moment, but we may expect this to expand in the coming years. Where aircraft are equipped to provide this service, the Commission has recently taken telecoms decisions to enable the provision of 3G and 4G to provide better connections for transmitting devices. ■

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Donsol whale sharks make comeback

Philippines tourist town reports rise in shark interactions. Area renowned as one of world's whale shark hotspots.



The World Wide Fun Nature (WWF)-Philippines has reported a marked rise in interactions with the giant fish in Donsol in the final quarter of 2013, resulting in increasing tourist numbers.

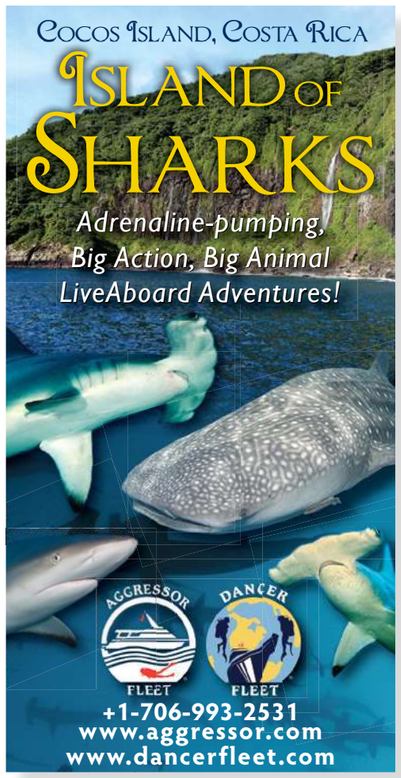
"For two years now, whale shark sightings in Donsol have been scant during the normal December to May season. In October 2012, however, we noticed they came early. This November, we have been posting more and more interactions," said Donsol boat association president, Lambert Avisado. "It seems that our Butandings have returned, but that they have changed their schedules," he added.

"We saw this drop in numbers once before, about 12 or 13 years ago," according to Butanding Interaction Officer (BIO) association president, Joel Briones. "Since there were few whale sharks that year, tourist numbers plummeted. Since early November, however, we have recorded almost daily sightings. Word is getting around. Tourists are starting to arrive," he added.

Fluctuations in shark numbers have dictated the success and failure of local tourism. Historically, Donsol's whale shark season has coincided with planktonic blooms.

"Whale sharks congregate in Donsol because of all the food," said WWF-Philippines Project Manager Raul Burce. "Plankton blooms occur when nutrients are discharged by Donsol's rivers. To ensure that the Bay remains healthy, we must protect Donsol's rivers," he added.

Three hundred eighty whale sharks have been identified in five years of WWF research in the area. For years, Donsol has been renowned as a whale shark hotspot, hosting one of the world's largest whale shark aggregations. Under normal circumstances, peak season tours promise from four to six assured interactions per trip. ■





India's first live-aboard to do volcanic diving

The *Infiniti*, India's first liveaboard yacht, has been launched, opening up avenues for scuba divers to explore the waters of the Andaman Islands. A part of India, the Andaman Islands are one of the world's newest diving destinations. After a 50-year period of virtual isolation, the Indian government has decided to allow limited, environmentally conscious tourism development in the islands. Situated 200 kilometres away from the nearest Asian mainland, only 26 of the 576 islands are inhabited.

Constructed in Thailand under the close supervision of the Royal Institution of Naval Architects (RINA) from Italy, the 40m vessel features luxuriously appointed guest rooms with ensuite bathrooms, an indoor dining room, kitchen, a diving platform and multiple relaxation areas including a large sun deck and lounge.



The *Infiniti* liveaboard is India's first

Diver numbers will be limited, offering a more intimate experience.

Included in the itinerary is Narcondam Island in the Andaman Sea. An extinct volcano, the island was immortalized by diving pioneer Jacques Cousteau, who was the first to dive in these waters. Now a wildlife sanctuary, its extreme remoteness and number of endemic species has long captured the imagination of travellers and explorers. With fringing reefs, steeply sloping walls, coral pinnacles, plus the unusual jet-black volcanic walls of Barren Island, the Andamans has something for every diver. ■

For more information, visit: ***infinitiliveaboard.com***

Irish Underwater Trail

Planned Blueway Trail will allow participants to snorkel in safe, controlled environments.

Mention snorkeling and Ireland isn't a destination that exactly leaps to mind. Despite possessing some 4,000 miles of coastline, the perception of Irish water as being cold and murky isn't exactly encouraging for snorkellers. However, the Irish Underwater Council hopes to dispel that notion with its planned Blueway Trail. Featuring a network of 'free water trails' at individual sites, people will be able to participate in activities such snorkelling and kayaking in a safe, controlled environment.

80 clubs

With a total of 80 diving clubs around Ireland, the council is seeking to increase the number of snorkellers nationwide. "We have really looked at snorkelling as next adventure sport," said Louise Gilligan, a full-time administrator and diver with the Underwater Council. "It's fun and family friendly. You could learn snorkelling with your children," she added.

The Blueway now has Fáilte Ireland, the Ireland Canoe Union and three rural development companies on board, as well as the National Trails Office. A total of five sites, five canoe trails and snorkel trails were chosen on the Mayo–Galway coastline, with an official launch planned for early in 2014.

Risk assessments have been conducted on the sites and signage is currently being worked on. It is hoped local guides will be utilized to bring people on guided snorkels. During a trial on Achill island during the summer, 350 people paid for guided snorkel trails over a two-month period, confirming interest in the sport. ■



Get your tickets now for the TEK Party of the Year!

Plans continue apace for May's TEKDiveUSA 2014. On Friday night (May 16) there is going to be a big party and BBQ at the Courtyard Miami Aventura Mall (the official TEKDiveUSA hotel).

"I am really excited about this," stated Rosemary E Lunn, event co-organiser. "The EUROTEK and OZTek parties always go down a storm. Where else do you get the chance to hang out with global leading explorers, divers and speakers?"

At US$29.95, tickets are selling fast via **www.tekdiveusa.com**, and everyone who is coming to this advanced and technical diving conference has already booked their BBQ tickets. It promises to be a not-to-be-missed awesome evening.

Rumour has it that Light Monkey has challenged Lust4Rust to a cook-off.

All the speakers and exhibitors are staying onsite at the Courtyard Miami Aventura Mall. If you want to join them, simply book your room via the TEKDiveUSA website. You will benefit from a great rate of US$139 per night for one or two guests. This rate also includes a continental breakfast, parking and Internet access. Please note that you can *only* get this price via the TEKDiveUSA website.

There will be something for every hungry diver wanting to know more at TEKDiveUSA 2014. If you want to hear about adventures from today's foremost explorers and expand your diving horizons, secure your weekend pass for US$129.95 now via **www.tekdiveusa.com.** ■



Roddenberry Dive Team and X-Ray Mag go to Fiji — Join Us!

MATTHEW MEIER

WHAT: RDT and *X-Ray Mag* Fijian Adventure

WHEN: April 28 – May 8, 2014

WHERE: Volivoli Beach Resort in Rakiraki, Fiji

COST: US$3,399 per person based on double occupancy (round trip airfare included from LAX (Los Angeles) – Nadi, Fiji)

NOTE: 8-night trip (10 days including travel time)



Join Rod Roddenberry, the Roddenberry Dive Team, and *X-Ray Mag* for an eight-night tropical escape to Volivoli Beach Resort: April 28 — May 8, 2014.

Join Rod Roddenberry, the Rodden-berry Dive Team, and *X-Ray Mag* for an eight-night tropical escape to Volivoli Beach Resort. We will explore some of Fiji's most famous and exhilarating dive sites in Fiji's Bligh Waters and the famous Vatu-I-Ra Passage. Divers will see first hand why Fiji is known as the "soft coral capital" of the world!

Professional photographer and *X-Ray Mag's* contributing photographer and editor Matthew Meier will also be on hand offering underwater photo workshops and image critiques to help improve your underwater photographs.

Divers will have the option of adding a day trip to Beqa Lagoon for their world famous shark dive (at an additional cost).

This wonderfully relaxed and remote beach resort is located in a truly unspoiled and spectacular corner of Fiji. The white sandy beaches, turquoise water, mangroves and coral reefs are just waiting to be explored. Divers and non-divers will enjoy this coastal escape with the perfect blend of relaxation, water sports, cultural activities, village tours, spa appointments and sunbathing on the beach and by the pool.

The trip is escorted by Jennifer Black of the Roddenberry Dive Team and Matthew Meier of *X-Ray Mag*. ■

For full trip details, please visit the RDT Events page at: ***http://roddenberrydiveteam.com/events/events.html&emode=M&E=159&2771***

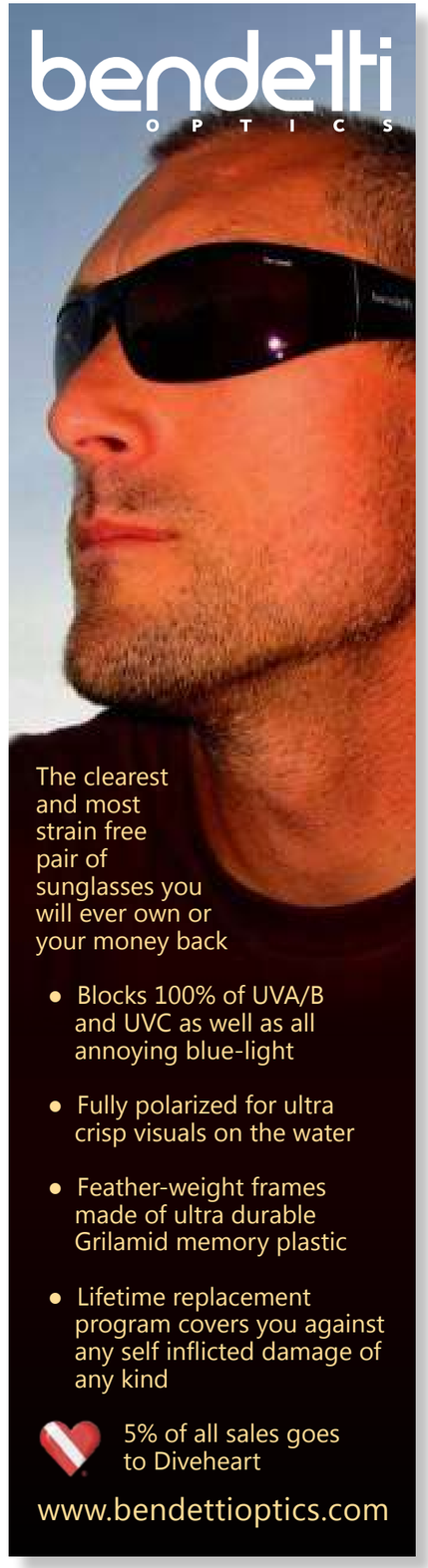
Contact RDT at: ***diveteam@roddenberry.com***



MATTHEW MEIER

THIS PAGE: Scenes from Fiji's lush coral reefs; Rod Roddenberry of RDT (upper right inset)

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Cuba

Gardens of the Queen

Text and photos by Matthew Meier





A pair of Caribbean reef sharks swimming over the colorful coral reef, Gardens of the Queen



Longspine squirrelfish hiding inside a purple tube sponge

RIGHT: Strolling on one of Cuba's picturesque beaches.

PREVIOUS PAGE: Aggregation of blue tangs and doctorfish feeding on the coral reef, Gardens of the Queen, Cuba



Cuba

As the wheels touched down at Havana's International airport, the plane erupted with cheers and applause. Many of the passengers on board had waited years, if not decades, to return home and visit relatives in Cuba. As part of a small group of Americans visiting for the first time, I knew immediately that we were in for a special treat. Traveling on permits from the U.S. Department of Treasury, we were embarking on a People to People Educational Exchange program, focused on ocean conservation, research and ecotourism—the first of its kind to allow U.S. citizens to legally travel and scuba dive in Cuba.

Our adventure began in Havana with three days of sightseeing, meetings and educational field trips learning about Cuba's history and culture. Afterwards, we spent six days on a liveaboard dive boat at the Gardens of the Queen (also known as Jardines de la Reina) exploring the uninhabited archipelago of small islands 50 miles south of Cuba's main island in the Caribbean Sea.

As we walked the streets of Havana, it felt like I had stepped back in time. Classic American cars from the 1950s and early 60's were a constant reminder of a bygone era. Men gathered under large shade trees in city squares to discuss sports on a lazy afternoon and locals assembled around games of checkers and dominos on marble park benches or an apartment stoop. The newsstand still had *Life* magazine for



American crocodile floating on the surface with its mouth open







Baroque facade of the Gran Teatro (left), one of the world's largest opera houses; A 1938 Chevy drives down the street in Havana (top)



sale on the bookshelves, and all around the city, building facades were carved in intricate detail. This was life as perhaps my parents remembered it, long before I complicated matters.

Mixed in with the nostalgia were reminders that Cuba is still a socialist country, struggling with their proud revolutionary history and capitalistic desires for a better life. Images of Fidel Castro and Che Guevara dot the landscape and armed soldiers stand constant guard at the Revolutionary Museum. Meanwhile, subtle signage on side streets, advertise businesses, such as hair salons and restaurants, inside private homes. These slowly opening doors to private capitalism are part of the small reforms put in place by Fidel's brother Raul since he was handed power in 2008.

Havana has a pulse to it that is mesmerizing. I am certain that part of the allure was simply being in a place that we had been told our entire lives was forbidden. However, from the live music coming out of doorways and the Cuban jazz on rooftop bars, to the hustle and bustle of the locals going about their



Street vendor's books on display along Calle Obispo (left); Erected in 1995, the seven story mural of Che Guevara adorns the Ministry of the Interior building just off Revolution Plaza (above); Detail of spire on Gran Teatro (right); Chicken fajitas with plantain garnish at Ivan's Restaurant, a private home converted into a local eatery (bottom left)





Night scene of Central Park, the Capitol, Gran Teatro, Hotel Inglaterra and Hotel Telegrafo



Cuba



daily lives, there is an energy you can feel. There is also a dichotomy that comes from seeing modern art deco structures next to baroque, intricately carved building facades that are hundreds of years old. Add in fortresses with working cannons, Cuban cigars, rum, exceptional food and friendly people, and you have a fantastic melting pot of experiences.

An American and Cuban cultural icon, Ernest Hemmingway, lived in Cuba from 1940 to 1960 and is still widely revered. His former home, Finca La Vigia, is now a museum, maintained as it was left upon his departure. His books remain required reading for Cuban school children. Novels *For Whom the Bell Tolls* and *The Old Man and the Sea* were written while living in Cuba, the latter earning him a Nobel Prize for Literature in 1954. Hemmingway dedicated the award to the citizens of the fishing village of Cojimar, the setting for the story. We toured the village and it was fascinating to see his inspiration in person and realize that the old man was likely based on a real fisherman and drinking buddy of Hemmingway's.



Cuba and Havana are still struggling to rebuild from the economic downturn encountered when the Soviet Union collapsed in the early 1990s. Years of electrical blackouts and limited fuel to run machinery or automobiles brought about food shortages and desperate times for a people accustomed to state provided nourishment and health care. Tractors gave way to ox and plows, and cars were replaced with horse-drawn carriages, as the infrastructure was ignored and left to decay in the tropical heat.

Fortunately, signs of rebirth and restoration were prominent during our visit. Scaffolding, providing face-lifts, surrounded many of the iconic buildings in old Havana. Cobblestone streets were torn up for new plumbing lines, and large cranes could be seen from the roof of our hotel. With over 3,000 structures in Old Havana of historical



CLOCKWISE FROM ABOVE: A man rolls Cuban cigars at Ron's Tabaco Cafe, Fortaleza de San Carlos de la Cabana; Built in 1646, this fort sits in Cojimar, the town that inspired Ernest Hemmingway's *The Old Man and the Sea;* A 1956 Ford Fairlane driving down the Paseo de Marti; Living room inside the house at the Hemingway Museum, Finca La Vigia, San Francisco de Paula; Farmer on horse-drawn cart brings fresh milk to a local restaurant on the road from Havana to Jucaro



1956 Chevy parked at Hemmingway Museum



University of Havana research vessel, *Felipe Poey*, anchored off the Gardens of the Queen while on a three-week research trip; Cuban flag (inset) flutters in the wind, while in the background the sun rises over a tropical island in the Gardens of the Queen; Housing (right) built into the hillside in the sustainable community of Las Terrazas



significance—the majority of which date back to the 19th, 18th and even the 16th and 17th centuries—resurrecting them all will be no easy task.

Marine research and educational exchange

While in Havana, we met with a scientist from the University of Havana's Center for Marine Research. Founded in 1970, the center is responsible for training all marine biologists in Cuba. The scientist showed us an impactful ten-part public service announcement campaign created by the center, which highlighted the connection Cubans have with sharks, turtles, eagle rays, marine pollution, etc, in their surrounding ocean. We had discussions regarding some of their ongoing conservation research, including work with sharks, sea turtles and a five-year study on manatees.

As part of the manatee study, researchers were able to verify evidence of a manatee traveling from Florida to Cuba through photographs and also create a tagging and tracking program to study the local population's migration patterns. Additionally, they found that none of the manatees that were documented had propeller scarring on their backs like their Florida counterparts, perhaps in part due to the limited number of boats allowed to operate off Cuba's coast.

The lack of available watercraft also serves as a hindrance for student research. The University has but one boat and limited funding for sending scientists out to sea. We were able to tour that lone research vessel and talk with some of the researchers on board while out at the Gardens of the Queen. The boat, named after famed Cuban scientist Felipe Poey accommodates 17 passengers and three crew members. There is one shared head on board, and everyone sleeps in lawn chairs on the deck.

As part of the permit that allowed us access to Cuba, these people-to-people educational exchanges were required but also very enlightening. We learned that conservation and the environment are viewed in a very positive light in Cuba.

The government requires environmental permits for all businesses; they are reviewed annually and may also be revoked. Science directs politics in establishing policy and also aids in the creation of a National Environmental Strategy, which is improved upon every five years, based on analysis of the success and failure of the previous plan. Each new design focuses on reforestation, the reduction of pollution both on land and in the sea, and the protection of biodiversity.

Several of the scientists we spoke with also emphasized the importance of collaboration between the U.S. and Cuba on environmental issues. One even went so far as to declare the environment as a national security issue—especially with regards to marine pollution and species preservation, as we all share the same ocean.

In order to see some of this environmental conservation in action, we spent a day at Las Terrazas, a sustainable development community and ecotourism settlement situated roughly an hour west of Havana. Las Terrazas is part of the Sierra del Rosario, a nearly 100-square-mile expanse of pristine Cuban wilderness, which has been recognized as a UNESCO world biosphere reserve.

Started in 1967 as a government reforestation project—following years of land clearing for a coffee plantation, and later, charcoal—the roughly 1,200 residents have replanted over eight million trees, encompassing 24 different species. The surrounding hillsides are lush with vegetation once again, and the villagers utilize conservation-minded sustainable practices to ensure they stay that way. Our guide led us on a tour of the grounds where we visited a primary and secondary school, community center, library, movie theater, restaurants, a hotel and Cuba's only zip line facility. Local musicians entertained us during lunch, as peacocks and chickens wandered around the grounds. Afterwards, we called on a resident artist's studio to see world-class eco-conscious paintings and handicrafts depicting climate change.



Peacock on the grounds at Las Terrazas





Colonies of red mangroves (left) grow in the shallow water between islands; Cuban hutia (above) climbing in the bushes at the edge of a sandy beach, also known as tree rats; Late afternoon cloud formations (right), indicating a pending rain storm, gather over a tropical island in the Gardens of the Queen



The Gardens of the Queen

Our journey from Havana to the Gardens of the Queen began at 4:30 in the morning with a five-hour bus ride through the countryside. Along the way we passed mountains, farms, small towns and miles upon miles of sugar cane, which is used to make Cuban rum. In the fishing village of Jucaro, we boarded the boat that would be our home for the next six days and spent another five hours traveling across the Gulf of Ana Maria and the Caribbean Sea to the Gardens of the Queen. The transit provided time to get settled into our rooms, assemble dive gear and camera housings and perhaps grab a short nap to make up for the early wake up call.

The Gardens of the Queen National Park was established as a marine protected area (MPA) in 1996. Consisting of over 250 coral and mangrove islands stretching across 75 miles of the Caribbean Sea, the park has a total area of over 830 square miles. Catch and release sport fishing is allowed within the 386-square-mile fishery reserve but otherwise, with the exception of lobsters, the area is a complete no take zone. Additionally, visitation is limited to a mere 1,500 combined fishermen and divers per year. Birds, iguanas, hermit crabs and hutia occupy the islands, the latter being a medium sized rodent that nests in trees and is affectionately called a tree rat. The park is part of the Cuban National System of Protected Areas and is managed as an area of special care for special use.



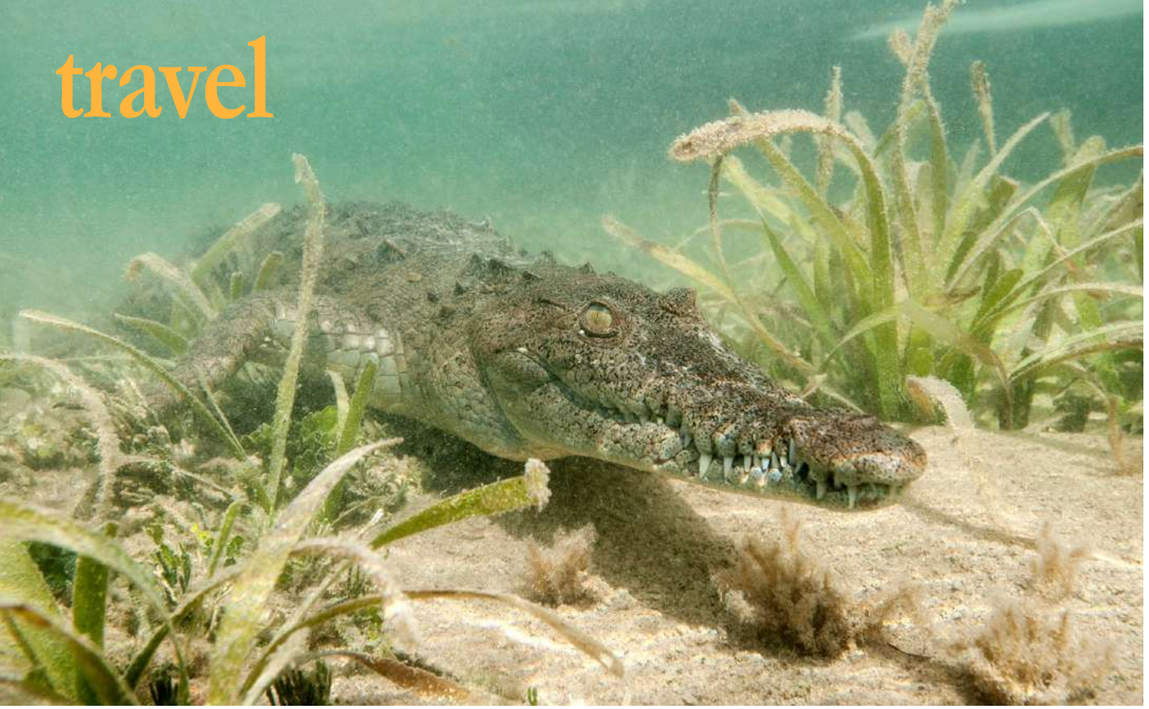


Field of sugar cane in the Cuban countryside along the route from Havana to Jucaro; Children play volleyball (right) on a cement playground at a local school in the fishing village of Jucaro; Cuban iguana's resting on a sandy beach (far right)



Diving

The next day, as I gently slid into the water, I thought of all the technology necessary to allow us humans to survive in the underwater world and how truly out-of-our-element we are beneath the surface. I then warily scanned the sur-





rounding sea grass for a prehistoric creature that has been living in harmony with water since the days of dinosaurs. The trepidation and excitement of being up close to an American crocodile was palpable. It is not every day that you come face to face with a living fossil.

As I cautiously made my first approach, the crocodile glanced in my direction and then lazily shut its eyes, as if already bored with our meeting. As I drew closer, the eyes opened once again, and it allowed me a few tight portraits before slowly rising to the surface for a breath of air and a scan of its surroundings. Thankfully, I had a few more opportunities to photograph the crocodiles, and those interactions were one of the highlights of my trip, but they were only the first of many big animal encounters while in Cuba.

We were fortunate to have Caribbean reef sharks swimming with us on nearly every dive. Rarely have I been in the water with sharks that did not turn and swim in the other direction in reaction to divers, but here, they ignored us and continued on their path. The same could be said for the large number of groupers found on the reefs. I saw several variations of black grouper, along with tiger grouper and the endangered Nassau grouper, and for the most part, they were also indifferent to divers. In addition to the reef sharks, we had a couple dives where we hung in blue water beneath the boat as a dozen or more silky sharks swam circles around us. The sharks were attracted to the scent of a single fish placed in a steel box hung beneath the boat, and they stayed with us for over an hour providing terrific photo opportunities and exciting interactions.





CLOCKWISE FROM TOP LEFT: American crocodile resting on the sandy bottom amongst the sea grass; A dozen or more silky sharks swimming below the dive boat; Black grouper with dark, marbled patterning; Silky shark swimming in the blue water near the water's surface

Healthy reefs

The coral reefs in the Gardens of the Queen were the healthiest I have ever seen in the Caribbean. Everywhere you looked the corals, sea fans and sponges were incredibly robust, in great variety and thriving with fish life. Larger species such as tarpon, barracuda and snapper were a common sight and accompanied the many schools of grunts, tangs and creole wrasse on the reef.

The icing on the cake for me was at



The sun is visible above this colorful coral reef, which is covered with sea rods, sea fans, sponges and hard corals

a dive site called Paradise Reef where we found huge colonies of beautiful elkhorn coral. These mainly shallow water corals are threatened and endangered throughout their range, and in some areas, their abundance has declined by 95 percent.

The Gardens of the Queen was Cuba's first MPA, and its creation required the establishment of fishing licenses and an enforcement office, as well as the creation of jobs and retraining for the displaced fishermen. Many of those fishermen are now employed as sport fishing guides, boat drivers and dive guides within the MPA. The area has been highly successful, as the ecosystem is abounding with healthy corals, large quantities of fish and marine life and abundant apex predators such as sharks and grouper. The evolution took time, yet the fishermen who are still fishing outside the reserve are realizing the benefits of an increased fish catch from the spillover effect, and the former fishermen are receiving comparatively higher wages by working in the tourism industry.

The success can be partially attributed to the parks location 50 miles offshore, the lack of commercial fishing, limited access and impact and effective enforcement. The Gardens now serve as an example for Cuba and abroad, touting the benefits of conservation and MPA's. Subsequently, the Cuban government has been creating more marine protected areas, with the ultimate goal of safeguarding 25 percent of their waters—the most of any country in the world. To that end, efforts are currently underway to expand the fishery reserve and protect the remainder of the Gardens of the Queen as a no take zone.





Nassau grouper swimming amongst several large sea fans on the coral reef; Diver and large pillar coral (right)

Tidal flow

Diving conditions and visibility at the Gardens of the Queen are dependent on tidal flow. The direction the tide is taking the sediment from the mangroves determines which dive sites are best for that time of day. While we were there, we typically had better visibility on our two morning dives and deteriorating visibility in the afternoons. We were also there at the end of the rainy season, which meant late afternoon thunderstorms but made for incredible sunsets. There was the possibility of seeing whale sharks on our trip, as they are found in

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Carolina DIVE SHOW
October 11 & 12, 2013
(Friday & Saturday)
CarolinaDiveShow.com

Baltimore/D.C. DIVE SHOW
January 25 & 26, 2014
(Saturday & Sunday)
BaltimoreDiveShow.com

TEXAS DIVE SHOW
February 22 & 23, 2014
(Saturday & Sunday)
TexasDiveShow.com

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Cuba

CLOCKWISE FROM FAR LEFT: Diver and aggregation of French grunts, bluestriped grunts and porkfish; Schoolmaster hiding amongst the roots of mangroves; Diver and colony of elkhorn coral in shallow waters; Southern stingray foraging in sea grass on the sandy bottom



the area around the full moon in October and November but unfortunately we struck out.

Diverse ecosystems

On a few of our surface intervals we had the chance to snorkel amid the mangroves and surrounding sea grass. I found several species of corals and anemones that I had not seen on the outside reef, along with upside down jellyfish, sea stars, sting rays and plenty of juvenile fish seeking protection in the mangroves root structure. At one point, I was staring face to face with a three-inch barracuda, quietly cursing the fact that I did not have a macro lens on the camera.

While the mangroves serve as a nursery for many species of fish, the deserted beaches of these remote islands serve as critical nesting sites for hawksbill sea turtles. Thankfully,



Cuba no longer harvests turtles as a commercial entity and stopped trying to export hawksbill turtle products in 2008. We saw a few turtles on our dives, and hopefully, that means their population is doing well.

As if the crocodiles, sharks and beautiful reefs were not enough, the Gardens of the Queen also harbors a healthy population of critically



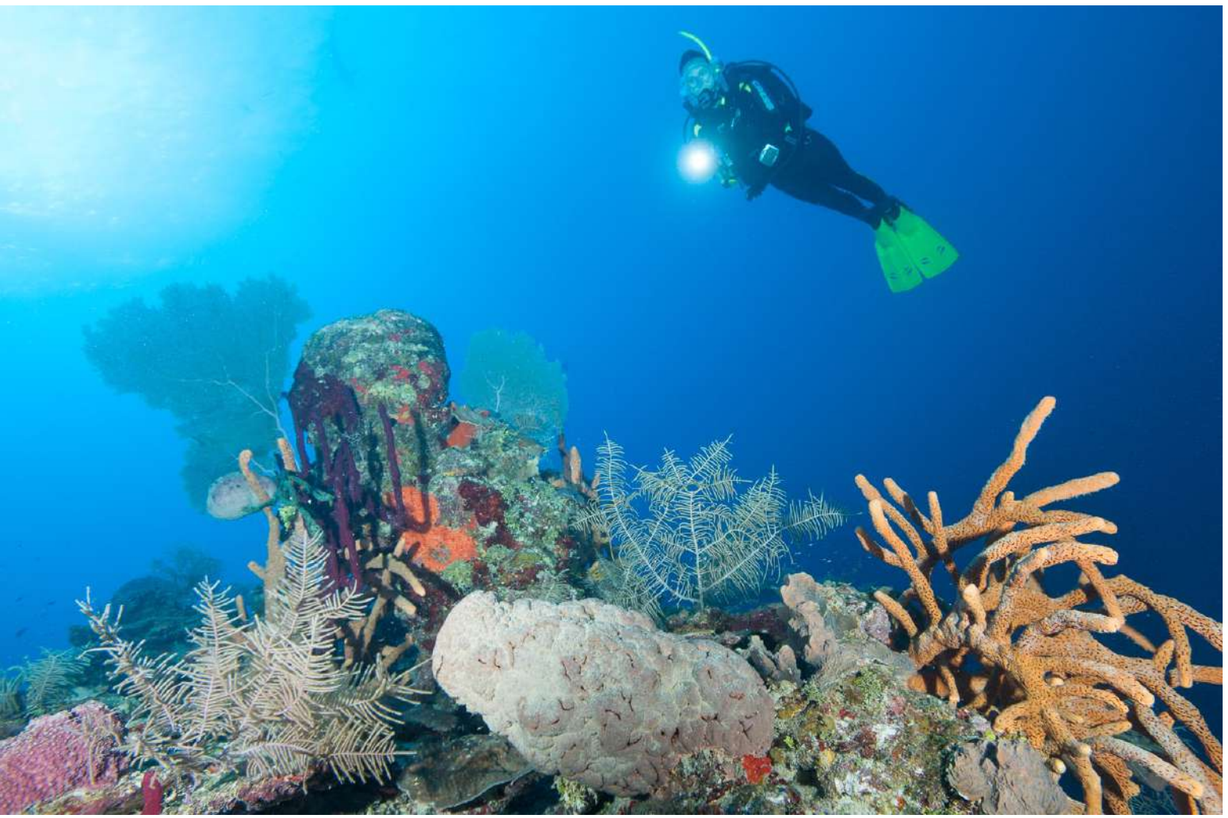
endangered Atlantic goliath grouper. These fish can grow to a length of eight feet and are considered mature at a weight of 400 to 800 pounds. We were treated to a couple of fish in the 400-pound range, along with a smaller youngster that was still intimidating in size.

These impressive fish are very inquisitive and circled us throughout the dive. On several occasions, the larger grouper produced a guttural booming sound to warn the smaller one when it had apparently got out of line. The explosion of force could be felt in the water column, and the concussion sent up a cloud of sand from the grouper's gills.

Marine biologists from the University of Havana, along with scientists from abroad, are studying the Gardens of the Queen in hopes of determining why this ecosystem has remained so healthy while other areas around the world have suffered the effects of global warming. With luck the discoveries made here will help restore other areas to the pristine conditions we experienced on this amazing trip.



Goliath grouper swimming above a large purple barrel sponge on coral reef; Red cushion sea star (right) in shallow bed of sea grass



Diver at deep water pinnacle of sponges, sea fans and encrusting corals; Large colony of elkhorn coral (top)

Afterthoughts

Watching U.S. President Obama shake hands with Raul Castro at the memorial for Nelson Mandela, I am hopeful that the economic embargo will one day be lifted and all Americans may once again travel to Cuba. Until such time, I feel truly fortunate to have experienced Cuba, the city of Havana and the fantastic diving at the Gardens of the Queen.

If you are a U.S. citizen and would like to dive Cuba for yourself, please contact Ocean Doctor (Oceandoctor.org/gardens/)—the only organization with permits to take Americans to dive the Gardens of the Queen. If you are not a U.S. citizen, please contact the Avalon Cuban Diving Centers (Cubandivingcenters.com), as they are the sole dive operator at the Gardens of the Queen.

The author would very much like to thank Ocean Doctor and Avalon for their incredible hospitality and memories that will last a lifetime, as well as Blue Abyss Photo (www.blueabyssphoto.com) and Scubapro (www.scubapro.com) for their assistance with underwater photo and dive 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: ***www.matthewmeierphoto.com***



SOURCES:
OCEANDOCTOR.ORG/GARDENS
CUBANDIVINGCENTERS.COM
WIKIPEDIA.ORG
EYEWITNESS TRAVEL CUBA
MOON HANDBOOKS CUBA



fact file

Cuba



SOURCES: U.S. CIA WORLD FACTBOOK, XE.COM

History Cuba was home to native Amerindians before Christopher Columbus discovered it in 1492. When Columbus sailed into the Gardens of the Queen he named it for Queen Isabel. As Cuba developed as a Spanish Colony over the next several centuries the native population declined. During that time, large numbers of African slaves were brought over to work the sugar and coffee plantations. Cubans overthrew Spanish Rule following the Spanish-American War of 1898 and the Treaty of Paris established Cuban independence from the United States in 1902. Several governments ensued before Fidel Castro led a rebel army and took control in 1959. He ruled his socialist regime for nearly five decades before stepping down as president in February 2008 and handing the country over to his younger brother Raul. Government: Communist state. Capital: Havana

Geography Cuba is the largest island in the Caribbean and is located 90 miles (150km) south of Key West, Florida. The island has a total area of 42,802 square miles (110,860 square km), with 2320 miles (3735km) of coastline. Los Jardines de la Reina, or the "Gardens of the Queen", covers more than 837 square miles (2168 square km) and is one of the largest marine parks in the Caribbean. It is situated 50 miles (80km) south of mainland Cuba and is comprised of islands, reefs and mangroves. Coastline: 3,735km. Lowest point: Caribbean Sea 0m. Highest point: Pico Turquino 2,005m

Climate Air temperature can range from 75-80°F (24-27°C) during November to April and 85-90°F (29-32°C) during June to August with nighttime temperature dropping by roughly ten degrees. Afternoon thunderstorms are common during the rainy season, which is from May to October. Water temperature can range from 75-85°F (24-29°C) and a 3mm wetsuit is recommended for diving.

Economy Cuba has a socialist economic system but is slowly introducing limited reforms and expanding opportunities for self-employment. These measures are meant to increase enterprise efficiency and alleviate serious shortages of food, consumer goods, services and housing. The economic downturn in the 1990's, caused by the loss of Soviet aid and domestic inefficiencies, is still affecting the average Cuban's standard of living.

RIGHT: Global map with location of Cuba BELOW: Location of the Gardens of the Queen marine protected park on map of Cuba





Currency The official currency is the Cuban Convertible Pesos (CUC), which in slang is pronounced *kook*. One U.S. Dollar is currently equal to one CUC, however when exchanging dollars to CUC, you will only receive .87 CUC back in return due to fees/taxes. Those fees are not imposed on Euros, and therefore, there is a much better exchange rate for Euros when compared to the U.S. Dollar. U.S. based credit and debit cards will not work in Cuba due to the U.S. Embargo, and so travellers must carry enough cash to support themselves while there. Exchange rates: 1EUR=1.37CUC, 1USD=1CUC, 1GBP= 1.63CUC, 1CAD=.94CUC, 1SGD= .79CUC

Population Cuba has a population of 11 million people (July 2013 est.) of which roughly 85% are Roman Catholic. Over two million Cubans live in the capital of Havana. Conversely, the islands at the Gardens of the Queen are uninhabited.

Phone/Internet Satellite telephones, GPS units or Walkie Talkie handheld radios are forbidden by the Cuban Government and must be left at home. Due to the U.S. Embargo, Cuba has no working relationships between U.S. cell phone carriers, and therefore, cell phones will not work while in Cuba. Internet access is possible in Cuba, but it is tightly controlled, painfully slow and expensive. While at the Gardens of the Queen, Internet access is only available on the Tortuga Floating Hotel.

Language The official language of Cuba is Spanish. Though in tourist areas many people also speak English.

Voltage 110 volts, with U.S. standard 2- and 3-prong plugs are available on the liveaboard dive boats. UK/European two rounded plug sockets (220V) are available at the hotels in Havana. Adaptors are typically available at the higher end establishments.

Cuisine Cuban cuisine is simple and has a mixture of indigenous and European influences, mainly Spanish. Rice and black beans is a staple, along with fried plantains, which is served with pork or chicken. Beef and seafood is available at tourist restaurants but is not common for locals. Empanadas filled with meat are often served as snacks or appetizers. The menu on the liveaboard boat includes a variety of local dishes, fresh fruits and vegetables and American style breakfasts. Fresh fish and local lobster are also readily available.

Tipping A 10-15% tip is customary for shuttle drivers, dive guides and boat crewmembers, as well as wait staff in restaurants.

Health There is an intermediate degree of risk of food or waterborne diseases such as bacterial diarrhea and hepatitis, as well as vectorborne diseases such as dengue fever (2013).

Driving Vehicles travel on the right side of the road. An International driver's license is accepted for renting a car and you may also be able to use your home county's. The roads are generally paved and in good condition, though not necessarily well marked.

Decompression chamber
The nearest hyperbaric chamber is located at Guantanamo Bay Naval Station. There are no chamber facilities in the Gardens of the Queen.

DAN Insurance Coverage
Here's what DAN says: "Due to the embargo the US imposed on Cuba, we would not be able to pay/settle any claims for accidents while actually in Cuba. However, we would be able to evacuate a member from Cuba and transport them to a medical facility in which we would be able to pay claims as stipulated by the policy. If you have specific in depth questions, please feel free to contact our claims department. You may reach them at 1-800-292-8381."

Travel/Visa A passport is required for entry into Cuba. U.S. Citizens may not enter Cuba legally without special permits and permissions. Ocean Doctor's license issued by the U.S. Treasury Department provides legal travel for U.S. citizens and residents only while participating in their person-to-person educational trips.

Websites
Cuba Toursim - Canada
www.gocuba.ca
Cuba Toursim - UK
www.travel2cuba.co.uk

Cuba *Photojournal*

Text by Larry Cohen
Photos by Larry Cohen and Olga Torrey



LARRY COHEN



LARRY COHEN



OLGA TORREY



LARRY COHEN



OLGA TORREY



OLGA TORREY

THIS PAGE: Caribbean reef sharks (top right); Diver inspects hard corals that decorate the walls (top left); Trumpetfish on reef (lower far left); Squirrelfish, French grunt and anemones on reef (center left); Christmas tree worms can be spotted on the healthy reefs (above)

PREVIOUS PAGE: Diver photographing sharks on the reef

The Cuban government is environmentally minded. In 1996, the 837-square-mile marine area and archipelago of Gardens of the Queen located south of the main island of Cuba became a no-take reserve—the largest in the Caribbean—and in 2010 was designated a national park.

Christopher Columbus named this island chain in honor of Queen Isabel of Spain. The Cousteau crew visited here in 1985. It is also rumored that both Castro and Che fished and might even have dove these islands.


LARRY COHEN


Cuba

LARRY COHEN


LARRY COHEN


OLGA TORREY

The reefs of the park host an exceptionally healthy marine ecosystem. When visiting the dive sites you will witness lush coral forest with abundant fish populations. Many of the dive sites are walls that bottom-out at around 60 to 100-feet (18 to 30m). There are many swim-throughs and over-hangs to explore. Finding large tarpon and nurse sharks in these enclosed areas is common.

Along the walls the intrusive visitor from the Pacific, lion-fish are spotted in large numbers. By keeping a watchful eye in the sand, large southern stingrays can be found. Taking a closer look at the fauna, tiny feather duster and bristle worms can be spotted on the hard corals. Among the sea fans and sponges a variety of crabs and snails can be observed. Queen conch and other mollusk can be found in large numbers.

THIS PAGE: Cuban reefs are rich with soft corals and sponges (top left); School of porkfish (above); Bristle worms crawl over the hard corals (left); Diver observing a lion fish on the wall (far left)



LARRY COHEN



Cuba

LARRY COHEN



OLGA TORREY

Black grouper, Cubera snapper, mahi-mahi and tarpon are just a few of the reef residences that could be studied in open water. It is estimated there are 200 species of fish. This is due to the lack of human development and the fact that the area is protected. The area's terrain includes islands, reefs and mangroves, which provide habitat allowing marine life to thrive. All of this biodiversity brings in the big boys at the top of the food chain.

THIS PAGE: The walls are covered with soft corals and anemones (far left); Diver and Caribbean reef sharks (above); Cup coral (left)


OLGA TORREY

One of the most fascinating animals to observe was the American crocodile. The American crocodile is one of the few species along with saltwater crocodile that lives in saltwater. One nicknamed Franco was a regular visitor at Tortuga. This crocodile was about 20 feet (6.1m) long.

In the mangroves, it is possible to get in the water with a few young, small crocodiles. They were around six feet (1.8m) long but had plenty of sharp teeth. Most of their diet consists of fish, reptiles, birds and small mammals. They are not normally aggressive. This was a comforting thought, as we slid into the brackish water with our cameras and snorkels.


OLGA TORREY

THIS PAGE: Crab and French grunt on reef (above); American crocodile lunges in (top left); American crocodiles live in the Cuban mangroves (right)


OLGA TORREY

Barrel sponge on reef

Cuba

We were in only about 3.3 feet (1m) of water. The crocs were actually shy. They would stand on the bottom with their heads at the surface. Only a small profile of the top of their head and eyes was above the waterline.

It took some thrashing about in the water with our hands to get their attention. Once we did, they would come in quickly with mouths open. They seemed to be interested in their own reflections in our domes. We made sure we wore gloves and kept our hands on our housings' handles behind the domes. Documenting the American crocodile was addicting. Since no gas supply was needed, we spent hours in the water with this intriguing animal.


LARRY COHEN



LARRY COHEN



OLGA TORREY



OLGA TORREY

Cuba

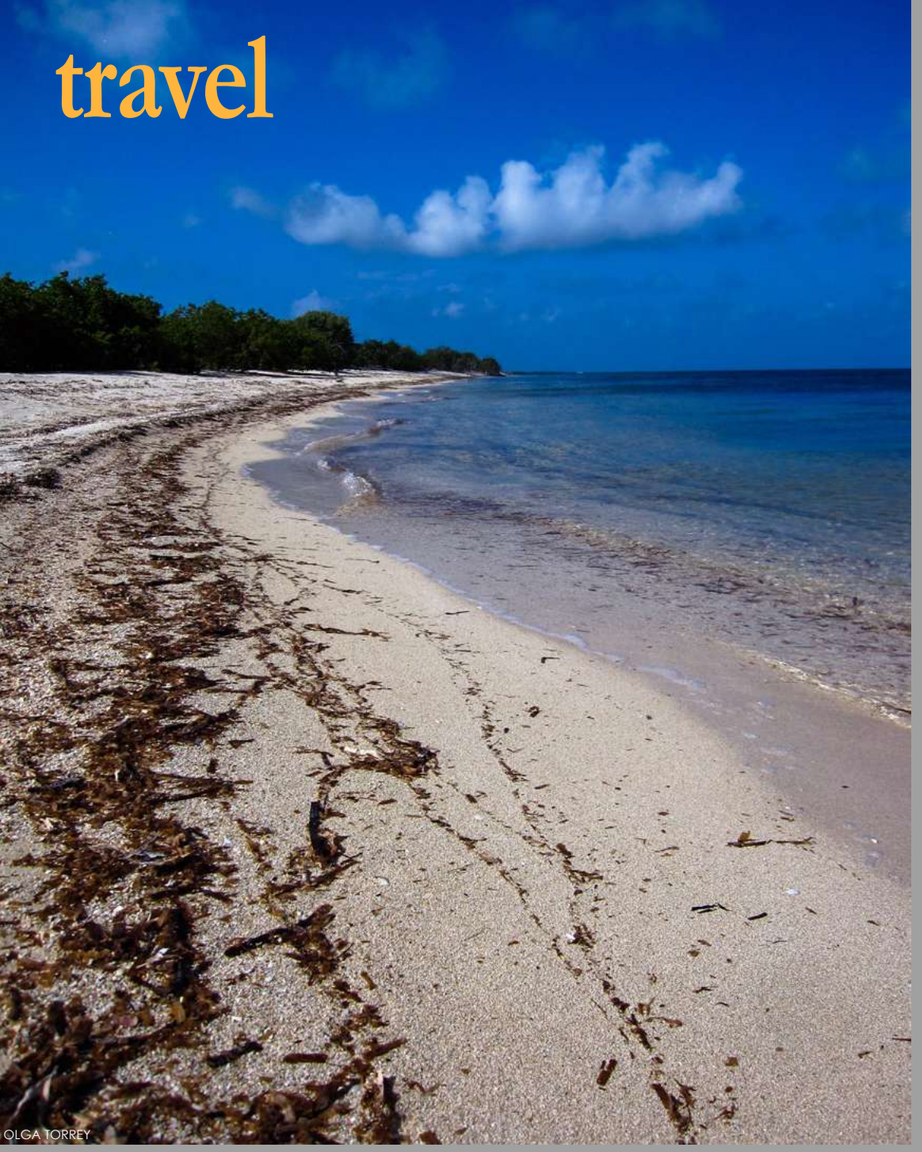


OLGA TORREY

The critically endangered Nassau and goliath grouper are found in large numbers. Many of these fish are the size of a small car. The area also harbors an abundant population of sharks, including Caribbean reef and silky sharks. Some of them are as large as nine feet (2.7m). A metal box filled with fish is taken onto the dive sites. The idea is to get the sharks in close for study and photographs. The goliath groupers and other marine life also get interested in the metal box. The reef becomes a hub of activity. Sharks, groupers and other fish buzz around the coral in every direction. At the end of the dive, the metal box is opened. The fastest creature takes the prize. The sharks don't always win.

THIS PAGE: Atlantic goliath grouper (top left and above) with Caribbean reef shark; Moray eel (left); Tiny gobies can be spotted by the trained eye (far lower left)

travel


OLGA TORREY


LARRY COHEN


Cuba

LARRY COHEN

CLOCKWISE FROM LEFT: Beautiful secluded beaches; Street musicians liven up the streets; Relaxing with good Cuban cigars; Couple at the Paseo del Prado promenade; Picturesque small village; Jutia and Cuban iguana can be found on the beaches of the marine park


OLGA TORREY


LARRY COHEN


OLGA TORREY


LARRY COHEN

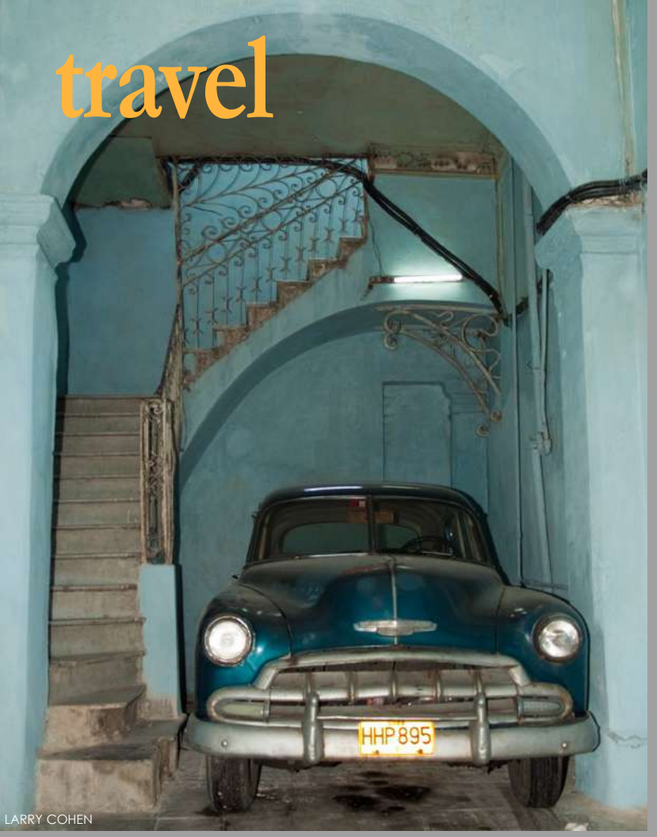
Not all the action takes place underwater. Cuban iguanas and jutia roam the beaches side by side. Jutias are rodents that are about eight to 18 inches (21 to 46cm) long.

Their diet consists of bananas and other fruit. In other parts of Cuba, they are hunted for food. But in the park, they are safe and have no fear of humans.

The Cuban iguana has an average length of 16 inches (40cm). Their diet consists of leaves, flowers and fruits. Young iguanas eat insects and shift to vegetation as they age.

Rural towns and urban life

Cuba has many picturesque small villages and farmlands along the country's routes. Music and performance is an important part of Cuban culture. The city streets are filled with musicians and performers.



LARRY COHEN


LARRY COHEN

American cars in front of National Capital building


OLGA TORREY

José Martí Memorial on Revolution Square



LARRY COHEN

Cuba


OLGA TORREY


LARRY COHEN

Percussionist Oscar Valdes and his band Diskara perform at the Jazz Café


LARRY COHEN

Street lamp in Old Havana (above); American cars from the 50's blanket the streets and garages of Havana (top left); Some buildings are crumbing due to lack of maintenance (top far right); Vegetable market in Havana (bottom far right)

Wandering the streets of Havana is like entering a time machine. The most noticeable sight is the abundance of American cars from the 1950s. Since the 1962 embargo, new American cars cannot be sold in Cuba. All the American cars in Cuba were acquired and registered before the embargo. Cuban ingenuity adapting household products and Soviet replacement diesel engines keep these vehicles on the road. Known as Yank tanks, or máquina, many of these classic cars are now taxis.

Much of the architecture in Old Havana imitates styles from Madrid, Paris, Vienna and other parts of Europe. Many of these proud buildings are deteriorating due to the lack of money for maintenance. When walking down the promenade Paseo del Prado, the crumbling structures sitting next to recent renovated buildings can be observed.

Crime rates in Havana are lower than most major cities. This is because the National Revolutionary Police Force acts strongly against any crime. Homes are wide open without locks. As you walk the streets, it is impossible not to peek inside and get a glimpse of these people's lives, and it is common for locals to come up and say hello. ■



Edited by
Rosemary 'Roz' E. Lunn

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POINT & CLICK ON BOLD LINKS

Equipment

Aeris A300



We could be in for an interesting Valentine's Day. Aeris has stated their latest dive computer will be on sale in February. The A300 CS is a hoseless air-integrated wrist computer with a patented 'Air Time Remaining' function. It has an ultra-bright high contrast OLED display with critical dive data displayed in different colours. Data can be downloaded and settings uploaded via via Bluetooth wireless technology. The A300 CS also features a 3-Axis Digital Compass with full tilt compensation and divers can change their own batteries. Apparently these have a 40–60 hour duration. **diveaeris.com**



Chromis

Scubapro launched this feature-rich wrist dive computer at DEMA 2013. The first thing that struck me about this computer is that Scubapro has acknowledged their customers like playing in water and added a useful patented swim-lap counter. (I don't know of any other dive computers that have this benefit). The Chromis has a large display, and can be put into free diving or apnea mode and gauge mode with continuous average depth. Recreational instructors may wish to use the Chromis when teaching because it can also be put into scuba mode with an independent stopwatch (really handy for timing skills). The Chromis comes in three sporty colours—black, white and orange and black. **scubapro.com**

Gobe



Light & Motion's latest travel torch weighs in at a mere 160 grams. The GoBe is compatible with six different light heads and comes with a wide range of accessories: USB Charge Cable, Bar Mount, Lanyard, Head and Body Splash Caps and GoBe+ Handle. The GoBe has five different power modes and a range of burn times from 1.5 hours (high) to 36 hours (SOS mode). The robust design is waterproof to 120m (393ft) and apparently it can be mounted to just about anything. **lightandmotion.com**



Otter

Respected U.K. drysuit manufacturer, Otter, has recently launched Otter Gators. Some drysuit divers (especially cave divers) want to reduce drag on their legs and limit airflow into their boots to lower the risk of inversion. A simple way to achieve this is to wrap gators around the lower leg. These Otter gators are constructed from cordura and are secured by double velcro strips. **drysuits.co.uk**

Se7en

The Poseidon SE7EN (launched at the DEMA Show in November) closed-circuit rebreather has '7' new features.These include Generation 7 (G7) electronics making the SE7EN firmware 40 to 50 times faster than previous Poseidon products. Divers gain speedy connectivity, courtesy of Bluetooth, so they are able to download their dive logs or update settings in seconds. The Dive Management System (now Mac compatible) allows divers to configure their rebreathers in minutes, and there is enhanced remote support should you get into a fix. The whole unit is encased in a rather sexy 'Marvel reminiscent' case, complete with grab rails, and it is rated to 100m (300 ft). **poseidon.com**



Mesh

If there is one piece of kit a diver needs, it is a mesh bag. These type of bags are very handy for stashing equipment when day boat or RHIB diving. Oceanic has manufactured this bag to withstand typical diver use and lack of maintenance. To this end, the eyelets are metal, and the mesh is PVC coated. Apparently, if you can lift the loaded bag, the mesh nor the backpack straps should not fail, Oceanic claims.

oceanicworldwide.com

Maxtec The market for dive logging software continues to grow. Now you can dive with an 'iMax Dive Buddy'. Just clip the yellow device to your kit and go diving. The instrument will log your typical dive profile, depth, water temperature, etc. Once you have completed your dive, you can wirelessly retrieve your log. Simply edit it, adding in location, gear configuration, highlights, friends, etc, and then upload the result to your social media channels by one-click. **Maxtecscuba.com**





Spyderco

Those working in and around water often have a need for a sharp knife. Spyderco has brought out a Pacific Salt Black Blade that looks to be a useful tool. They state that the H-1 steel blade will never rust even if it is put away wet. The H-1 blade is PlainEdged and coated in long-lasting black carbonitride. All internal steel parts are also treated making them impervious to rust and pitting. And the blade's hole is enlarged to 14mm for easier opening or closing with gloved, wet or cold hands. The Volcano Grip is textured, and the titanium pocket clip can be reversed to suit right and left-handed people. Finally, the lanyard hole offers a redundant method of attachment for those just-in-case-I-drop-it moments.

spyderco.com



Seac Seac unveiled two new regulators at the DEMA Show. Pictured here is the 100 Series second stage. This regulator has a balanced-diaphragm first stage. Seac states this reg will be available in three options: cold water (DX 100 ICE), warm water (DX 100) and lightweight (MX 100). The 200 Series will again be available in three options: DX 200 ICE, DX 200 and MX 200. Apparently, this is an ultra-high performance, balanced first stage with a balanced second stage that has a user-adjustable Venturi assist. These regulators should be available in spring 2014.

seacsub.com





Trilobite The design is clever because you can 'feel' what you are about to cut before you do, i.e. your high-pressure hose. If you ever end up in that unfortunate situation of having to cut blind—you are entangled in monofilament and your buddy hasn't noticed—this is quite reassuring. Apparently, the EEZYCUT Trilobite can cut line up to 13mm thick, neoprene, fishing line, kelp and trilaminate drysuits. The tool comes in nine different colour options including Phosphorescence, Hi Viz, Red and Yellow Jacket. Divers also have three different options for mounting their EEZYCUT Trilobite—a wrist pouch, a harness pouch and the flexi pouch.

Eezycut.com

Doug Allan

Underwater Cinematographer



Text by Alison Barrat
Photos courtesy of Doug Allan and Khaled bin Sultan Living Oceans Foundation

You might know Doug Allan because of his spectacular cinematography. In his 30-year filming career, he's been involved with over 60 films and series, and has worked for BBC, Discovery, National Geographic and many others, filming on series such as *The Blue Planet, Planet Earth, Human Planet* and *Frozen Planet.* His photographic awards include seven Emmy's and four BAFTA's. He has twice won the underwater category in the Wildlife Photographer of the Year and was awarded the Royal Geographical Society's Cherry Kearton Medal for his wildlife images. Last year, he was made an Honorary Fellow of the Royal Photographic Society.

Or, maybe you're familiar with his work in Antarctica. He spent eight years down south as a research diver, scientist, and photographer for the British Antarctic Survey (BAS), before changing direction to full time filming in 1985. He has three honorary doctorates in recognition of his camerawork, as well as two Polar Medals.

But you probably won't know Allan for his views on being hugged by a Walrus, why he gives Svalbard airport café a wide berth, or what he thinks about making films on ocean conservation. Read on to find out what Allan has to say about these as well as some of his other stories.

AB: You've said that your early career ambitions were to work "underwater, anywhere". What attracted you to diving?

DA: I was drawn to the water in the 60's when quite honestly there were two frontiers. There was space and the ocean, and they were talked about in the same paragraph. I couldn't go into space, but anyone could go underwater.

Back then, underwater was a much more foreign environment then it is now. I read *The Silent World* [by Jacques-Yves Cousteau] when I was 11 or 12, and it really fired me up with that sense of underwater adventure. It was exciting and romantic, and I liked the idea of getting close to dangerous animals. Classic things that would attract a wee boy.

AB: Are those the same reasons you went to be a research diver in Antarctica?

DA: When I graduated as a biologist, I didn't want to be a full on scientist. I wanted to help scientists underwater



Allan filming humpback whales

Doug Allan

because I simply felt I was a better diver than many of them. Back in those days, it was slightly unusual for scientists to dive, and I had been working as a pearl diver in Scotland and as a diver in the central Sudanese Red Sea, so when the vacancy for a diver in Antarctica came up, I didn't think too much about it, I just applied.

I was offered a one year contract to take the place of somebody who had left. Normally, when you go to the Antarctic you get the job about June or July and then you go to a big conference in Cambridge to learn about BAS and meet all the other people who have jobs in the Antarctic. But I bypassed all that completely, and when I arrived on base, I had only been to Cambridge for about a week, then flown down to the bottom of South America and been on a ship for four days. I arrived on the base on one morning, and the following day, the ship left for the winter. We wouldn't see any other people for nine months.

AB: You spent five winters in Antarctica. How do you cope with that type of isolation?

DA: The most isolated place was a base called Halley, and I got a chance to be the base commander there. The 16 of us on the base were isolated for 11 months; we only got one ship during the year. There's no exposed rock for 150 miles, and the sun doesn't come above the horizon for 100 days.

I think the whole BAS experience is great if you hit it at the right time in your life. If you're the right kind of person to be there, then there's nothing else like it—you don't really notice the isolation, or if you do, then it's something that you take on and almost thrive under. But I have to say that the isolation back then was very different from now.

The Antarctic is still physically isolated, but we were quite cut off with regard to communication. Because back then—and we're talking about the days of telex, a very slow and cumbersome form of communication—messages had to be practical, to do with issues on base. We were only allowed to send out 100 words of personal news every month and receive 100 words back each month.

Today, most of the bases have email, so you can pretty much send as much text as you want. I think that would be too much communication for me. Because the problem is that the really good emails would tend to make me long for home, and the really depressing news from 'the real world' would make me sad because there's nothing you can do because you are isolated.

I think if you can't physically get back, then you're actually better if you mentally can't get back there either. But this is an oldie speaking, not a digital native!

AB: You first started filmmaking in Antarctica, how did you get into it?

DA: I became very interested in photography during my first three winters, but then at the end of my third winter, we had a film crew come on the base, including David Attenborough. They were there for just a day, and through that day, I helped them around the island and took their cameraman underwater.

It was while talking to them that I realized that there was this job called a wildlife cameraman that checked all the boxes I was enjoying—diving, travel, animals, excitement, worthwhile cause. That's where the germ started. That's where I thought that I should consider shooting movies rather than stills.

So I decided I would take a movie camera down on my next winter in Antarctica. Before I



Allan diving with camera

Doug Allan


DOUG ALLAN

Allan with underwater camera under the ice in the Canadiian Arctic; Emperor penguins and three-week-old chicks, photo by Doug Allan (left)

went, I contacted the BBC and asked was anyone interested in the footage I might come back with? A producer said he was, and so when I was down there, I filmed the emperor penguins.

When I came back, I showed him the footage. He liked it. He bought some and asked me to go down for the following summer to shoot stuff for his upcoming series about birds. So when *Birds for All Seasons* came on TV in 1985, I had my foothold. You could say the first commercial piece of movie photography that I shot was in 1983 when I did the emperor penguins.

I then wrote up a couple of ideas that I had about films, which you could do in the Antarctic winter. I persuaded Survival Anglia to commission them and went into full time filmmaking in 1986.

AB: What is the best thing that you have filmed underwater in Antarctica or the Arctic?

DA: Wow, that's a hard call, but we did do leopard seals hunting Adele penguins for the BBC's *Life in the Freezer*. It was the first time leopard seals had been filmed underwater.

I was always fairly confident that we could do it. But in those days, a lot of people believed that leopard seals were very dangerous. In reality, the seals were actually quite approachable in the water, and that closeness made for a very dramatic sequence.

I always remember that one in terms of being a real groundbreaker. Then, on the other hand, the time I spent with the emperor penguins in the water for *Blue Planet*—that was really special as well.

But I have to say the pick of my underwater polar sequences is probably the polar bears swimming, which I did for the BBC wildlife special just called *Polar Bear*, back in '96-97. We got these lovely underwater shots of polar bears swimming. For a couple of shots, I was in the water with them, but the loveliest takes were with a remote camera held over the side of the boat and working with a very cooperative polar bear. He let us get really close while he was paddling through the water.

AB: So have you had any close calls while filming underwater?

DA: Well a walrus grabbed me when I was snorkelling off the ice edge in the Arctic. I had just finished taking some still shots of some murres diving, and I was treading water vertically. Suddenly, something had me around the waist and was holding me really, really tightly. It was a complete surprise; this was a classic attack, no warning whatso-ever. I looked down and literally tucked underneath my arm there was a head of a walrus. I hit him on the head, hard, with the camera; he let go and swam away a couple of meters and looked at me. By that time I was swimming hard for the ice edge and pulling myself out, so the whole thing lasted seconds. But that's exactly how walrus attack seals.

Sometimes they shift their diet from mussels to seals, hunting them when the seals are sleeping at the surface. The walrus dive down and look up from under water, see the seals, grab them, and take them down. If that walrus' reaction to being hit on the head had been to sink down with me, that would have been it. They kill the seals by either squeezing them very tightly and



Allan being handed his camera in a hole in the ice

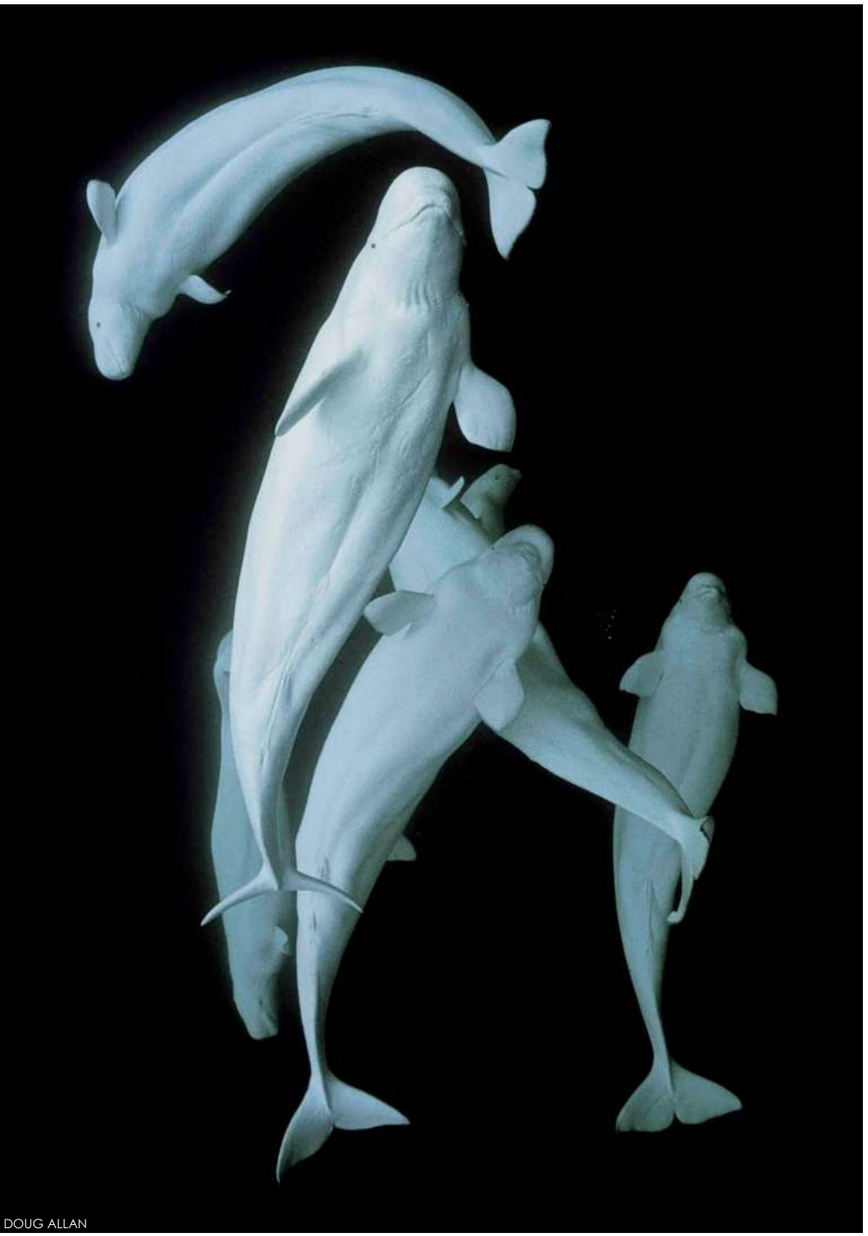
Doug Allan



Allan filming humpback whale and calf in Tonga

crushing them, or the walrus puts his lips on the seal's head and sucks his brains out. So it was just luck really that he didn't do either of those things to me.

As an aside to that, as wildlife filmmakers we go into situations on land or in the water where certainly there's the potential for things to get dangerous. But I think ... that our experience, gained from the amount of time we get to spend with the animals, means that we can recognize when their mood changes, and at that stage, you just back off. There's no point in getting injured or bitten. That usually brings the shoot to a halt, and that's just frustrating and daft. After all, you're there to do a job, and to be unnecessarily injured is just a bit pointless really.



DOUG ALLAN

Beluga whales, photo by Doug Allan

AB: You've recently written a book called Freeze Frame *about your experiences filming in the Arctic and Antarctica. Why did you write a book?*

DA: I think I've always enjoyed the different media—television, radio and books. Of the three, television actually gives you the least information output. It aims to swamp you with visuals. Radio is better, and books are best of all. And I like talking to people, talking to schools. People ask me about my adventures, and I knew there were a lot of things I wanted to offer, information to give out about my career and animals, who I am, and how you film and various things like that. So, I'd been thinking about a book for quite a long time.

I decided to do it in the form of short stories. Of course, that was much easier to write than a big long linear book. You can open mine anywhere and read a little story. And I wanted it so that within the stories there would be at least one or two moments where you would say, "Well I didn't know that."

And it can be all kinds of "didn't know that"—maybe a wee fact about a polar bear, or a different way of thinking about an ethical issue that comes up when you're filming. How close can you go? How do you take such a shot? How do you live in the Antarctic for two and half years without women and come away quite sane? What was it like shooting film when you didn't see the results until you came back? All these little sort of things are just answered piece by piece through the book. Writing it was one of the biggest bits of fun I've ever had, and I hope that comes through. Me, my editor Roz, and my designer, Simon—those were the only people involved. Great.

AB: You reveal quite a lot about yourself in the book. How did you choose which personal moments to include?

DA: What I did when I started, I had this idea to write all these short stories. I literally sat up one night in bed about 2:00 AM, and I thought, "I know what some of these stories are going to be." So I just wrote down the one-liners that reminded me about all of these things.

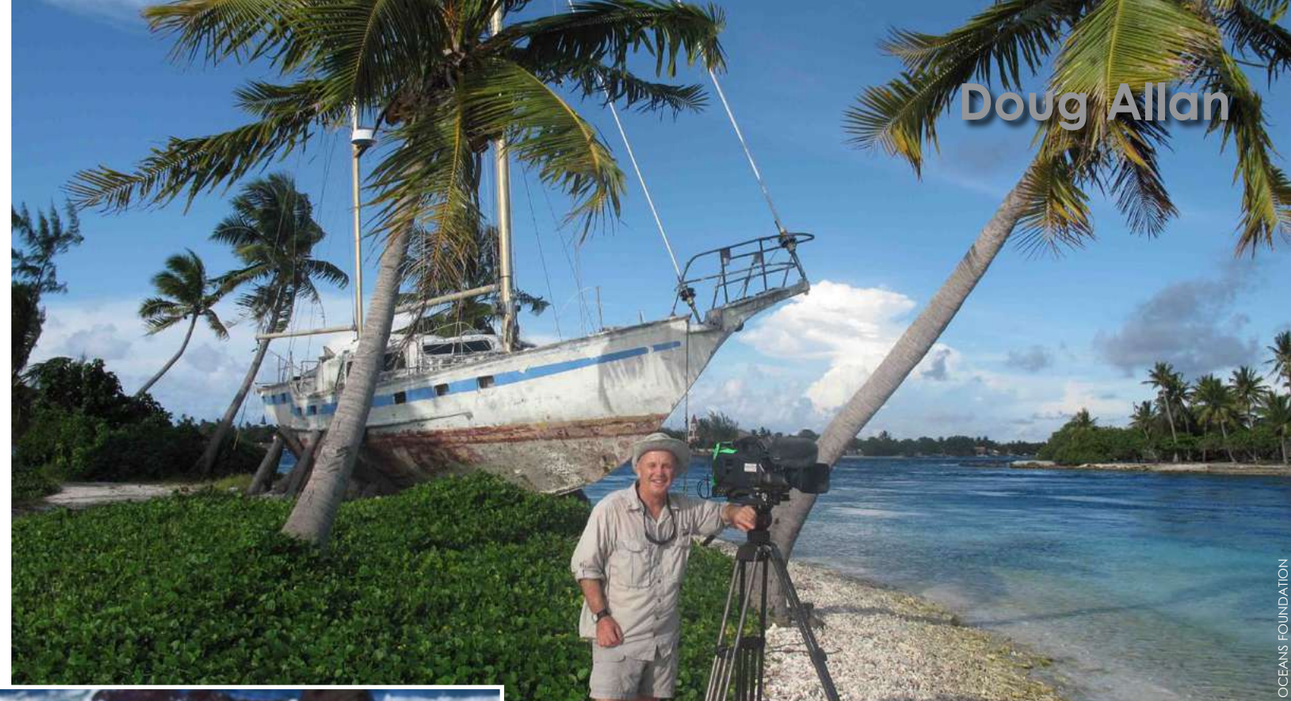
I wanted to wear my heart on my sleeve and open up a little bit, too, and I didn't find that difficult at all. In some respect, it was wonderfully liberating. When you don't have to write an introduction to anything, you can just go right into the story. It's almost like doing standup comedy or being on a talk show. Give them the facts, make them laugh, make them sigh, make them gasp! That's what I like about it. But it's up to the reader to choose—it's what makes the book different.

The best review that I got was in *Wanderlust* magazine, who said, "The most fascinating thing about *Freeze Frame* is that you can feel Doug's personality and passion come singing through when you read the stories. Like the man himself, this book is a one off." I thought that was great. Very flattering.

AB: You like making people laugh. What are the funniest moments that you've spent filming or diving?

DA: One of the funniest was when I was coming back off of a shoot in Svalbard, in the Norwegian Arctic. I had been in the field for a long time, and we'd been held up by bad weather. We just had time to get all the gear packed, fling it in the car and drive to the airport. Back in those days, there were only two or three flights a week back to Norway.

We got all the gear checked in with very little time to spare. We had just a few minutes, and




KHALED BIN SULTAN LIVING OCEANS FOUNDATION


KHALED BIN SULTAN LIVING OCEANS FOUNDATION

Allan filming current meter deployment

Allan on a shoot in French Polynesia; Allan filiming sealion in Galapagos (below)

so I went upstairs to the toilet. I went into this toilet that was just off the café, and it was so nice and warm, I fell asleep on the loo. I woke up a little bit later to a Norwegian airport announcement—I thought it had to be the last call for this flight.

So, I went to go out, but the main door back into the café was locked, and I couldn't get out. Then, there was another announcement, and I was beginning to get concerned because this was a big, heavy, metal door, and I wasn't able to open it. There hadn't been many people in the café when I went in. I thought people had left the café and that it was all locked. So, I started banging on the door, kicking at it, shouting at the top of my voice. No way I was going to miss my flight!

Then suddenly, there was a noise behind me—another door opened, and all these people were looking in from the café. I had come out of the toilet cubicle and turned the wrong way. Now I was basically trying to kick myself into the cleaning closet. I had to push my way past these people and run down the stairs and get on the plane.

And the thing is I had to go back through that airport several times over the next year, and there were always people there who had been in that café. I'm sure I became known as the mad man who locked himself in the toilet in Svalbard.

AB: You've returned to Antarctica and the Arctic many times since you first went there. What kind of changes have you seen in terms of climate change?

DA: I first went to the Arctic in 1988 and caught the tail end of what I would call the classic predictable weather period. When you went in April or May, you could pretty much guarantee nine or ten lovely days of sunshine followed by a two- or three-day blow, and then another decent period of weather.

Now 25 years later, the weather in April or May can be all over the place. You don't really know what you're going to get. There can be rain, which was almost unheard of back then. You seem to see much less of the sun. The weather patterns are much less predictable weather patterns. I certainly notice that.

And in the Antarctic, I can go back to places where 35 years ago I would be standing right at the front of a glacier, where I could reach out and touch the ice. I stand in that same place now, and the glacier is 30 meters away.

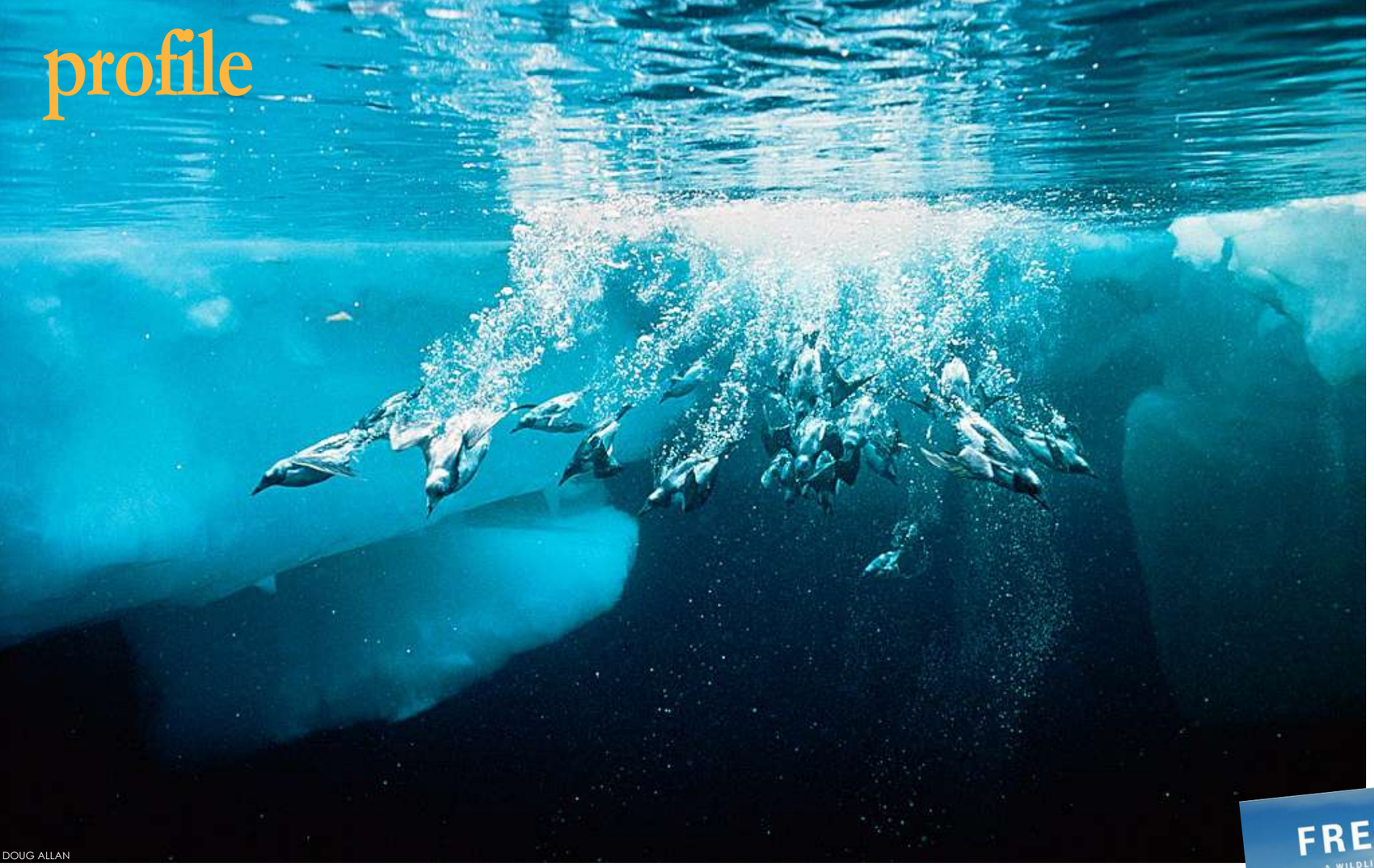
I can look at where 30 years ago I could see a 20,000 strong colony of Adelie penguins. I stand there now, and there are only 2,000 to 3,000 Adelies, and the rest are Gentoo penguins—so one species has moved over. Gentoos are basically a northern species, but the peninsula of the Antarctic has warmed up so much that these Gentoos are now able to come further south.

You talk to the Inuit in the Arctic because they are the people who really know. Their experience of the climate goes back not 25 years like mine but 2,000 years. They will tell you about the berries coming out sooner, about the ice changing and how much longer the summers are becoming. Things like that.

There is absolutely no doubt that the Arctic in changing really, really dramatically. The amount of sea ice in the summer is much, much less than it used to be, and almost certainly in the next five to ten years, we will have a summer where all the ice melts in the Arctic. What this will mean in the long term to population numbers of seals, whales and polar bears is open to question. It will mean a huge change to basic Arctic marine ecology, but it seems clear that polar bear numbers will fall, and their distribution will become more restricted.

AB: You've recently been working on some scientific films that highlight climate change. What are these projects?

DA: I've always worked on a range of films. And certainly among the most challenging and exciting, but also good fun and worthwhile films, are the ones I've done which are conservation or issue led. That's why it has been so satisfying working with a group called the Living Oceans



DOUG ALLAN

Diving Guillemots, Allan's prize-winning photograph; Book cover of *Freeze Frame* by Doug Allan (below inset)

Doug Allan

Foundation. Their purpose is scientific, educational, and it has a conservation angle to it because they do reef surveys. They study coral reefs and use the science and the films to help influence government opinions about which are the best areas of a country's coral reefs to conserve.

The films are also used to get the information into schools, which is where I think you have to go for the basics. You've got to educate the youngsters about these things. I think it's great that wherever the foundation is, they try involving some local divers and local scientists, encourage them to come along and make space for them on their expedition—because nothing speaks to a country like local people from that country.

It's much more powerful if you have the locals talking about it; it's much more powerful if the local scientists spread the word. So, for all of these reasons, and even though they may be non-broadcast and are lower profile than a whole lot of these bigger series that I'm on, I still often think the films that the Living Oceans Foundation makes are more worthwhile.

AB: Why is it important to you to be involved in films that teach about ocean conservation?

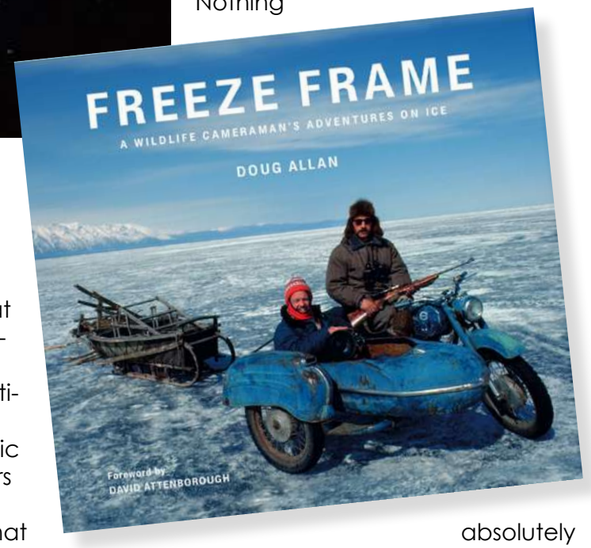
DA: Part of it is just your maturity as a person and maturity as a film maker. I know that it's my involvement with these high-end series which gave me the profile I have. But I like to think I have something now to give back.

I think when I started, I was really excited to show people things which they hadn't seen before. Twenty years ago, there was a strong case for saying that we won't get people to care about the oceans or the environment until we let them see what it is that we want them to protect. But I think the big series run the risk of losing that purpose. They educate to a degree, but they're not multi-faceted enough. They may be realistic about the behaviors they show, but do they really show what the broader world is like?

What I would like to see is a series, which is imaginative enough, which is clever enough with good producers, and good story lines, where we can mix the message with the lovely wildlife and make something that really does make people think differently about the sea and about the environment, and so let people reconnect with it. The big glossy series are wonderfully polished, but I'm not sure the viewers connect with them on a visceral level the way you do with other films. I think the smaller films like the Living Oceans Foundation production are getting closer to we want somehow.

AB: What's your next project?

DA: My next project is a Living Oceans Foundation program out in the Pacific. And then I have some polar bear filming to do. It's actually second unit stuff for a feature film. It's a feature film with a climate change message in it. Nothing



absolutely major—just a number of things to consolidate. It's always like that as a freelancer.

AB: You been a lot of places, and you've seen a lot of things other people haven't seen. Do you have a philosophy for making life worthwhile and enjoyable?

DA: There are two quotations that I found a long time ago. I found them when I was at university, and I've sort of lived by them, consciously or subconsciously. One has been ascribed to Henry David Theroux: "The mass of men live lives of quiet desperation and go to the grave with song still in them."

I think you should start singing as soon as you can, and make sure you sing as long as you can, and as loud as you can.

And the other is often attributed to Mark Twain: "Twenty years from now you will be more disappointed by the things you didn't do than the things you did do. So throw off the bowlines. Sail away from the safe harbor. Catch the Trade winds in your sails. Explore. Dream. Discover."

I say that somewhere inside you is a passion for something which is as strong as my passion was for diving. I didn't know when I started where I would end up, the main thing I did was follow my heart. ■

Doug Allan's book, Freeze Frame, *is available at Dougallan.com. You can see the work of the Khaled bin Sultan Living Oceans Foundation at Livingoceansfoundation.org.*

Alison Barrat is a former producer and series producer for National Geographic Television. She is currently Director of Communications for the Khaled bin Sultan Living Oceans Foundation.



in many cases, there is actually no plan to deal with a DCI incident. The rationale given runs along the lines of, "It hardly ever happens, so it is not worth thinking about until it does."



CHRIS EDZERODT

Scuba Confidential

Where's the O_2?

Text by Simon Pridmore

I was a guest on a dive boat a few months ago. We had just arrived in Crystal Bay, a notorious diving accident black spot on the outlying Balinese island of Nusa Penida, when our attention was drawn by a burst of frenetic activity next to a neighbouring boat. A wetsuited figure was being manhandled over the side of the boat and laid out on deck. A couple of crewmen hunched over the figure while everyone else on board stood to one side, heads craned in concern. Seeing us approach, one of the crew shouted over and asked if we had oxygen. We did and we handed our big green DAN kit over to them as the boats met bow to bow. They turned and headed off at full speed to the main island of Bali, a good 45 minutes rough ride away.

I never found out what happened to the injured diver nor what had caused the accident, but the combination of cool water, fast current and depth at the edge of the bay has caused more than a few inexperienced divers to elect for a rapid ascent as a way of "just getting out of there!"

The wrong choice

Once the key first aid concerns of monitoring consciousness, airway and breathing have been taken care of, the recommended treatment for suspected decompression illness (DCI) is administration of 100 percent oxygen. The oxygen should be delivered as soon as possible and continuously until there is no more oxygen available or until a diving doctor instructs that it should be interrupted. Therefore, every responsible dive operation, whether boat or land-based, should carry a sufficient supply to allow a diver with suspected DCI to continue breathing oxygen until they arrive at a medical facility with oxygen on tap.

The diver in the above incident had unfortunately chosen to dive from a boat that was carrying no oxygen at all. Luckily for the crew and for the diver (I hope), we had happened by and were suitably equipped to help. (Of course, this meant we no longer had oxygen, but that is another story!)

A key question

Before you dive with any operation, no matter how apparently professional it seems, make sure they have an appropriate answer to the question, "Where's the O_2?"

Sadly, many are both under-prepared and under-equipped to deal with a diving emergency. In your excitement to go diving, you may not have noticed how many dive briefings gloss over the key issues of where the oxygen is and who among the dive team is qualified to deliver it. This is not always an oversight; in many cases, there is actually no plan to deal with a DCI incident. The rationale given runs along the lines of, "It hardly ever happens, so it is not worth thinking about until it does."

Failing to plan

Even top dive operations are guilty of failing to plan adequately. For example, liveaboards often carry oxygen on board the mother-boat but not on the small tenders that ferry divers to and from the dive sites. Often this ferrying involves long rides to allow the mother-boat to float free in the deep channel away from the reefs. This means that if a diver blows to the surface, the nearest oxygen is a long way away, and the delay in delivery could make the difference between tragedy and survival.

The reassuring visible presence of a big green box on a dive boat is not always a reliable indicator that the dive operation is prepared to deal with an injured diver. Given that accidents that require immediate delivery of oxygen are thankfully rare, the oxygen kit can sit for a long time without being deployed. Stories abound in the dive industry of boat crews turning to the kit in an emergency and finding that the unforgiving marine environment has caused the rubber hoses to waste away and corroded the cylinder valve to the point of immobility.

So, when the question, "Where's the O_2?" is greeted with a vague gesture in the direction of the green box, make a point of asking someone to open it, so you can see what sort of condition it is in and if that cylinder with the reassuring green band around actually has gas in it. This may not make you very popular, but as a diver, you have a vested interest in ensuring that the people you are paying to take you diving are taking their responsibilities seriously, and the prospect of a few awkward questions might just encourage the idle or negligent to get their act together. ■

Simon Pridmore has been around the scuba diving industry in Asia, Europe and the United States (well, Guam) for the past 20 years. His latest book, also called Scuba Confidential, *was published in September and is available on Amazon.*

Diving New Georgia

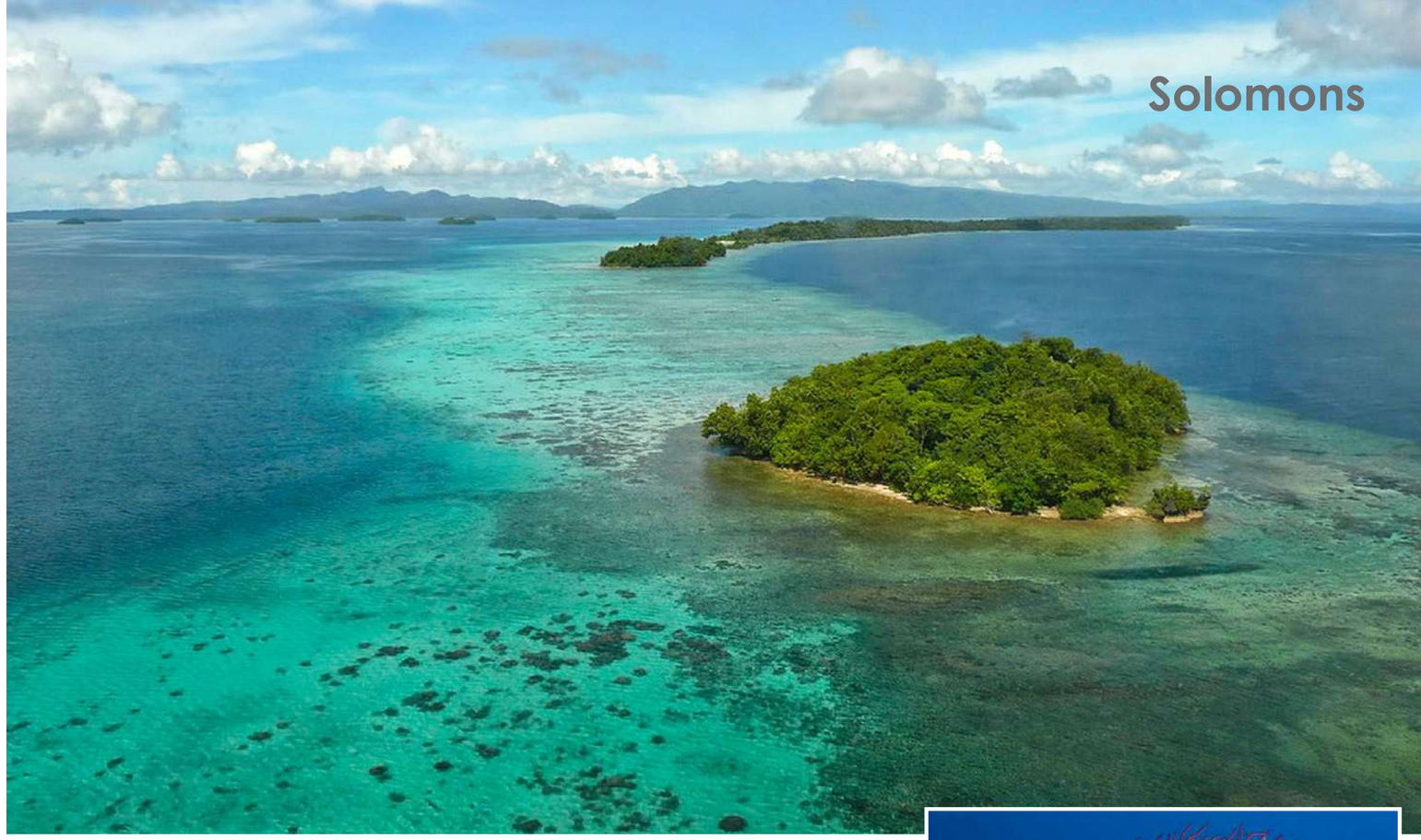
Solomon Islands

Text and photos by Don Silcock

Solomons



Underwater photographer on reef at Langranga. PREVIOUS PAGE: Charapoana Point



Aerial view of Marovo Lagoon barrier reef; Long-fin bannerfish, Uepi Jetty (right inset)

Like a series of random punctuation marks, the many islands of the Solomons archipelago lay along the southern section of the Pacific Ring of Fire, in between the countries of Papua New Guinea to the north, and Vanuatu to the south.

An independent country since 1976, the Solomon Islands are a quite special blend of Pacific Island Melanesian culture and phenomenal tectonic forces, which have created a chain of mountainous islands that are rich in native rainforest, spectacular volcanoes and incredible lagoons. Underwater, there are rich reef systems and an amazing variety of marine life together with one of the highest concentrations of WWII wrecks in the Pacific.

Somewhat off the beaten track and to a degree tainted by the civil disorder that convulsed the country from 1998 to 2004, the Solomon Islands have long since stabilized and are open for business again, offering a most rewarding destination for divers.

Selectivity… New Georgia

At the beginning of this year, having heard and read much about the country, I decided that it really was time I explored the Solomon Islands first-hand. My first port of call when visiting a new location is always Google Earth, because it really does put everything into perspective, and with the Solomon Islands, I soon realized that I needed to be selective. The country consists of a total of almost 1,000 islands organized into nine provinces, plus the capital territory of Honiara on the northwest coast of the island of Guadalcanal. All of which means there are a lot of places to dive, and deciding where to go is a bit like the kid in the candy store—where to start?



Working the Internet hard narrowed down the first choice—land-based resort or liveaboard?



Schooling fusilier over hard corals, Langranga; Wary cardinalfish at Eagle's Nest in Munda (left)



Honiara is the base for the respected liveaboard company, Bilikiki Cruises, who operate two boats in the Solomons. While logistically this offered the easiest place to begin as you fly in and go straight onto the boat, I opted for land-based diving so that I could get a deeper sense of the local cultures.

I eventually settled on two locations in the New Georgia area of the large Western Province of the Solomon Islands: Uepi Island Resort, in the huge Marovo Lagoon at the eastern end of the province, and Munda, in the not quite so large Roviana Lagoon on the southern coast.

Both these locations have excellent reputations, and logistically, they are pretty easy to get to, as Solomon Airlines operates regular domestic flights from Honiara to New Georgia with stops at both Seghe, which is the closest airstrip for Uepi Island, and Munda.

There were another couple of places in New Georgia I would have loved to include: the spectacular Gatokae Island on the southern edge of the Marovo Lagoon and the wrecks of Gizo on the western tip of New Georgia. But my time for travel was limited, so I eventually decided that they would have to wait for next time.

A bad rap?

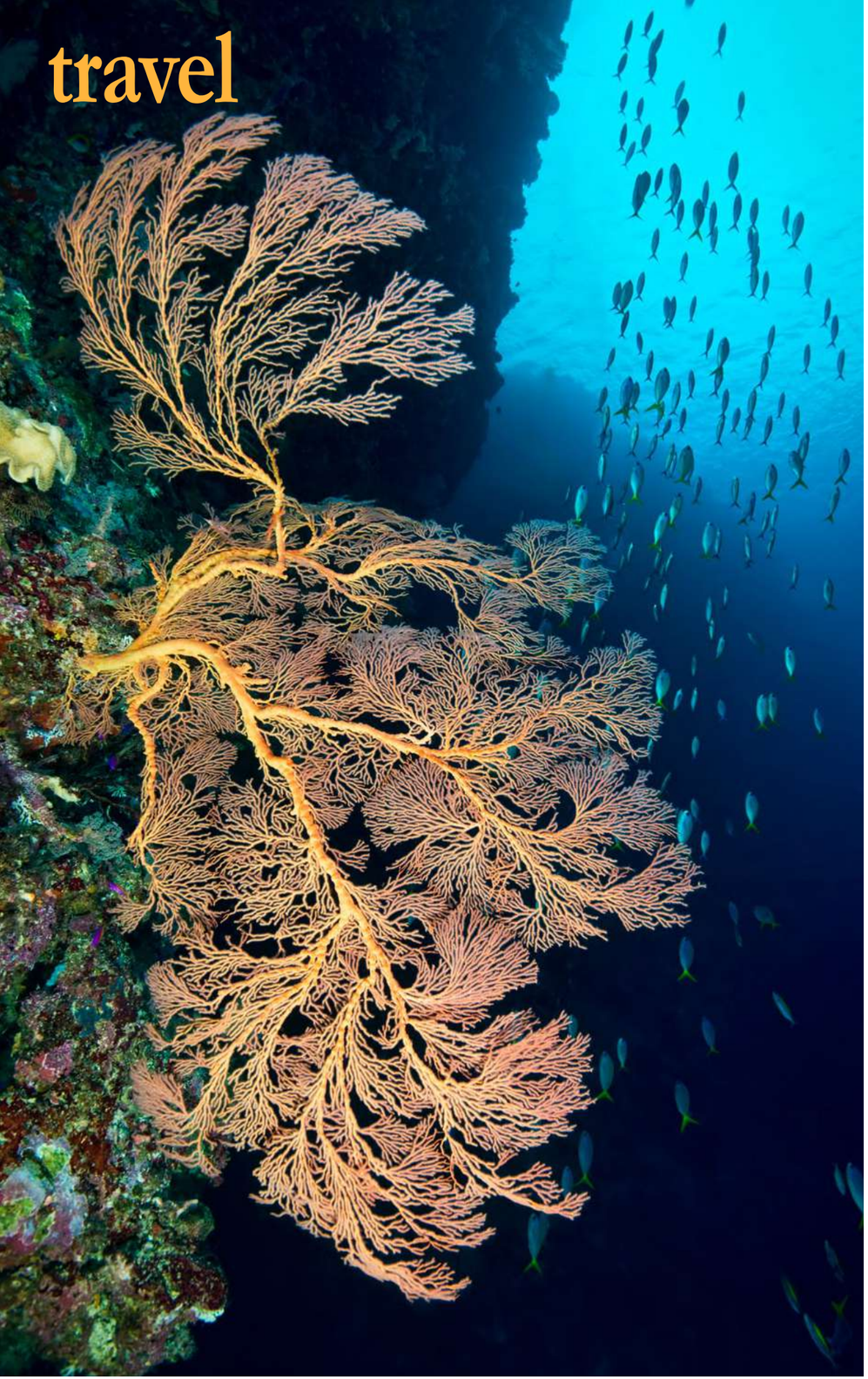
If certain sections of the Australian media are to be believed, the Solomon Islands is the Afghanistan of the Pacific, and only the intervention under the Regional Assistance Mission to the Solomon Islands (RAMSI) stopped it from actually becoming a failed state.

RAMSI was launched in July 2003 at the request of the Solomon Islands government, after the civil disorder had reached a crisis point. It was basically a plea for help to its Pacific Ocean neighbors. Led by Australia, RAMSI consisted of military, police and civilians from a coalition of regional countries that stepped in and quickly stabilized the situation, restoring law and order, and over time, establishing the foundations for the Solomon Islands to grow again.

But perceptions linger, and I had lots of raised eyebrows in Australia when I told friends and colleagues that I was off to the Solomon Islands for three weeks.



Superb sea fans at Charapoana Point near Uepi



Beautiful sea fans at Secret Spot in Munda



Graeme Sanson models with a large elephant ear sponge

Solomons

My personal acid test for such situations is to take off my watch, leave it and anything else of value in my room, pick up my cheap shirt-pocket camera and go for a walk to see what happens.

I always ask around if is it safe to go walkabout. From the taxi driver who brought me from Honiara Airport to the hotel concierge, I got a general "no worries". Sure enough there were no worries, and I walked for many miles around Honiara without a single problem, meeting lots of nice people on the way.

Uepi Island

Having "survived" Honiara, the next part of my journey was the flight to Seghe, which is the main airstrip for the Marovo Lagoon and the stopping off point for Uepi (rather amusingly pronounced *you-pee*) Island.

The flight heads northwest from Honiara towards New Georgia, passing over the scenic Russell Islands group on the way. The journey provides the first real indication of the incredible beauty of this country, as you fly over one rainforest covered island after another—all surrounded by the clear blue waters of the Solomon Sea. Then, as the plane descends over the Marovo Lagoon towards Seghe, you can see how the outer barrier islands form what is in fact the largest saltwater lagoon in the world, and an appreciation forms for its sheer magnitude!

There really is something uniquely exciting about getting off a small plane on a grass airstrip on a remote island and watching your dive gear being extracting from the cargo bay. Feeling a little bit like a cross between Indiana Jones and Jacques Cousteau, I walked over to the arrivals area—which is also the departure area, shop and waiting area, all consolidated into a single small wooden building—and was met by my "driver" from Uepi.

Five minutes later, we were skimming across the lagoon on the 25-minute journey to Uepi where the indomitable Jill Kelly was waiting to greet me on the main jetty.

Jill, and her husband Grant, are partners in the small consortium that operates Uepi Island Resort where they are also the resident managers. But most importantly, the island





Soft corals, Mushroom Island, Munda; Seghe Airport, Marovo Lagoon (above)





Beautiful marine life at Haipe; Diver at Haipe near Munda (left)

is their home, and they are fiercely proud of it.

They discovered Uepi by a series of quite special coincidences in the early 1980s and took over the operation of the small resort on the island in 1987, running it remotely from Australia through resident expatriate managers, while they raised their two children. In 2000, they moved to the island to take over direct control and have been there ever since, developing the operation into an integral part of the lagoon's cultural fabric.

The complete staff of Uepi is drawn from the villages of the lagoon, and the Kelly's have personally developed all of them—from the cooks in the kitchen to the dive staff. Managing a successful tourism-based business in a remote location is inevitably a balancing act between the inescapable perception of wealth being taken from the common property, that is the Marovo Lagoon, and the "Wantok" system that predominates in the Solomon Islands.

Wantoks are basically those who speak the same language or dialect, and in the Solomons where there are about 220 different languages, it can be thought of as a kind of tribal system whereby you look out for and share what you have with your Wantoks. In many ways, it is the glue that holds things together and evolved as a part of the traditional culture for very good reasons, but it is also a major impediment to progress, as it effectively penalizes those who do well by requiring them to provide for those who have not prospered so well.

A successful business like Uepi can end up in a situation where excessive demands are made, and failure to comply can generate significant resentment. The Kelly's have tackled this issue both positively and proactively by starting their own not-for-profit organization, Solutions pa Morovo, and supporting the admirable work of the Marovo Medical Foundation.

Solutions pa Morovo is focused on improving the quality of life of the people of the Marovo Lagoon and has a specific focus on educational scholarships, while the Marovo Medical Foundation has worked absolute wonders at Seghe's local hospital—including (believe it or not) building and equipping a complete new operating theatre.

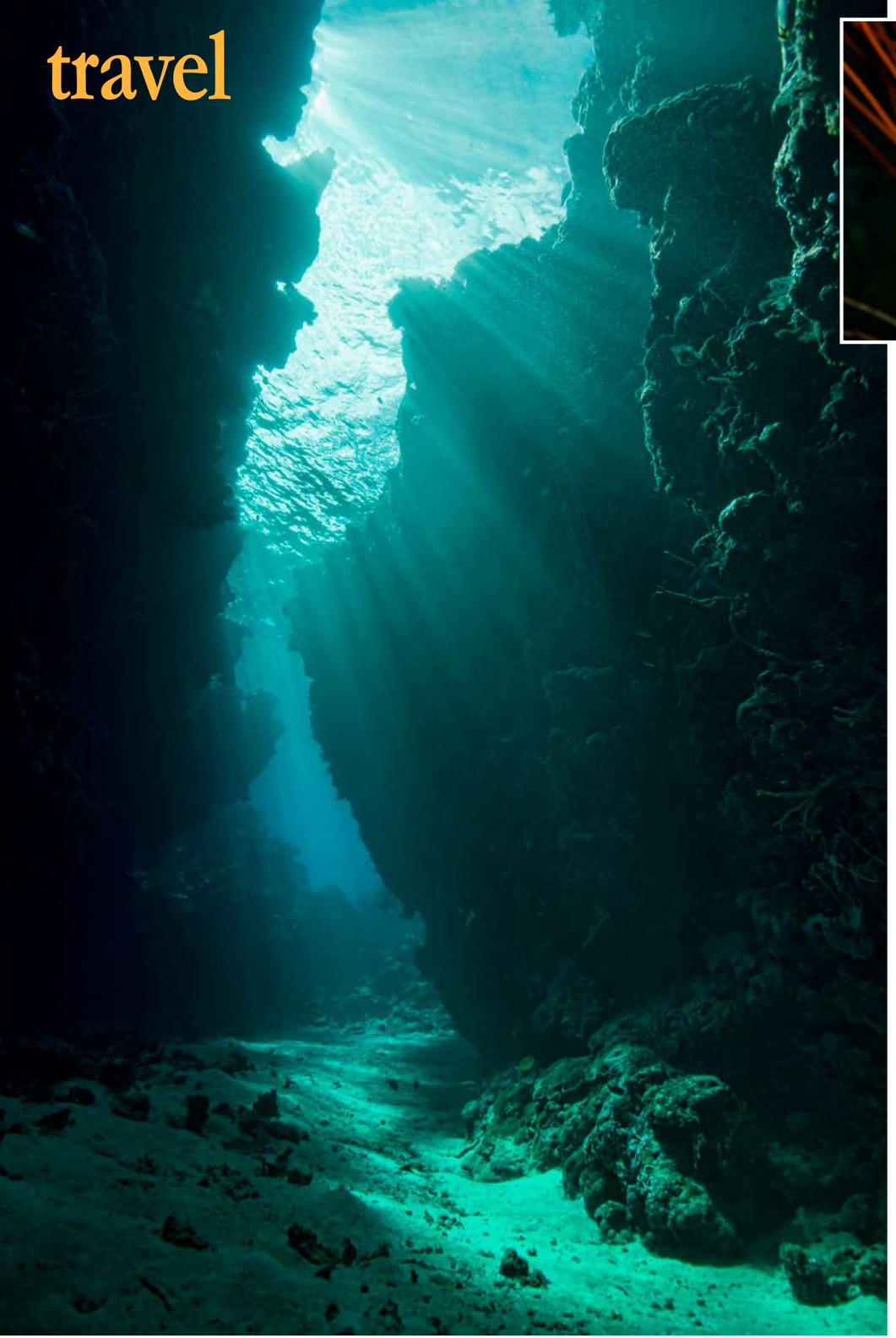
Diving the Marovo Lagoon

The majority of the dive sites accessible from Uepi Island are on the New Georgia Sound side of it and the other barrier islands that form the northern rim of the



Exit of Cave of the Kastum Shark, Munda; Curious turtle, Shark Point near Munda (lower left)

Solomons



Superb swim-through at the General Store near Uepi





Yellow Sergeant fish at Uepi Jetty; Sunset on the Marovo Lagoon (right); Uepi Island main lodge (lower right); Uepi Island and the channel between Uepi and Charapoana Islands—the Welcome Jetty is on the left (below)

Marovo Lagoon. The Sound is the large body of water that runs through the middle of the Solomons, separating the two main island chains that make up the country, which was nicknamed "the Slot" by the Allied forces during WWII.

The Slot was the route chosen by the Japanese for what became known as the "Tokyo Express"—blacked-out destroyers travelling at high speed through the night to try and avoid Allied attack, while they resupplied their base on the island of Guadalcanal.

In fact, the Slot is actually a series of deep-water basins that are surrounded by the islands of the Solomons, which in turn are bounded on all sides by the incredibly deep trenches and troughs of the region—all of which produce a strong flow of nutrients and bountiful marine life, including a very healthy shark population. Sharks are so common that after a few dives you start to ignore them.



Diving the sites on the Slot side of the Marovo Lagoon are heady experiences—think sloping walls dropping into the depths of the abyss with clear blue water and every chance of seeing large passing pelagics.



Then there are the "points" where the geological fault lines have thrown up the islands and left the passages into the lagoon. Here, there are ridges where rich coral gardens have developed along with their ecosystems, all nourished by the mixed nutrients from the depths of the Slot and those that come out of the lagoon.

At the points, such as Uepi Point on the tip of the island and the main channel into the lagoon, you will see the

Titan Trigger Fish at Uepi Island jetty; Diver Anna Moriarty at Uepi Elbow (left)



underwater world as Mother Nature intended it to be—lush soft corals, superb fans filtering the nutrients and the full food chain of creatures all the way up to the cruising grey reef sharks—or Her alter-ego at Charapoanna Point on the other side of the channel where the same intensity is concentrated onto the ridge, as the currents sweep round the corner.

Uepi Welcome Jetty

No visit to Uepi would be complete without experiencing the resident school of Marovo Lagoon grey reef sharks at the Welcome Jetty. Located on the edge of the deep-water passage between the island and its neighbour Charapoana, the jetty and its guardians are literally world-famous and are truly a "must-do" experience. Best dived on an incoming tide, the trick is to position yourself in front of the jetty at about 5m and wait, as the sharks are used to divers and quite curious. So, if you are patient, they will come in and check you out.

Jill and Grant Kelly have been diving and snorkelling with the sharks of the Marovo for nearly 30 years and say they have never felt threatened by them. In fact, the way Jill described it, the sharks are comfortable and curious around divers because they have never been threatened by them. Is that not how it should be?

Munda and Roviana Lagoon

The next step on my journey of exploration in New Georgia was the short flight from Seghe to Munda and the incredibly scenic Roviana Lagoon on the southwest coast of the island. While not as big as the Marovo Lagoon, the Roviana is still a significant body of water that extends for over 50km eastwards from Munda and is bounded by a chain of barrier reefs and islands lying 2-4km offshore.

Within the lagoon, the tectonic gods have created a series of relatively shallow but sheltered environments that are interspersed between



Underneath Uepi's Welcome Jetty; Reef sharks patrol at Uepi's Welcome Jetty (top right)



deep channels, which provide unobstructed passage for the waters of the Solomon Sea to enter. Rich with nutrients from deep trenches and basins to the south, these waters produce the perfect conditions for fish to aggregate and then spawn, which means the Roviana Lagoon can be considered as a gigantic nursery and larval trap for the area.

Munda is both the epicenter of the lagoon and the largest town on the island of New Georgia. It consists of a number of small villages that grew around a colonial era coconut plantation at Munda Point.

During WWII, the Japanese built an airstrip at Munda, which they managed to conceal for some time from the Allied forces by suspending coconut palms on cables across the runway so that it was not visible from the air. The subsequent discovery led to a lot of bombing runs on the area, resulting in temporary closures of the airstrip while the Japanese made repairs to get it back in operation. It also meant that there is still a lot of unexploded ordinance in the rainforest that surrounds the Munda.

The original airstrip is the site of the current runway, which while I was there was approaching the end of a significant upgrade to allow jets to land. A major part of the project had involved the safe disposal of all those unexploded bombs.

The construction work had created a bit of a bubble in Munda, the downside of which was that the flow of money into the town had produced a lot of young drunks eager to spend their new found riches on Solbrew (the local beer) rather than to disperse it amongst their less fortunate Wantoks.

Fridays in Munda are the highlight of the week, and I have to say that they are worth giving up an afternoon's diving, as the locals come in from all directions across the lagoon to sell their produce at the local market in Lambete, the main village and the location of the very quaint Agnes



CLOCKWISE FROM TOP LEFT: Sea whips at Uepi Elbow; Picturesque Roviana Lagoon; Village kids at Roviana Lagoon; Blacktip reef shark at Uepi's Welcome Jetty





Solomons





Lionfish, Shark Point, Munda; Sunrise at Roviana Lagoon (top)

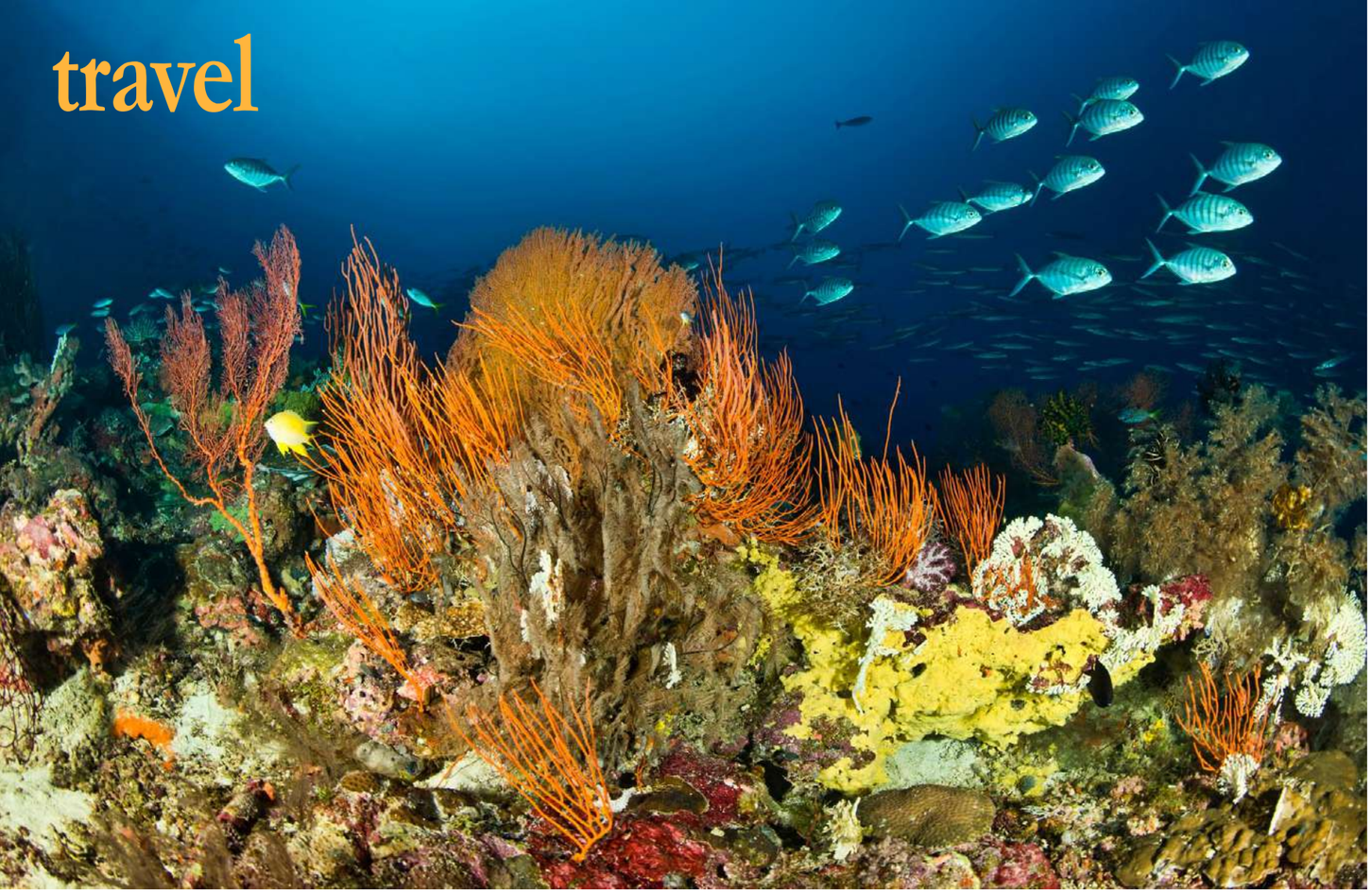
Lodge—the only hotel in town. The Solbrew starts to flow from mid-afternoon, and a distinct party atmosphere develops by sundown when the action moves to the Kava Bar—think Bob Marley meets Somerset Maughan and happy drunks all around!

Dive Munda

One of the great things about traveling to remote locations is that you meet some really interesting people. If Jill and Grant Kelly at Uepi personify Aussies in the South Seas, then Graeme Sanson and Jen Will are the U.K. versions. In their sixth year as residents of the Roviana Lagoon, their British bulldog determination to overcome the odds whilst still enjoying themselves and doing what they do best, was positively uplifting and at times very amusing. Both keen technical divers and instructors, they have managed to assemble all the "stuff" associated with doing this safely in a remote location in their small dive shop at the side of the Agnes Lodge.

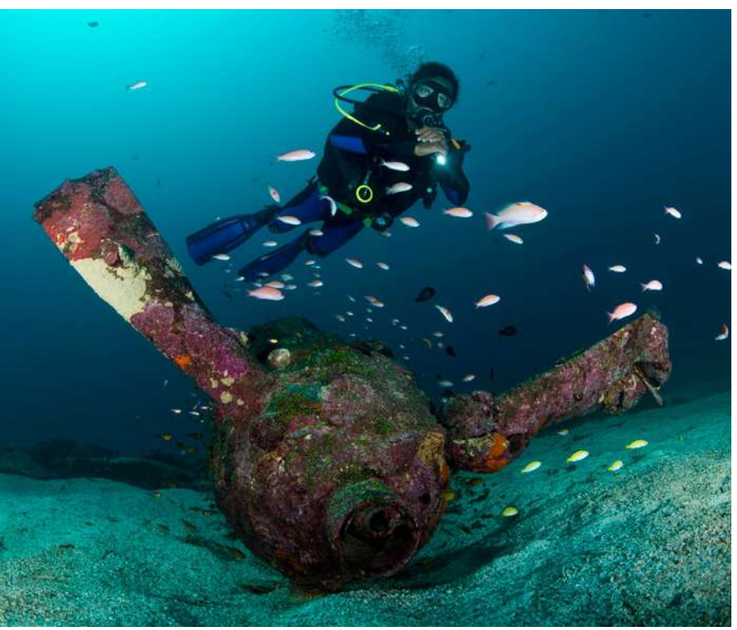
Being a humble air diver, I had to listen stoically to their many stories about deep cleaning stations at 55m where oceanic slivertip sharks come in for a touch up and polish, or the limestone formations and cave systems of the lagoon, together with the numerous WWII ship and plane wrecks of the area that are still to be located; but all that is for another story, and as they say—watch this space.

Diver and sea fan, Mbelo, Munda; Schooling jacks at Top Shelf near Munda (top right)





Wreck of the P39 Aeracobra near Munda;
Deep water bommie at Nusa Roviana Wall (left)



Diver on the wreck of the P39 Aeracobra near Munda

Diving the Roviana Lagoon

There are many sites to dive in the Roviana Lagoon, both inside the barrier islands and on the outside. The best, and certainly the most adventurous diving, are to be had on the outer sides of the barrier islands where you will find walls and slopes washed by the oceanic currents of the Solomon Sea and the biodiversity associated with those current flows—more hard corals than the softer variety, but very rich none the less, and all bathed in the deep clear blue waters that create stunning photogenic backdrops to the pelagics that patrol in them.

Probably the most iconic dive inside the lagoon is the Cave of the Kastom Shark, which is about one hour's boat ride from Munda and located in the mangroves of one of the many islands. Entrance to the cave requires a short walk through the mangroves and then dropping into the small freshwater pool that is the start of a vertical shaft that leads into two large connected chambers.

A guide line has been laid all the way through and, although you reach a depth of 35m at one point, the whole experience is pretty laid back and non-threatening to my untrained cave diver perspective. The exit from the cave takes about ten minutes to reach from the entrance in the mangroves and leads you out onto a steep wall where pelagics prowl on a regular basis.

Similarly, no trip to the Roviana Lagoon can be concluded without a pilgrimage to the wreck of the Bell P39 Aeracobra wreck. I think every diver would like to discover their own wreck, but Graeme and Jen have actually done it when they located the WWII fighter sitting serenely upright on the sand in 36m of water inside the lagoon. The wreck is reasonably intact and comes complete with its own school of sweetlips, which appear to have no fear of humans whatsoever. It is also a "must-do" dive.

Graeme Sanson has not been able to identify the plane or its history since he discovered it in April 2011 but believes it was shot down on a combat mission, as the ammunition trays have rounds in them but are not full.

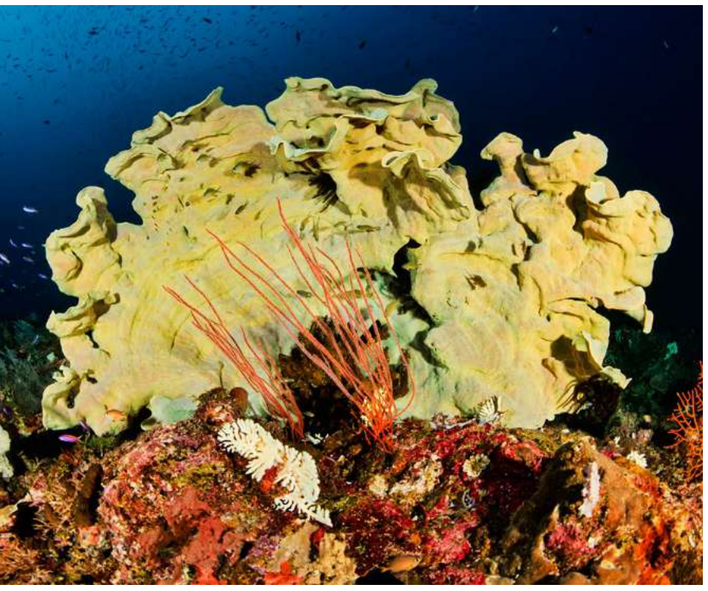
Altogether, I spent 12 days in Munda and had many amazing dives. But if I had to pick a favorite,



Wreck of the Dauntless
Bomber near Munda











Clownfish and anemone (above), beautiful elephant ear sponge (lower left) and longnose hawkfish (right) on the deep water bommie at Nusa Roviana Wall; Schooling barracuda (top right), Shark Point, Munda

Superb swim-through, Eagles Nest near Munda

it would be Nusa Roviana Wall, which we first dived almost as an afterthought one afternoon. Down at 35m was the most amazing deep water reef, flush with both hard and soft corals, black coral trees and teeming with fish, while in the blue, large schools of jacks and barracuda patrolled looking for their next meal.

As we watched a squadron of eagle rays pass overhead and as I pondered whether it could ever be any better, the frantic signaling of Graeme Sanson drew my attention to the great hammerhead that was cruising up the channel just two meters to my right. If only I had taken the wide-angle camera!

Afterthoughts

Like a fine wine, the Solomon Islands stimulates your taste buds and then draws you in, wanting more. I would have loved to stay longer and explore the things and places I learned about. This fine wine, once opened, has to be finished, and I will go back to the Solomons to finish my journey of exploration. It's just a matter of time. ■

Don Silcock is a Bali based underwater photographer and writer whose principal focus is the diving and cultures of the Indo-Pacific region. His images, articles and extensive location guides can be found online on his website: ***Indopacificimages.com***



fact file

Solomon Islands

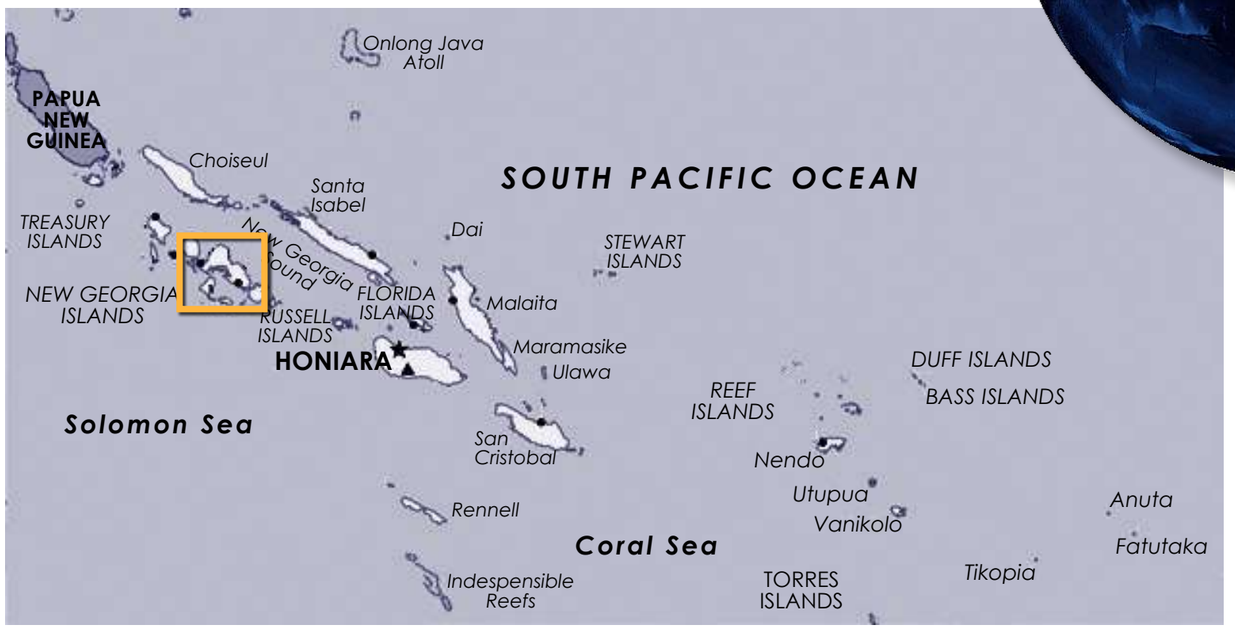


SOURCES: U.S. CIA WORLD FACTBOOK, XE.COM

RIGHT: Global map with location of Solomon Islands
BELOW: Location of New Georgia on map of Solomon Islands
LOWER RIGHT: Roviana Lagoon at sunset

NASA





History Great Britain established a protectorate over the Solomon Islands in the 1890s and developed a number of coconut plantations. The archipelago was the theatre for some of the bitterest fighting of World War II, including the famous battle of Guadalcanal. Self-government was achieved in 1976 and independence two years later. Government: The Solomon Islands is a parliamentary democracy and a member of the British Commonwealth. Capital: Honiara

Geography The Solomons are an archipelago of almost 1,000 islands located along the southern rim of the Pacific Ring of Fire, in between the independent countries of Papua New Guinea to the north, and Vanuatu to the south. Coastline: 5,313km. Terrain consists mostly of rugged mountains and low coral atolls. Lowest point: Pacific Ocean 0m. Highest point: Mount Popomanaseu 2,310m.

Climate The Solomon Islands archipelago lies within 12 degrees latitude of the equator and more than 1,500km from the nearest continent. It has a tropical climate with average daytime temperatures of 29°C and evening temperatures averaging 19°C, high humidity and abundant rainfall. Natural hazards include typhoons, but they are rarely destructive. It is a geologically active region, so there can be tremors, frequent earthquakes and volcanic activity as well as tsunamis.

Environmental issues The Solomons Islands are rich in natural resources but faces many environmental problems, which the development of the country's small mining sector may soon exacerbate. The expansion of human settlement, agriculture, and timber harvesting has also led to deforestation.

Economy The bulk of the population depends on agriculture, fishing, and forestry for at least part of its livelihood. Most manufactured goods and petroleum products must be imported. The islands are rich in undeveloped mineral resources such as lead, zinc, nickel, and gold. Prior to the arrival of The Regional Assistance Mission to the Solomon Islands (RAMSI), severe ethnic violence, the closing of key businesses, and an empty government treasury culminated in economic collapse. RAMSI's efforts to restore law and order and economic stability have led to modest growth as the economy rebuilds.

Currency Solomon Islands dollars (SBD). Most major credit cards are accepted at the majority of hotels. Exchange rates: 1EUR=9.78SBD; 1USD=7.15SBD; 1GBP=11.68SBD; 1AUD=6.38SBD; 1SGD=5.65SBD

Population 597,248 (July 2013 est.) Ethnic groups: Melanesian 94.5%, Polynesian 3%, Micronesian 1.2% (1999 census) Religions: Protestant 73.7%, Roman Catholic 19% (1999 census).

Internet users: 10,000 (2009)

Language Melanesian pidgin is the lingua franca in much of the country. Although English is the official language, it is only spoken by 1-2% of the population, There are about 220 indigenous languages.

Visas/Permits U.S., British, Commonwealth and E.E.C visitors do not need to obtain a visa before arrival.

Security Since 2003, the Regional Assistance Mission to Solomon Islands, consisting of police, military, and civilian advisors drawn from 15 countries, has assisted in re-establishing and maintaining civil and political order while reinforcing regional stability and security.

Electricity 240 volts AC, Plug I (same as Australia). Electricity is not available on all islands though and supply may be erratic.

Health/Vaccinations
Dental, doctors and hospital services are available in major centres. Malaria is a problem in the Solomon Islands, and anti malarial precautions are highly recommended.

Decompression chamber
There is a recompression chamber in Honiara.

Web sites
Solomon Islands Tourism
www.visitsolomons.com.sb





ED.— ALWAYS CONSULT A PHYSICIAN FIRST BEFORE BEGINNING ANY EXERCISE OR FITNESS PROGRAM.

Back & Biceps

Text and photos courtesy of Gretchen M. Ashton CFT, SFT, SFN, NBFE

The biceps are recruited along with the muscles of the back when the body is required to perform powerful physical activities such as lifting and pulling. To maximize their full potential, and because of their integrated function, the biceps and back are ideal muscles to train in the same exercise session. In the same way divers rely on the buddy system, the biceps and back accomplish together what they cannot individually. Divers will benefit from both the physical strength and mental discipline of this exercise combination.

Adaptations to diving activities are numerous and include lifting and handling gear on or near the body, climbing boat ladders under the weight of gear, assisting other divers with gear or rescue, and construction, industrial and technical diving tasks.

Workout and muscles

Supersets combine more than one muscle group into an exercise sequence without a rest. Giant sets are multiple exercises that target the same muscle for more than one exercise in a sequence without a rest. This workout is a thorough combination of supersets and giant sets for major muscles, prime movers and stabilizers, which include the latissimus dorsi, trapezius (mid and upper), rhomboids, deltoid (anterior and posterior), biceps (brachii, brachialis, brachioradialis). Shoulder involvement provides another layer of protection and strength through a greater range of motion. The exercises shown here are demonstrated with dumbbells. If modular resistance machines or cables with weight stacks are available, greater power and strength can be added with more resistance.

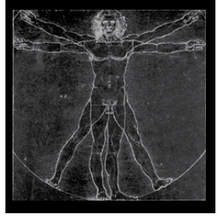
Sets, repetitions and intervals

Select a weight that is comfortably performed for 15 repetitions. Now



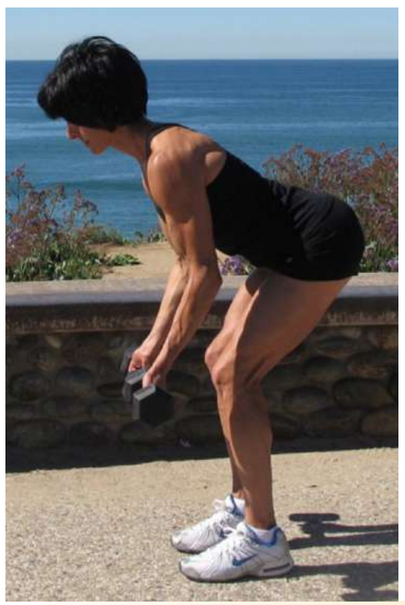
Concentration Curl beginning (above), middle (right) and ending position (above)





using the same weight, complete 25 repetitions or one-minute intervals, whichever is longer. Continue to the next exercise without stopping to rest until all four exercises have been completed. After each round, rest for one to three minutes. The workout is finished after four full rounds or 16 sets. Target a completion time of 45 minutes. Remember to sip water during rests.

Concentration Curl. This exercise is great practice for the mind-muscle connection, thus its name. In a seated position (as shown on previous page), brace the back of the arm between the elbow and shoulder against the inside of the same thigh above the knee. Count to four while exhaling and



Bent-Over Dumbbell Row beginning and ending position



Bent-Over Dumbbell Row middle position

lifting the weight, then count to four while inhaling and lowering the weight. Watch the biceps work and feel the sensations of the exercise. It is very rewarding and motivating.

Precautions. The elbow will sometimes slide up and/or on top of the leg. This usually happens when divers attempt to lift the weight by leveraging with the body instead of using the biceps. If this "unraveling" of form occurs, pause, reset and continue with proper form.

Bent-Over Dumbbell Row. Along with developing strength, this exercise helps maintain good posture. The standing position involves muscles of the lower body similar to diving activity. Stand with feet between hip and shoulder width, bend forward at the hip, contract the abdominals and the buttocks to protect the low back, tuck shoulder blades down and toward center (retract), keep head in line with the spine, reverse the grip (palms up), straighten wrists, bend knees slightly, and extend arms. Inhale before beginning the movement and exhale while pulling the elbows back along the sides of the torso. Inhale again while resisting and lowering the weights. Notice the flat back. Concentrate on pulling with the biceps and large muscles of the back. This is a BIG exercise and meant to be performed with BIG muscles. Some divers will enjoy performing this exercise with a T-Bar Row apparatus.

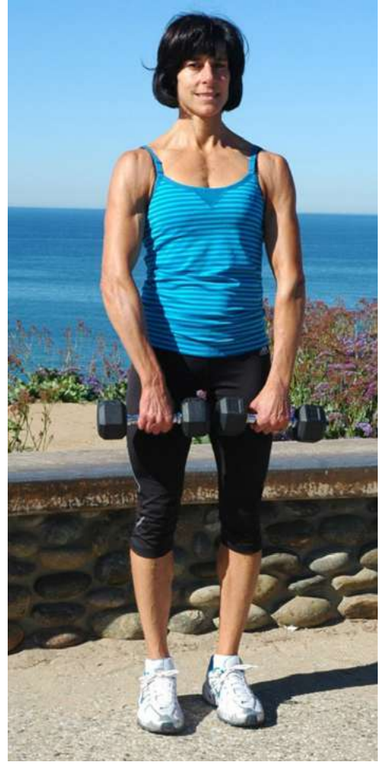




Standing Biceps Curl beginning, middle (right) and ending position (left)

Precautions. This exercise is not recommended in a standing position for divers with low back complications. Instead, it may be performed in a seated position with a small rolled towel or pillow placed under the abdomen for support for the low back. It may also be performed as a One-Arm Dumbbell Row, either kneeling or seated.

Standing Biceps Curl. Standing with feet about hip width apart, slightly flex the knees, contract the abdominals and buttocks, and tuck the shoulder blades down and toward center. The dumbbells are held in a hammer position in this demonstration. There is no need to twist the dumbbells at any time during this exercise, but definitely look to make sure the elbow remains alongside the torso throughout the curl. For most divers the range of motion will be complete before the dumbbell gets to the shoulder. If the elbow is pulling forward this means the movement has gone too far, the biceps is beyond contraction and the final movement came from the shoulder. Inhale before starting the exercise and exhale while lifting the weights.



Upright Row beginning (right) , middle (far right) and ending position (right)



Precautions. Do not lean backwards during the lift to prevent strain in the low back. If the dumbbells won't come all the way up, drop the amount of weight or do a partial repetition.

Upright Row. Raise the weights leading with the elbows. Keep the weights close to the torso. Control the speed and movement of the weight especially while lowering. Inhale to begin and exhale while lifting the weights.

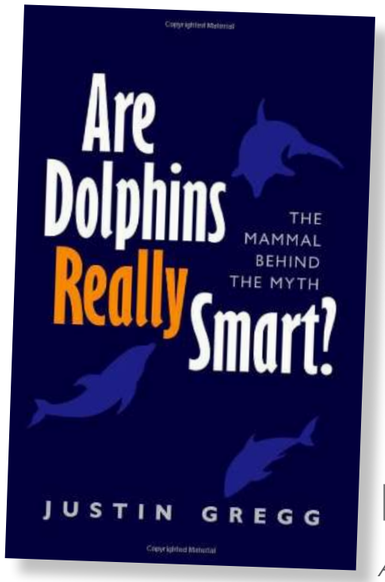
This exercise may be performed in a narrow, mid or wide position from the center of the body. The greater the distance between the dumbbells, the more difficult the exercise is to perform. The wider the position, the lower the elbows will raise because of natural strength and range of motion restrictions. It may be fun to try a different position in each round.

Precautions. Never allow the elbows to drop below the hands when performing this exercise. The greater the flexibility, the higher the elbows. When fatique prevents the elbows from lifting higher than the shoulders, scarecrow (partially lift) the arms with elbows leading. Certain shoulder injuries or conditions may preclude this exercise. ■

Gretchen M. Ashton is registered with the National Board of Fitness Examiners. An advanced diver, International Sports Sciences Association Elite Trainer, and world champion athlete, Ashton developed the ScubaFit program and the comprehensive FitDiver program, which includes the first mobile app for scuba diver fitness. Ashton is the co-author of the PADI ScubaFit Diver Distinctive Specialty course. For more information, visit: ***Scubafit.com***

media

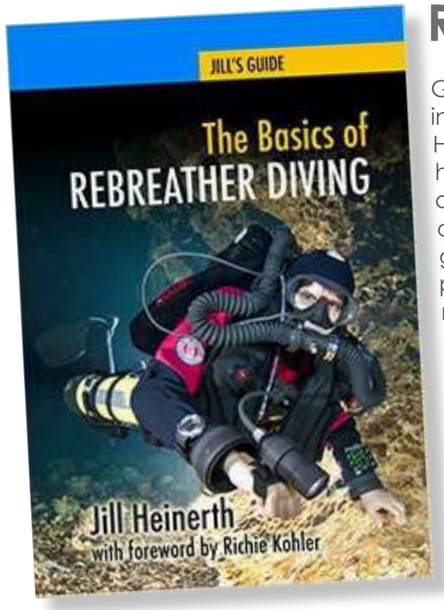




Dolphins

Are Dolphins Really Smart?: The mammal behind the myth, by Justin Gregg. In this book, the author, who is a research associate with the Dolphin Communication Project and co-editor of the academic journal *Aquatic Mammals*, takes an indepth look at dolphin intelligence, separating scientific fact from fiction. The latest research in animal behaviour is presented and comparisons are made with scientific studies of other animals, such as great apes and crows. With underlying evidence, Gregg offers an up-to-date and comprehensive look at this fascinating animal—a new perspective, which many who love dolphins may find of great interest.

Hardcover: 296 pages
Publisher: Oxford University Press, USA
Date: 1 December 2013
ISBN-10: 019966045X
ISBN-13: 978-0199660452



Rebreather Diving

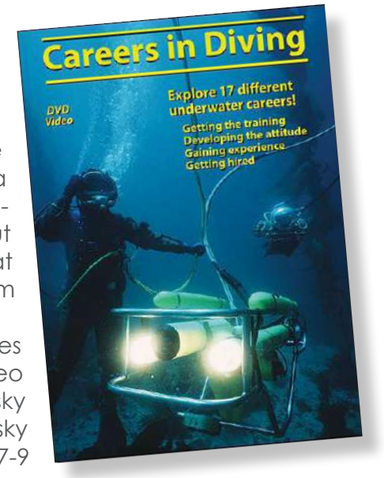
Get on the rebreather trend! Rebreather diving is one of the fastest growing segments of the diving community. Author and leader in the field, Jill Heinerth, who is a professional rebreather diving instructor and cave diver, helps you navigate the complex and often intimidating world of rebreather diving. Get straightforward information on the basics and technical aspects of diving with a rebreather as well as the history of rebreather diving and guidance for beginners. Read tips on how to make the right choice when purchasing a rebreather. Already own a rebreather? Gain insight into the new trends, academics and the future of CCR diving. Most importantly, this book covers safety culture in rebreather diving with accident analysis and prevention. The book is packed with lots of full color photographs, drawings and charts, as well as personal anecdotes from the author.

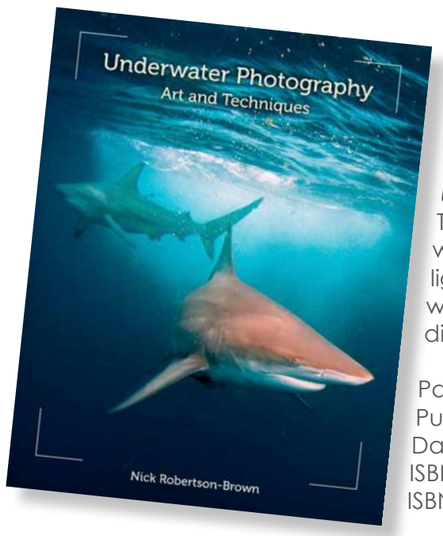
Perfect Paperback: 228 pages
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Date: 2014
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ISBN-13: 978-1940944005

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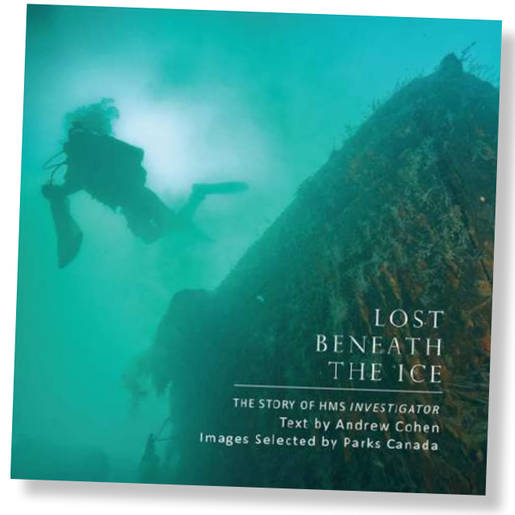




Underwater Photography

Underwater Photography: Art and Techniques, by Nick Robertson-Brown. This is a practical book for divers interested in taking better images underwater. It covers topics such equipment, composition, natural and artificial lighting, underwater conditions and exposure, animal behavior and underwater habitats as well as how to be a responsible photographer. The author discusses both the art and science of underwater photography.

Paperback: 176 pages
Publisher: The Crowood Press Ltd
Date: 27 Jan 2014
ISBN-10: 1847976573
ISBN-13: 978-1847976574



Shipwreck

Lost Beneath the Ice: The Story of HMS Investigator, by Andrew Cohen. In 1850, England sent the HMS *Investigator*, under the command of Captain Robert McClure to be part of one of the largest rescue missions in British history. Their goal: to find Sir John Franklin, who disappeared in the Arctic in the 1840s. The ship's crew, who did not find Franklin, stumbled upon the Northwest Passage before becoming trapped in the ice of Mercy Bay for three years. The *Investigator* was abandoned when the crew was finally rescued. The ship's fate has been a mystery ever since, until Parks Canada sent a team of archaeologists to Mercy Bay to find out what happened to it. This book by Andrew Cohen, illustrated with archival imagery and stunning underwater photographs of *Investigator*, explores the sensational story of the ship, the captain and her crew.

Hardcover: 152 pages
Publisher: Dundurn
Date: 10 December 2013
ISBN-10: 1459719492
ISBN-13: 978-1459719491



Edited by Kelly LaClaire



NOAA

Dolphins using puffer fish as narcotics?

The BBC has broke new ground, filming a group of dolphins using toxic puffer fish in what seems to be an attempt by the mammals to purposefully induce a narcotic-like effect that puts individuals in mild trance states.

The footage is part of a documentary that will air on BBC One in January called, *Dolphins: Spy in the Pod*. Wildlife film maker John Downer and his crew installed remote control cameras into imitation (but life size) dolphins and followed several pods into the open ocean to capture never before seen behaviors—including passing puffer fish around like they are some kind of psychedelic, marine hallucinogen.

The video shows several dolphins deliberately playing with a small puffer fish for 20 to 30 minutes, apparently chewing it gently and then passing it to another pod member.

Rob Pilley, zoologist and series producer, stated, "We saw the dolphins handle the puffers with kid gloves, very gently and delicately, like they were almost milking them to not upset the fish too much or kill it. As a result, the fish released various toxins as a defense. The dolphins then seemed to be mesmerized and hung there up near the surface of the water."

Watching the film, viewers can see several dolphins, heads up, tails down, slowly drifting with little or no motion and staring at the sky,

And this behavior, while new to researchers, seems to be old hat. "Dolphins seem to be experts on how to prepare puffers and how to handle them," continued Pilley. "The dolphins were specifically going for the puffers and deliberately handling them with care."

While very rare, the practice of one animal using another species to alter mental or sensory states is not unknown. Black lemurs, for example, have been known to play with toxic giant millipedes, rubbing the insects all over their bodies in order to feel specific physiological effects. And In Australia, dogs have been documented becoming addicted to the psychotropic secretions of cane toads from licking their backs. ■

SOURCES: BBC; MAIL ONLINE



STEVE DAWSON / NOAA

Maui's dolphin getting some help – but it may not be enough

The Maui's dolphin is the world's smallest and rarest dolphin and only found on the west coast of New Zealand's North Island. According to a recent report by the BBC, there are only 55 adult Maui's extant, and their numbers are being constantly threatened by fishing and disease.

Moreover, a 2012 survey initiated by the New Zealand Department of Conservation, researchers say that around 20 breeding females are living and each one only gives birth to a single calf every two to four years.

In an attempt to halt their decline, the New Zealand government is proposing an extension to a small protection zone to save the diminutive cetaceans. Dr Nick Smith, the conservation minister, has stated that the move will help reduce the biggest threat to the Maui's. "We are taking a cautious approach by banning set netting where there is clear evidence the Maui's dolphins go while not unnecessarily banning fishing where they are not."

Controversy

But local activists argue the introduction of nylon filament nets in the 1970s has been a key factor in the decline of these dolphins, and these new actions don't go far enough.

Conservationist say that more than 75 percent of the Maui's habitat still remains unprotected from set netting and trawling. They worry the Maui's could be extinct within 20 years if more isn't done fast.

"These new measures will do nothing to stop the dolphins' decline," said Dr Elizabeth Slooten from the University of Otago, who has studied these creatures for 30 years.

In protest, the International Union for the Conservation of Nature declared the Maui's critically endangered and passed a motion urging full protection. The International Whaling Commission and the Society for Marine Mammology have also lended their voices and asked the New Zealand government to remove all fishing nets from the entirety of the Maui's habitat. ■



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Marlies and Wolfgang Liebau, November 2013

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Diving Indonesia's Bunaken

Text by Kelly LaClaire. Photos by Kate Clark



Clingfish in yellow feather star. PREVIOUS PAGE: Large red gorgonian sea fan



Bunaken

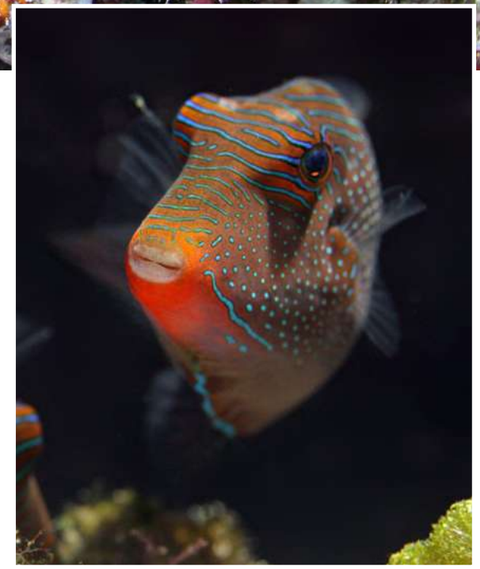
Diver and white-mouthed moray eel; Papuan toby (right inset)

We're swimming fast. Too fast for my liking. I'm taking heaving gulps, and I know my tank won't last very long if we don't slow down soon. Just as I'm about to stop and risk losing my group, we hear a rapid series of bangs coming from our dive boat in the distance. Our guide, a lithe Indonesian with pistons for legs and bottomless iron lungs, points into the blue and somehow quickens his pace.

A few meters ahead to my left, my cousin, Kate Clark, an accomplished diver and tireless swimmer, senses my fatigue and looks back to make sure I haven't quit on her. She slows her speed a bit, trying to be a good buddy and stick with me. The woman is wearing snorkel fins and carrying a 40-pound camera for Pete's sake, I think to myself. How is she swimming so fast?

Kate has me check my gauge, and I groan silently as I see I've already used a third of my air. We've only been in the water ten minutes. She smiles patiently and points to her own gauge (which, of course, is still full) and then to her octopus—"You can always take a few sips off mine if you need it," her eyes say.

More banging, frantic now and louder than ever; the crew has found what they were looking for. Kate beckons me to push on, and I begin kicking with renewed vigor, knowing our prize is just ahead. After another few minutes of hard swimming, I check my pressure gauge once more—the tank is half empty. My heart is pounding audibly,



and I can no longer hear the banging from the boat. My legs are throbbing, and I consider surfacing and giving up. I look up to signal Kate and see her pointing frantically ahead towards the sheer drop off of the giant wall to our



right.

Look! Look!

I shift my gaze and see them. Everything changes.

Volcanic cliffs

Two days earlier, our little boat drifted into a small inlet surrounded by the lush mangroves and the white sands of Bunaken. A tall, slight woman stood at the water's edge and waved us in while two dogs danced at her feet, wagging their tails energetically. Tina Melson, co-owner with Nigel Thomas of Two Fish Dive Resort, served hot tea and cookies while giving us a brief history of the island, as the boat crews and divemasters took our gear to our lodgings.

Bunaken National Marine Park covers nearly 900 square kilometers of ocean ecosystem and was established in 1991. The park is dominated by the rising crest of Manado Tau, a cone shaped peak that reaches 600 meters above sea level. From almost anywhere inside the park's boundaries you can see its lush slopes of coconut palms gathering pillows of clouds throughout the day. The dive sites around the inactive volcano feature some of the steepest, most dramatic walls in the area and are absolutely packed with life.

"The underwater landscapes around Bunaken are breathtaking," Tina told us. "There is so much diversity of marine life here—hard and soft corals, reef fish, invertebrates, pelagics, turtles and so on—that each dive offers something new and exciting for any certification level." She paused a moment before smiling, "You're really going to love it here."

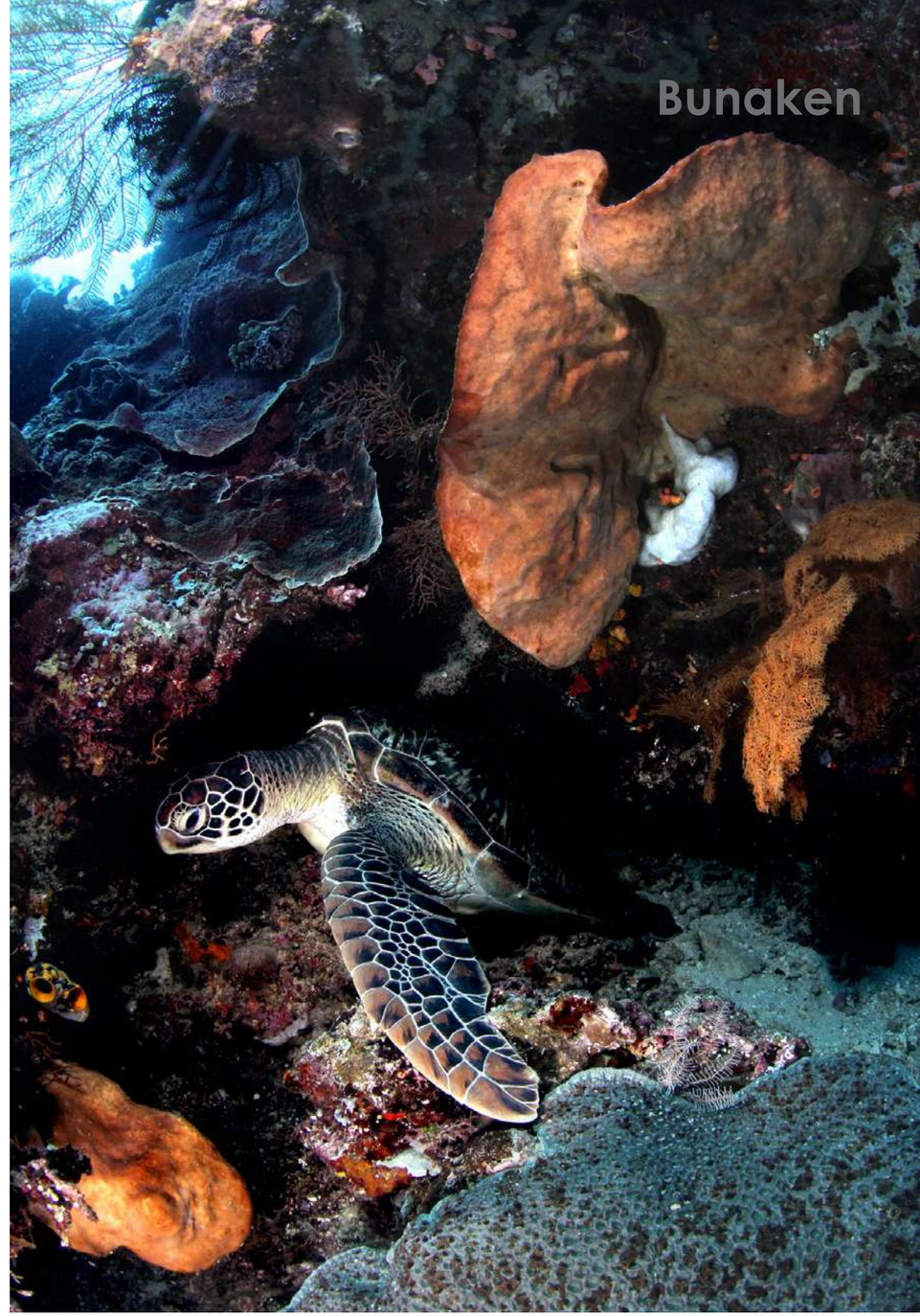
She was right. The first two days, as Tina promised, were spectacular. The giant walls of the park's volcanic islands are absolutely monolithic, dropping hundreds of meters, and home to more turtles than any one area I have ever encountered. In the first several dives, we saw over

Banded sea snake; Bubble coral shrimp (top left); Detail of eye of blue-spotted stingray (left)

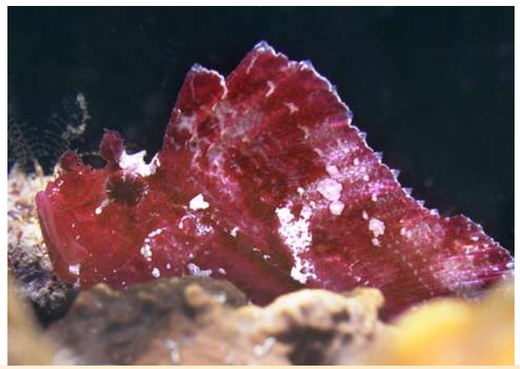












CLOCKWISE FROM ABOVE: Hawksbill sea turtle head-on; Clownfish on anemone; Flatworm on reef; Pygmy seahorse; Green sea turtle in alcove; Leaf scorpionfish

a dozen hawksbill sea turtles and several massive "greens" that were easily six feet long and as big as Smart Cars.

One friendly and curious green sea turtle took more than a passing interest in Kate's camera and spent several moments following her around, inspecting the domed housing with its mouth agape and its eyes wide with wonder. In some areas, they were so ubiquitous that soon—and I cringe at having to admit this—I was actually beginning to pass them by without a second glance.

Banded sea snakes and leery morays are also extremely common in the nooks and crannies of the rocky outcroppings—the small caverns and deep cracks in the granite making excellent hunting grounds. Large numbers of blue-spotted stingrays make the sandy coral breaks along the sheer cliffs their home as well, but they are rather shy and divers need to keep their cameras at the ready if they want a chance at capturing a good image.

Each underwater precipice here is literally swarming with pyramid butterflyfish and feisty red-toothed triggerfish that you can actually hear chomping their teeth, as they charge your mask and regulator valve. The triggers aren't the only species fierce about protecting their territory, however. Anemonefish can be downright belligerent, rushing your mask and slapping your ears with their tails if you spend too long peering into their habitat.

Large schools of silver jacks also whirl and dance along the sheer drop-offs and whitetip sharks can usually be found cruising the walls as well. Unfortunately, a long, hot Indonesian spring had pushed the water temperatures to nearly 28°C (82°F), and the sharks had sought cooler waters in the depths below. Bunaken also boasts the occasional whale shark sighting.

Unexpected macro

To be sure, most dives in Bunaken are wall dives, and the volcanic crags are absolutely covered with large corals and colorful fish, but that's not all the protected group of islands has to offer.

On our third day, Kate asked our guide, John Kanoneng, if there were any good spots for macro. John just smiled and said in his thick accent, "Any dive is good for the small lens. You bring macro, I show you." And he did,









CLOCKWISE FROM LOWER LEFT: Whip coral shrimp; Ornate ghost pipefish pair; Randall's shrimp goby; Coral crab on sponge; School of jacks



in a big way.

As the other divers in our group swiftly drifted along the rock faces in search of more giant sea turtles and rays, we slowly and methodically stopped every few feet, as John searched out ornate ghost pipefish, banded boxers, leaf fish, orangutan and porcelain crabs, pygmy cuttlefish, juvenile puffers, grumpy and stoic scorpionfish and wire corals hiding the tiniest shrimps imaginable—and all this on a single "average" wall dive.

Bunaken sometimes gets short shrift when it come to its microscopic life—being so close to Lembeh Strait where macro photography is considered by some, the best on Earth, doesn't help—but, as John proved again and again, the hawk-eyed guides here will seek out pygmy seahorses, candy crabs, juvenile sweetlips, leaf scorpionfish and a host of other exotic, tiny creatures that make the sheer cliffs their home. It's enough to convince anyone that Bunaken's macro life is world-class.

My personal favorite find was a blood-red electric clam hiding under a rocky overhang. The rest of our group had passed by the area rather swiftly, not finding anything special besides a large purple sea fan. But John led us into a small cave and methodically searched the rocks and dark cracks until he spotted the jumping arcs of electricity zipping across the glowing edges of the creature's shell.

Hundreds of species of nudibranchs thrive along these walls as well. "Nudi hunting", as it commonly referred to, can actually get quite addicting, and each time we spotted a new and bizarre color combination hidden among the corals, we flashed happy hand signals and big smiles.

So, if you happen to hear another diver telling you Bunaken is all wall dives and the macro life is lacking, please, please, pleeeeeeease don't listen. There is abundant and varied macro life hiding along those volcanic cliffs, and if you slow down just a little and allow the guides to help you, Two Fish will make a believer out of you.

Topside treasures

Monkeys at Manado. A stone's throw from Manado Harbor sits the Tangkoko National Forest, a small rainforest reserve that includes three mountains: Mount Tangkoko (1,109 meters), Mount Dua Saudara (1,109 meters) and Mount Batuangus (450 meters). It is here, hiding among the dense flora of the island's volcanic peaks, that one can often view the endangered tarsier monkey—



Decorator spider crab



Children of the local village

Bunaken



The majestic Protestent church in Bunaken's village is dwarfed by the volcano, Manado Tau, in the background. Rising 600m above sea level, its lush slopes of coconut palms gathers pillows of clouds



Flowerrs in Bunaken's village

the world's smallest (and possibly most adorable) primate. Only the size of a tennis ball, these little primates are a nocturnal wonder, foraging for geckos and small insects among the hardwood trees, their enormous, saucer-shaped eyes and soft velvety fur gleaming in the moonlight.

Tarsiers are the only monkeys in the world that are completely carnivorous, eating nothing but small animals and insects. They accomplish this with incredibly acute hearing and unmatched eyesight, as well as strong legs and elongated feet and fingers that allow them to pounce on and hold prey while hunting.

You also may be lucky enough to encounter a small group of Celebes crested macaques—small, jet-black monkeys with long muzzles, high cheek bones and a long tuft of hair on the top of their heads. These primates, known as *yaki* to the locals, are endangered as well, but conservation efforts are helping.

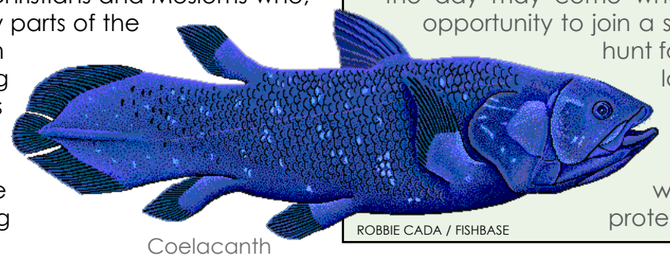
One group in particular, known as Save the Yakis has made great strides in educating villagers and adding environmental protections. Unfortunately, Celebes can be devastating to local crops, and farmers view them as pests. The interaction has thinned the population significantly, and deforestation has robbed this species of much of its natural habitat.

Village life. Life on a remote island is pretty quiet, so if you're looking for a place to get wild after a day of diving, Bunaken probably isn't the place. But the slow and easy atmosphere is exactly what I liked most about our stay.

Kate and I took a leisurely walk around the island and visited the main village. Here, you can find friendly locals sipping cold drinks, napping on shaded porches or tending to their land. Children chase small pigs and goats or gather in groups to play tag or kick a soccer ball around the narrow streets.

In the center of the community lies Bunaken village's splendid and majestic Protestant church, its Gothic spires and peaked eaves towering above the palms. It was Easter the day we visited, and the pews were filled with well-dressed villagers singing hymnals, chanting psalms and fanning themselves in an attempt to keep cool.

The island, like much of Indonesia, is a mixture of Christians and Moslems who, unlike many parts of the world, seem to get along just fine. This was somewhat of a shock to me at first. Living



Coelacanth

YOU FOUND A WHAT?

In case you haven't heard of the famous coelacanth, let me give you a brief introduction.

This prehistoric fish is truly a living fossil. Its body and behavioral habits have hardly changed in the last 400 million years, The coelacanth, known to the locals as raja laut (king of the sea) is one of the most mysterious and enigmatic fish in the ocean and was believed to have gone extinct 80 million years ago.

However, in 1938 a live coelacanth was found off the coast of South Africa. Not surprisingly the scientific community was astounded and suspected that the Comoros Islands were the only area left that was home to these ancient fish. Turns out they were wrong again.

In 1997, a couple honeymooning in Manado (eight miles from Bunaken Island) saw a coelacanth for sale in a local fish market and reported the finding to researchers. Several months later, in 1998, another coelacanth was caught in the Bunaken Marine Park by two local fisherman, and two more were filmed underwater in 1999 by researchers in the same area.

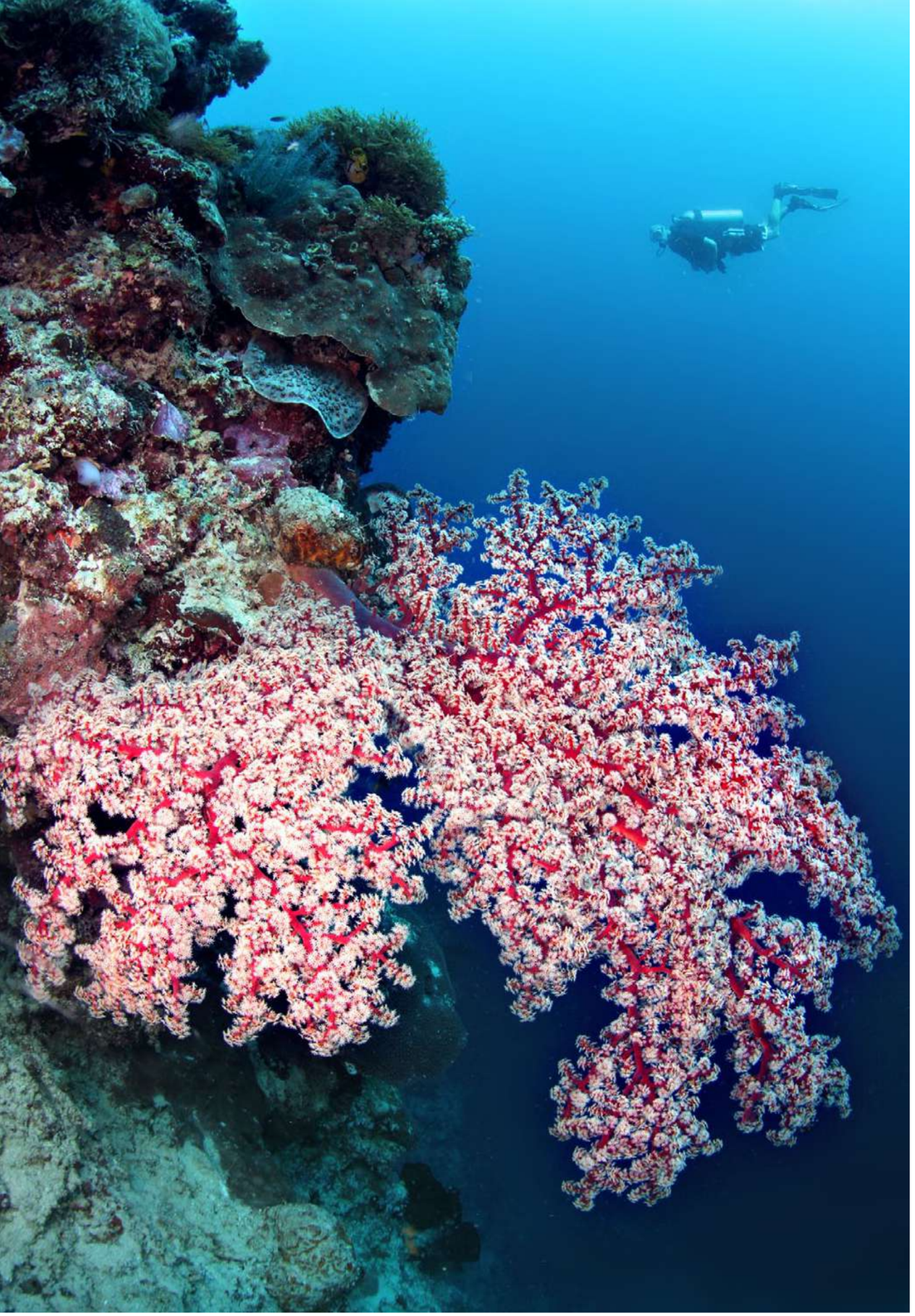
Scientists concluded after examining the second catch, the fish was not one of the South African coelacanths, but a separate species of its own. Since then, four more coelacanths have been caught in the waters around Bunaken, and the Indonesian government seems to be cooperating with research and conservation efforts to study and safeguard the ancient fish.

Currently, very little is known about the coelacanth, other than the fact that they usually hide in deep caves during the day and feed along the coasts at night. But that may be changing.

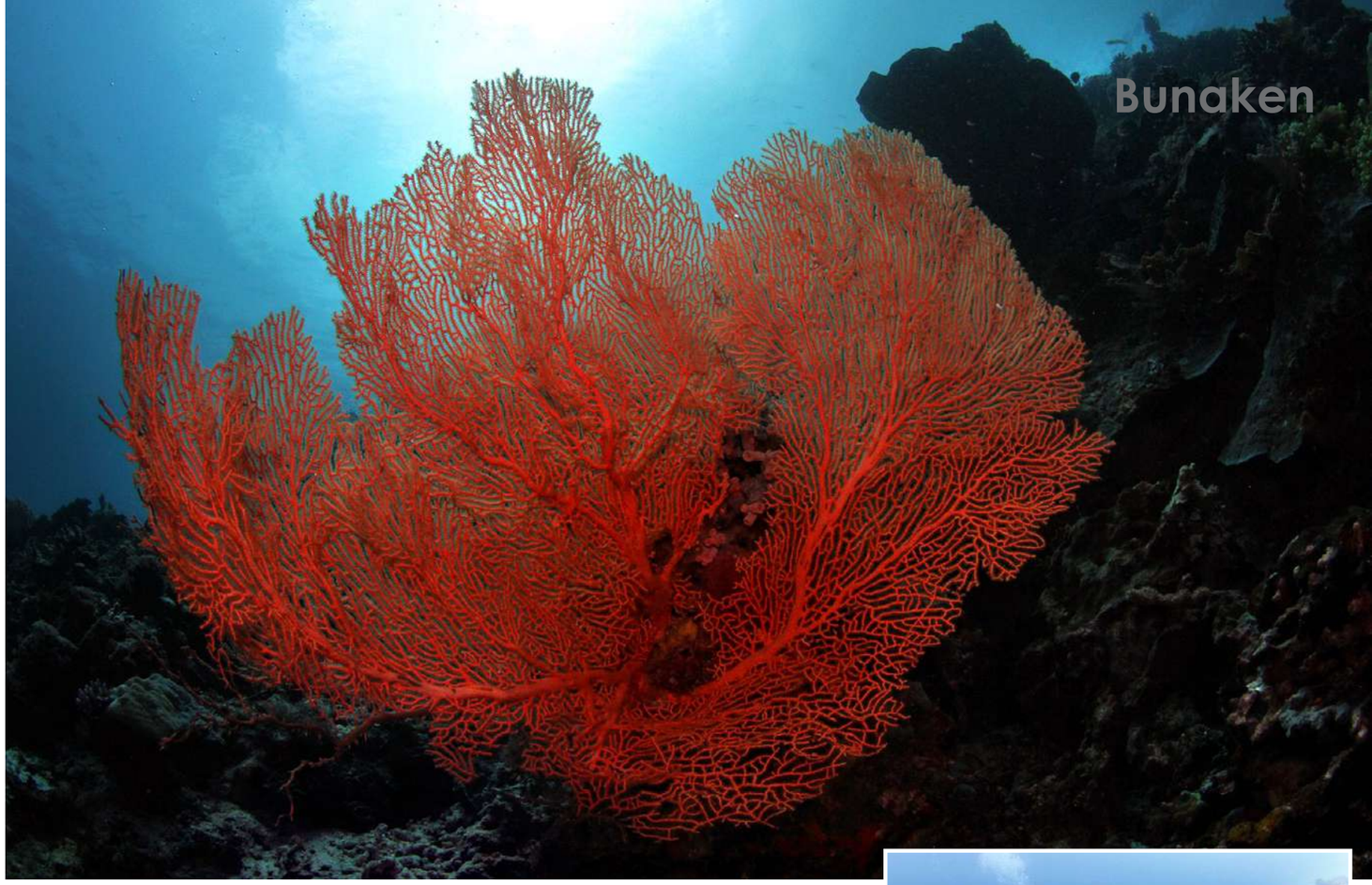
In October of 2000, a team of experienced trimix tech divers located a small school of the coelacanths at a depth of just over 100 meters off the coast of South Africa.

Now, Two Fish has started their own technical dive operations in the marine reserve. So, the day may come when you have the opportunity to join a special group and hunt for the elusive coelacanth and other bizarre creatures in the deep and unexplored waters of Bunaken's protected sanctuary. ■

ROBBIE CADA / FISHBASE



Wall with billowing red soft coral, author Kelly LaClaire hovers in the background, Mantahege Island



Large red gargonian sea fan and large colony of staghorn coral (right), Mantahege Island

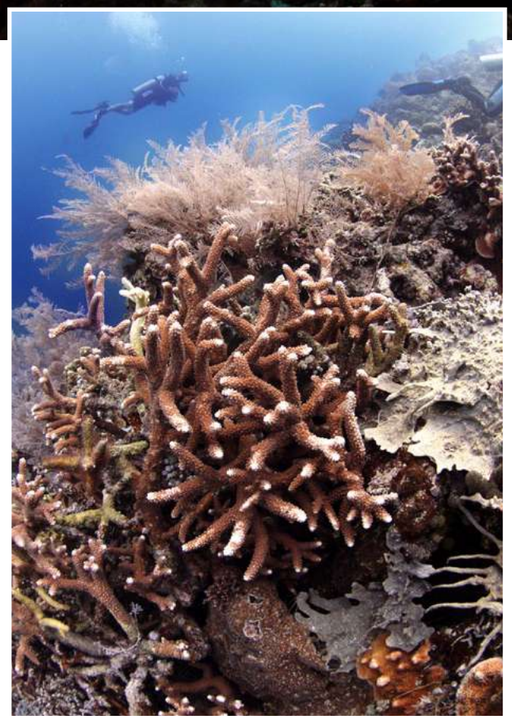
in the United States, I am used to the constant, bitter hostility between these two groups. If more people could come here and see these two sects living alongside one another peacefully, with almost no animosity or resentment, it might just change some thinking back home and around the world.

But perhaps my favorite topside activity was lounging around the Two Fish common area, visiting with friendly folks after a sun filled day of diving. Each night, after enjoying homemade satays, fresh fish selections and spicy noodle dishes, several guests would gather around the softly lit cabana for a cold bottle (or three) of Bintang beer while the divemasters sat nearby playing guitar and singing under the stars.

We made many friends there, sitting under a brilliant moon sharing the day's dive adventures, swapping travel stories, telling one another about the lives we led back home. One couple hailed from New Zealand, another from Spain, and many others from far reaching locals across the planet.

When I sit down to write articles about my experiences, I always smile widest when I look back on these moments. There are few things better than learning about the world from good conversation with fine people.

It was on one such evening that one of the guests asked us if we had visited Barracuda Point. Kate and I looked at each other with wide eyes and simultaneously leaned forward in our chairs, our interest seriously piqued. "What's that?" we asked.





Barracuda Point

The next day we were up early and headed out towards Mantehage Island, several miles north of the resort. Mantehage is just one of many islands in the marine park that, due to their distance from Bunaken, are far less visited than the main islands. Each trip is an all day, three tank affair and a bit more expensive, but the remote waters and relative lack of divers make the surcharge well worth it.

After about an hour, our captain shut off the engine and gave one of the greatest dive briefings I've ever heard.

"This is Barracuda Point," he said. "We only have one shot at this. Everyone is going to get in the water, and the boat will go ahead of us and try and find the school. When they do, we will hear rapid banging, and then we're all going to swim like hell! If we do this right, you are all going to see a huge swarm of giant barracuda. Sound good?"

Everyone on the boat nodded feverishly.

"Okay, then. Let's go!"

Ten minutes of hard swimming later, I was in agony. My lungs were on fire and my calves were cramping with every kick. I had just decided to give it up and surface when we finally saw the massive school. At least three hundred giant barracuda were swimming in a lazy tornado near the steep drop off.

All the pain disappeared instantly. My lungs no longer burned, my legs didn't seem to be tired at all. My attention, which had previously been focused entirely on my protesting body, had shifted wholly to the sight before me.

I took two deep pulls on my regulator and then my breathing levelled out. I'd never seen anything like this before.

Our guide put out his arms, telling us to stop. He didn't want to spook them. The

Barracuda ball at the surface; Diver Markko doing a technical dive (top left); Diver over coral garden (left)





Bunaken

CLOCKWISE FROM FAR LEFT: Mangroves at Two Fish; The dive guides of Two Fish on deck; *Chromodoris annae* and *Halgerda batangas* nudibranchs; Sunset silhouette of village church; Yellow feather star on barrel sponge





school moved out a bit into open water but slowly drifted back towards the coral, getting within touching distance of Kate and I.

I'm not embarrassed to tell you my heart rate quickened considerably. I wasn't too worried; I'm an experienced diver, and I have been in similar situations, but still, these were barracuda, and damn big ones. The average fish was around two meters, some even larger, and I knew what these aggressive hunting machines could do if they decided to strike. Most of them eyed us suspiciously as they passed—a few baring their teeth just to let us know that this was their territory—but none broke away from the pack to investigate us further.

A few moments later, Kate pointed to our left and another school, this one bigger than the first, moved in and began circling the area. The two groups moved like slow, underwater cyclones along the rocky walls, coming together for a brief moment in a great double helix and then breaking away from one another to sweep the rock face again in wide, deliberate circles. It was one of the most beautiful sights I've ever seen underwater, and I didn't want the dive to end.

The show lasted 20 minutes before the barracuda decided to head down to deeper waters. Our little group followed them a few meters into the blue, watching as they slipped down into the depths below.

On the surface, a loud chorus of whoops rang out. The whole group was pumped and no one restrained their emotions. Each one of us had just experienced one of those rare dive encounters we knew may never come again, and we were far too excited for inhibitions.

Kate looked at me, eyes bright and filled with laughter. "You know..." she said, "I really love scuba diving."

Yeah. Me too, Kate. Me too. ■

Assistant editor Kelly LaClaire and underwater photographer Kate Clark are cousins based in Portland, Oregon, USA. They share a passion for worldwide travel, experiencing new cultures, and friendly competitions to see who can last the longest on a single tank of air—so far, Kate is the undisputed champion.

SOURCES: SULAWESI.COM, WIKIPEDIA.ORG





fact file

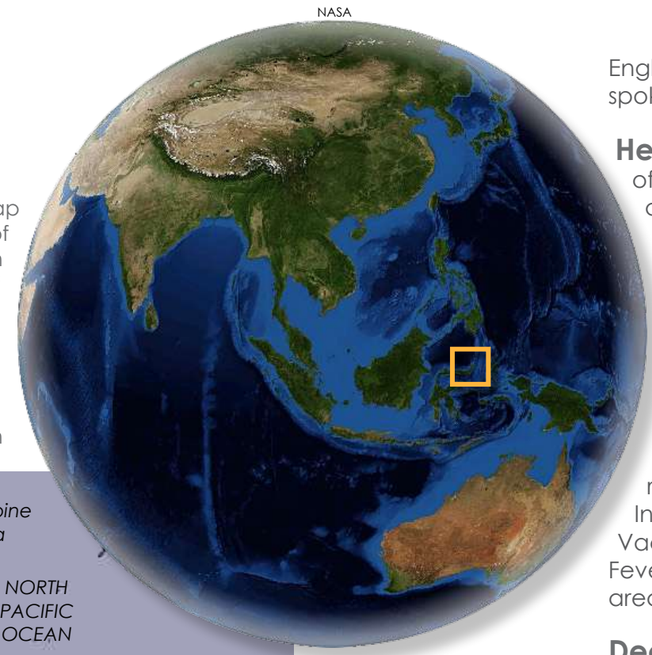


Bunaken, Indonesia

SOURCES: U.S. CIA WORLD FACTBOOK, NORTH-SULAWESI.ORG, D. SILCOCK

RIGHT: Global map with location of Bunaken
BELOW: Location of Bunaken on map of Indonesia
BOTTOM RIGHT: Porcupinefish with cleaner wrasse, Bunaken

NASA





History Moslem merchants from Persia began visiting Indonesia in the 13th century and established trade links between this country and India and Persia. Along with trade, they propagated Islam among the Indonesian people, particularly along the coastal areas of Java. In 1511, the Portuguese arrived in search of spices after their conquest of the Islamic Empire of Malacca. They were followed by the Spaniards. Both began to propagate Christianity and were most successful in Minahasa/North Sulawesi and Maluku, also known as the Moluccas. However, it wasn't until the arrival of the Dutch in the early 17th century that Christianity became the predominant religion of North Sulawesi. From 1942 to 1945, Japan occupied Indonesia. Shortly before Japan's surrender in WWII, Indonesia declared its independence. However, it took four years of often brutal fighting, sporadic negotiations, and mediation by the United Nations before the Netherlands finally agreed in 1949 to transfer sovereignty. Strife continued in Indonesia's unstable parliamentary democracy until President Soekarno declared martial law in 1957. Soekarno was removed from power following a fruitless coup in 1965 by alleged Communist sympathizers. President Suharto ruled Indonesia from 1966 until 1988. Suharto was toppled in 1998 following a round of riots, and in 1999, free and fair legislative elections took place. Indonesia is the world's third most populous democracy, Government: Republic. Capital: Jakarta.

Geography

Located in Southeastern Asia, Indonesia is an archipelago situated between the Indian and Pacific Oceans. Coastline: 54,716km. Terrain consists primarily of coastal lowlands, with interior mountains on larger islands.

Climate Tropical, hot and humid, with more moderate climate in the highlands. The water temperature is normally 28-29°C (84-86°F) year round, with an occasional "chilly" 27°C (82°F) spot. Most divers use 1mm neoprene suits. However, some people prefer 3mm.

Environmental issues

Challenges include industrial waste water pollution, sewage, urban air pollution, deforestation, smoke and haze due to forest fires. Logging—the rainforests within the combined West Papua/Papua New Guinea land mass are second in size only to those of the Amazon, making it 'the lungs of Asia'. In 2001, there were 57 forest concession-holders in operation around the country and untold other forest ventures operating illegally. Mining—tailings from copper, nickel, and gold mining are real threats.

Economy A vast polyglot nation, Indonesia has experienced modest economic growth in recent years. Economic advances were made with significant financial reforms. In 2009, when the global financial crisis hit, Indonesia fared well compared to its regional neighbors. It was one of the only G20 members posting growth in 2009, alongside China and India. However, the government still faces ongoing challenges of improving the country's insufficient infrastructure, labor unrest over wages, and high oil prices affecting fuel subsidy programs.

Currency Indonesian Rupiah (IDR). Visa cards, Euros and U.S. Dollars (large bills issued after 1999) are widely accepted. ATM machines in tourist areas offer the best exchange rates, Travellers cheques are becoming quite difficult to use except at banks. Exchange rates: 1EUR=12,723IDR; 1USD= 9,737IDR; 1GBP=15,127IDR; 1AUD= 9,972IDR; 1SGD= 7,908IDR

Population

251,160,124 (July 2013 est.) Ethnic groups: Javanese 40.6%, Sundanese 15%, Madurese 3.3%, Minangkabau 2.7%, Betawi 2.4%, Bugis 2.4%, Banten 2%, Banjar 1.7% (2000 census). Religions: Muslim 86.1%, Protestant 5.7%, Roman Catholic 3%, Hindu 1.8% (2000 census). Note: Indonesia is the largest Muslim country in the world. Visitors are encouraged to respect local traditions and dress modestly. Internet users: 20 million (2009)

Language Bahasa Indonesian is the official language, plus English, Dutch and local dialects are spoken. In tourist areas, English, Spanish and German are spoken.

Health There is a high degree of risk for food or waterborne diseases such as bacterial diarrhea, hepatitis A and E, and typhoid fever, as well as vectorborne diseases such as chikungunya, dengue fever and malaria. Check with WHO or your dive operator for prophalaxis recommendations. Larium is not effective. Bring insect repellents containing DEET. International Certificate of Vaccination required for Yellow Fever if arriving from infected area within five days.

Decompression chamber

Manado: Malalayang Hospital
tel: +62 0811 430913
Makassar: Rumah Sakit Umum Wahidin Sudirohusodo
tel: +62 0411 (584677) or 584675

Travel/Visa/Security

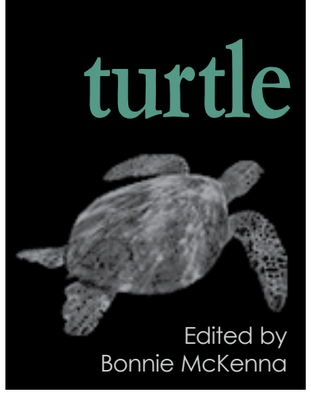
Passport valid for six months beyond intended stay is required. There is a Visa-On-Arrival for 35 countries including USA, UK, most European and Asian countries. It is US$25 for a stay of up to 30 days. Although there is an active independence movement in Papua, tourists have not been impacted.

Web sites

Indonesia Travel
www.indonesia.travel/en



turtle tales



Longline fishing off Costa Rica continues killing sea turtles

At the end of October 2013, the group, Widecast, found dead green sea turtles along the Pacific cost of Costa Rica attached to longline fishing hooks, nylon strings and rope.

The 70 dead green sea turtles were found near the Murcielago Archipelago, in the northwestern province of Guanacaste.

"It is not difficult to conclude that they were caught by longline fishing devices," said Wildcast Costa Rica director Didiher Chacon. "Last week, we had reports of mahi mahi in the area, and behind them usually comes the longline fishing fleet."

In January 2013, 280 dead sea turtles were discovered in the Gulf Dulce, in the southern Pacific area of Costa Rica. Veterinarians discovered inflammation and damage to the turtles' respiratory systems, leading them to determine the turtles had drowned after being snared in nylon nets and fishing lines.

Wildcast's campaign in Costa Rica is called "Yes to sustainable fishing." The campaign aims to inform the public about turtle deaths due to fishing bycatch. They also hope to obtain signatures calling for technical, administrative, legal and socio-economic measures to ensure sustainable fishing practices.

"With this campaign, we intend to ask the government to regulate longline fishing, which includes eliminating the use of live bait and prohibiting that type of fishing in areas with large turtle populations," said Wildcast administrators.

The petition also calls for fines for those who leave unsupervised fishing gear out at sea and increased fines for snaring sea turtles as bycatch. ■


FILE PHOTO: KATE CLARK

Expand your diving horizons
with Pelagian dive yacht

"The perfect dive vacation. We did five days on Pelagian and five days at the resort. Pelagian is the best liveaboard we have ever experienced in our 20 years of diving. Our cabin was equal if not better than a five star hotel room."

Ann Donahue, October 2013

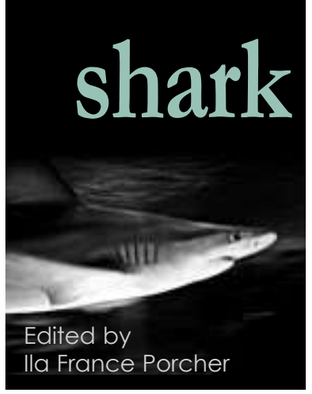


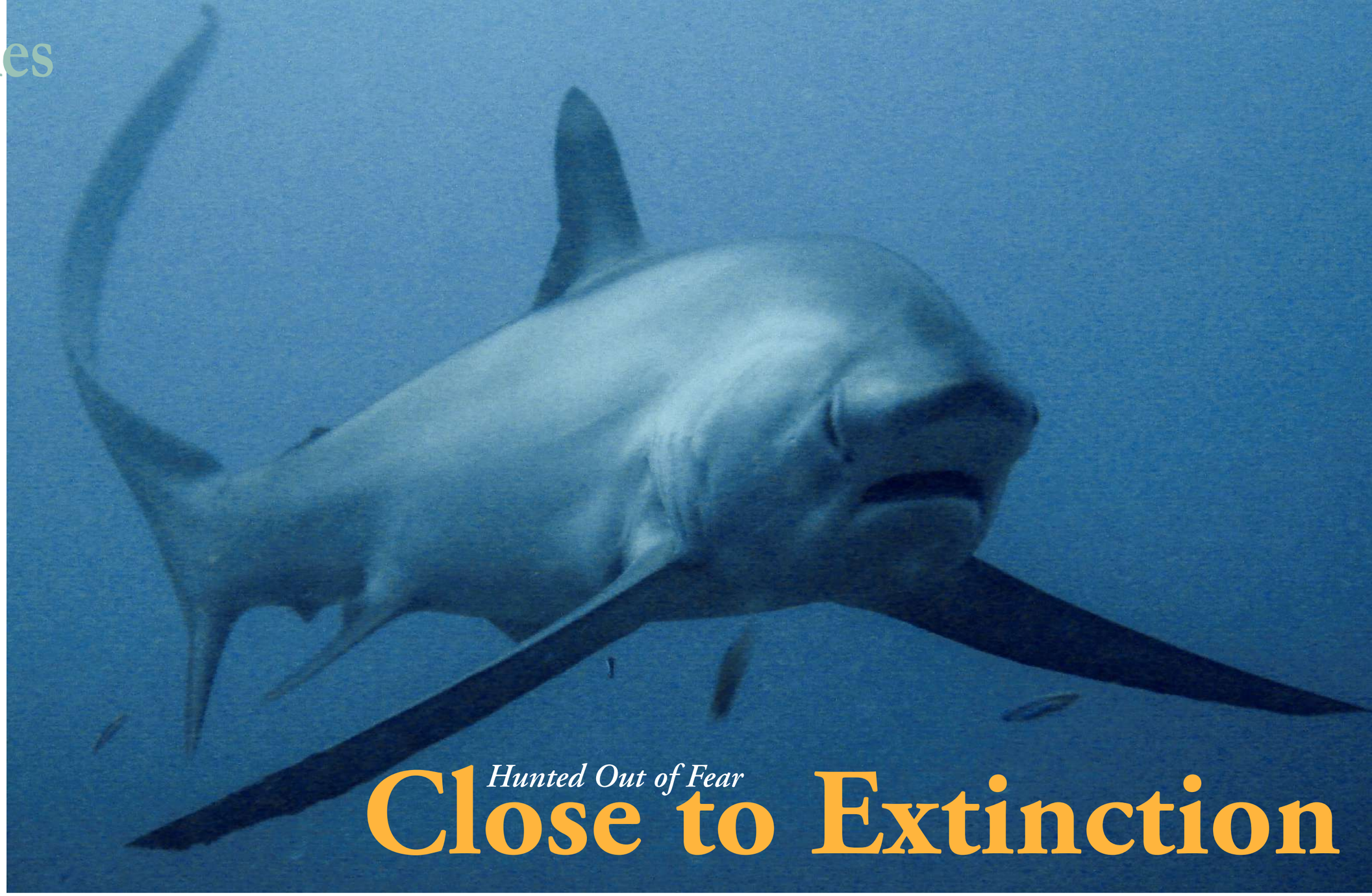
Indonesian village turns to traditional law to protect sea turtles

Seacology has funded a new sea turtle guard post near Pelilit Village on Nusa Penida Island that will help villagers keep sea turtle nesting areas from poachers. The guard post will be staffed according to tongayah, the system of obligatory volunteer work for village members.

In Pelilit, conservation rules for this beach and for the nearby forest are enforced by traditional laws known as awig-awig.

Though awig-awig isn't official Indonesian law, the consequences for breaking its rules are severe. If caught, the fine can be as much as 100kg of rice, and village members can be forced to make a public plea for forgiveness. Breaking the rules multiple times can lead to expulsion from the village. ■





Hunted Out of Fear

Close to Extinction

Text and photos
courtesy of Rohan Perkins

The shark is an apex predator that has been on this earth for over 400 million years—a predator that, through the media and our deep-seated fears, has been systematically targeted and hunted throughout the world's oceans, pushing many species close to extinction.

"Four hundred million years to perfect—30 years to almost destroy." This simple, yet apt phrase from the Shark Education, Awareness and Survival program (SEAS) in Malaysia describes the situation that shark populations are in worldwide. It is the phrase that Scuba Junkie Mabul Resort on the east coast of Borneo has been using over the last seven years when talking passionately about the area in which they take people diving on a daily basis, and about the sharks that they have been trying to protect in the area over that time.

The fact is—contrary to popular belief and misconceptions—sharks are relatively shy and hesitant animals. Even with the millions of interactions that happen with sharks around the globe daily, there are only around five to seven human fatalities a year.

However, due to misunderstanding and human nature as well as the current rate of targeted fishing and by catch, we may see species of shark, such as the now globally endangered hammerhead, become extinct in the very near future.

I have had the privilege to be underwater for thousands of hours with these beautiful and enigmatic creatures, and I believe that this must not happen. It is time we started to see these creatures as the beautiful and ecologically vital creatures that they are. It is time that our attitudes towards them change, and that the protection and education begins.

The reefs of Sabah, Malaysia, exhibit some of the most biodiverse marine ecosystems in the world, from corals to large rays and the top predators—sharks. Over the last 11 years living and diving in Southeast Asia, I have yet to come across a place as unique as this. But there are problems here, like any other place in the

shark tales


ENIRO

world. We still have many shark species here, including the very rare hammerhead shark, and currently, these species are not protected.

Sharks, which have been part of the ocean's ecosystems since long before the dinosaurs roamed the Earth, are at risk of extinction because of increased industrial fishing and demand for shark fin soup in the past 30 years. It is estimated that one in five of every shark species is classified as 'Threatened with Extinction' by the IUCN—a conservative estimate, as there is insufficient data on almost half of all shark species to determine their population status. With estimates of anywhere from 70 million to 200 million sharks being killed annually, the state of their future is in serious jeopardy.

These statistics are worrying enough when talking about losing entire species, especially those which are a joy to see when diving. But sharks, as apex predators, are key to regulating the ocean ecosystem. They maintain a balance in populations of prey species by removing diseased or old animals. Remove the shark, and the health of the ecosystem suffers. Disrupt ecosystems, and the health of the ocean as a whole suffers.

The scale of the problem can be daunting. It is a global problem, and it is at a critical stage. Action is needed now, not just at the international and governmental level, but also at a local and grassroots level. Areas of ocean known for their shark populations and marine biodiversity become even more important in circumstances such as these. This is what has inspired us to take action to protect the sharks and rays of Sabah, Malaysia.

The importance of Sabah

The waters of Sabah lie within the coral triangle—a roughly triangular area of the tropical marine waters of Indonesia, Malaysia and Papua New Guinea—that is recognized as a centre of high marine biodiversity. The iconic Sipadan Island—one of the top diving destinations in the world, which was made famous by Jacques Cousteau—lies within Sabah waters.

The area is vitally important for marine conservation in general, with Sipadan itself being a prime example of what can be achieved with appropriate action by authorities. The intercession of the Malaysian government in 2005 to declare Palau Sipadan a Marine Protected Park brought together marine conservation and recreational diving in an effort that drastically reduced the negative human impacts on the island and preserved this island 'jewel' for future generations. Such protection being extended to a wider area of the Sabah region would bring untold benefits, especially for shark conservation.

With estimates of anywhere from 70 million to 200 million sharks being killed annually, the state of their future is in serious jeopardy.

There are around 63 species of shark and 68 species of ray currently confirmed in Malaysian waters—including rare species such as hammerheads, eagle rays, devil rays and manta rays. Populations and sightings of whitetip reef sharks, grey reef sharks, whale sharks, blacktip reef sharks and silvertip sharks are common.

We still have these species here, unlike many other places I have dived in Southeast Asia, where most of the large fish species have simply been wiped out. If we protect them, we will not only protect the species and health of this marine environment, but we will also save a significant long-term economical resource, which will disappear if the area is allowed to be indiscriminately fished. Ironically, if that happens, it will take the increasing, sustainable tourism industry with it, so it will become a 'lose-lose' situation.

We are lucky to see some very rare species in the Semporna region. Recently, schooling devil rays have been seen at Si Amil, numbering well over 100. Both great and scalloped hammerheads are sighted at Sipadan. Populations of hammerheads have crashed by up to 89 percent in some areas—making those sightings crucially important for species recovery. A personal incentive for getting shark conservation really moving in this area was guiding at Sipadan and seeing hammerheads there.

There is nothing quite like spotting what you know is an endangered animal, showing it to your divers and seeing their reaction. I have seen both scalloped and great hammerheads at Sipadan, but the joy of seeing them turns





to worry when I know that outside of Sipadan, these migratory species have no protection.

The extensive mangrove system around Semporna presents a prime pupping ground for some sharks. Sharks, which grow slowly, mature late and produce few young over long lifetimes, are exceptionally vulnerable to over-exploitation and slow to recover from numbers depletion, so they need secure areas such as these more than ever.

We first helped write a proposal for shark protection back in 2009. This was done with the local communities and the environment in mind. We cannot simply waltz in and remove livelihoods from local communities. If we are to get protection of such species as sharks and large rays, we must work with the communities and integrate them into the inception and creation of the sanctuary. Without them, we will fail, and without a sanctuary both the sharks and the local communities will suffer in the future. We are looking at long-term, alternative, and sustainable livelihoods, and that is what a well managed diving industry in the area can bring.

Considering the dire straits of shark and ray populations worldwide, the situation begs for an extended protected area for the region—imagine if the success story of Sipadan was replicated for the entire area!

Problems in paradise

However, both Malaysia (ranking, 10) and Indonesia (ranking, 1) are in the top ten shark fishing nations in the world, most of which is exported for the shark fin soup industry. Of the 14 species prevalent in the finning industry, many are found within the Sabah region—these include both the scalloped and great hammerhead sharks. In Semporna, fishing has always been the dominant economic activity in the region and the way that most people in the area traditionally earn a living. Shark fishing, in particular, is a lucrative business, as one fin can be worth at least US$100, in an area where the monthly salary is considerably lower in other vocations. The act of finning and discarding shark bodies is less prevalent, but sharks are targeted for their fins with the bodies sold for as little as 2-5rm in local markets.

Part of the problem has been that many people in the region see only the individual, upfront value of the shark fin, and do not realize the greater importance of sharks in the ecosystem in general, or see the vast revenues that shark diving tourism can generate year after year in many countries where protection is in place—in the millions of dollars per year. It necessitates a change in attitude, or a change in perceptions, about sharks. Just as many western countries need to move away from the highly sensationalized 'shark attack!' perception of sharks, and shark conservation efforts in those areas focus on changing those perceptions, so efforts in this area centre around solid, financial incentives for leaving the sharks in the ocean.

Generating a change of mindset is not only geared towards business incentives. The people of Sabah are lucky to have such an amazing area on their doorstep. But rarely does this passion come to the fore, nor do people from the area get the chance to be actively involved with conservation issues. It is not apathy—just lack of opportunities.

Tourism is a relatively new industry in this area, on any scale, but is an alterna-



Pair of eagle rays



tive that could financially support and compensate such protection of these species. People are just concerned about putting food on their table; the method is of less importance.

Think global, act local —on the ground support

The problems facing us here in Sabah are not unique by any means, however, Sabah itself is a unique area. Whatever actions are taken here will have great impact, and as the dive industry brings significant income into the area, what influence our industry has can be used to great effect. The success of Sipadan Island Park is a key example of what can be achieved.

When S.E.A.S was first started, our key aim was to inform and challenge established perceptions of sharks. Some divers and guests would still hold the highly fraught 'sharks are dangerous' mindset, and would not be aware of the greater problems of shark conservation or their numbers worldwide.

We wanted to challenge this mindset—make people see sharks for the wonderful animals that they really are, in terms of biology, their occurrence in Sabah and their contributions to the ecosystem.

We carried out a series of presentations and talks to this effect, with great success. The more we told people about sharks, how important they were, and how unique this area was, the louder was the call to protect it.

In addition, we began a programme of talks and lectures in local schools on shark and turtle awareness. Children and teenagers present an amazing opportunity for changing established mindsets and attitudes.

Our aim was to provide opportunities for people to learn more about their home, its environment and the unique ecosystem they have on their doorstep as well as to provide children and teenagers with opportunities to get involved.

We sent local divemasters and instructors to the schools, with resounding success—we have been invited back not only to speak about conservation issues, but with interest for people wanting to become divemasters and work in the sustainable tourism arena.

We have spearheaded the call for a Semporna shark sanctuary (SSS) with local and international support and over 50,000 signatures on an online petition for the creation of the SSS, which brought a lot of international focus and interest in the area. Most recently SEAS joined with the Marine Conservation Society, Scuba Zoo, Tropical Research and Conservation Centre, WWF and Malaysian Nature Society to form the Sabah Shark Alliance.

The state and federal governments, as well as Fisheries, Sabah Parks and the Wildlife Department, have been some of the most understanding and pro-active partners anywhere I have been. They are in a very difficult situation, trying to protect the livelihoods of millions, as well as their amazing abundance of wildlife.

Most recently, open forums with fishermen, stakeholders, business owners, and environmentalists have been held, to discuss the need for more research and more protection of these species, possibly in the form of sanctuaries. It is a difficult task for all involved but one which I believe all believe is attainable.

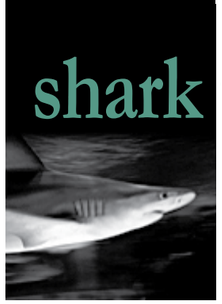
The business of protecting sharks

A key to getting high level backing for the Semporna Shark Sanctuary—or shark conservation in the Sabah region—has been providing an alternative, reliable, financially sound alternative to shark finning and fishing in this area. Governments realize the importance of sharks in ecosystems and conservation efforts in general, but it is easier for them to establish and support plans when there are sound financial and economical incentives.

Established shark sanctuaries, such as Palau, the Bahamas and the Maldives, all realized this, and the sanctuaries were created af-



Hammerhead shark



Detail close-up of manta ray

ter carrying out detailed reports on the financial benefits of establishing shark sanctuaries in the region. A detailed report was carried out for the Semporna region in 2012 titled, *The economics of shark diving in the Semporna Region, Malaysia* (Vianna, G. and Meekan, M., 2012).

The report found that in total, the diving industry contributes US$34 million in business revenue to the region, and US$7.8 million of this is directly attributed to shark diving (26 percent of total dive revenue). Tax revenue to the government from shark diving totalled over US$1.5 million. The estimated community income from shark diving was over US$1.4 million. Protection of sharks in the Semporna region would result in the loss of approximately US$122,000 for the shark fishing industry—a mere two percent of the income generated by shark tourism.

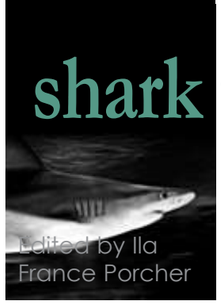
The estimated annual revenues that could be collected through a park fee (used to enforce the proposed sanctuary) would be US$943,000 to US$1.5 million. The estimated annual revenues that could be collected through a park fee and used to generate alternate jobs for local fishermen amounts to US$781,000 to 1.2 million (Vianna, G. and Meekan, M., 2012).

The idea of a sanctuary is to work with the government and the communities to create a future for the area and its people, with more research and scientific studies to help answer such relevant questions as:

- Are Semporna's shark and ray populations stable? If not, why?
- How important are extensive mangrove systems in Semporna region?
- Do we need more protection or research regarding these areas and why? And so on.

We believe that this drifts between the lines of humanitarian, environmental and moral issues. At the heart of it, we must learn to live harmoniously with the natural world, and the people that rely on it for their future as well as maintain and manage tourism responsibly. This kind of integrated community and environmental work can provide the key to the future of this beautiful area and its amazing wildlife. ■

Rohan Perkins is an PADI IDC Staff Instructor, Resort Manager, Reef Check Eco Trainer and Shark Conservationist based at Scuba Junkie Mabut Resort in East Sabah. As the Environmental Project Manager at Scuba Junkie, he has has lectured on sharks and sea turtles for guests, governments, universities and dive expos. Along with Richard Owen and Tino Herrmann, Perkins has been the driving force behind projects such as the Semporna Shark Sanctuary, the Mabul Turtle Hatchery and countless reef and marine conservation projects as well as local community initiatives and educational programs throughout the area over the last nine years. Between the three, they have over 30 years experience working in Southeast Asia, thousands of dives with sharks and rays, hold degrees in marine biology, geological science and earth processes as well as certifications in reef and coral monitoring, water treatment and other conservation disciplines. For more information, visit: ***Scuba-junkie.com***



Sharks are vital to coral reef recovery

A team of researchers led by Jonathan L.W. Ruppert has found evidence that the fishing of sharks from tropical reefs affects the ability of the coral to recover from disasters.

The severe and continuing depletion of sharks from tropical reefs is expected to have serious ecological consequences; yet, just what form those consequences will take is not so easy to determine.

Coral systems regularly undergo cyclic changes due to storms, hurricanes and bleaching events—some of which take decades to complete—and this cyclic nature can complicate assessments of the consequences of shark fishing.

To avoid these difficulties, the scientists compared two separated ecosystems along the northwestern shores of Australia. The sharks of Scott Reef are fished by Indonesia, while nearby Rowley Shoals are in a protected area.


ILA FRANCE PORCHER

Blacktip shark over damaged coral reef

Since both groups of shoals and atolls were in various stages of recovery from bleaching and storm events, the two regions permitted a direct comparison of similar coral ecosystems, with and without shark removal.

The researchers found that the loss of sharks had a significant effect on the populations of the fish inhabiting the coral. In the absence of sharks, smaller carnivorous fishes were more numerous, and this effect was the same on damaged and undamaged reefs. In contrast, the numbers of fish that feed on plankton and coral varied according to changes in the coral habitat, rather than whether or not sharks were present.

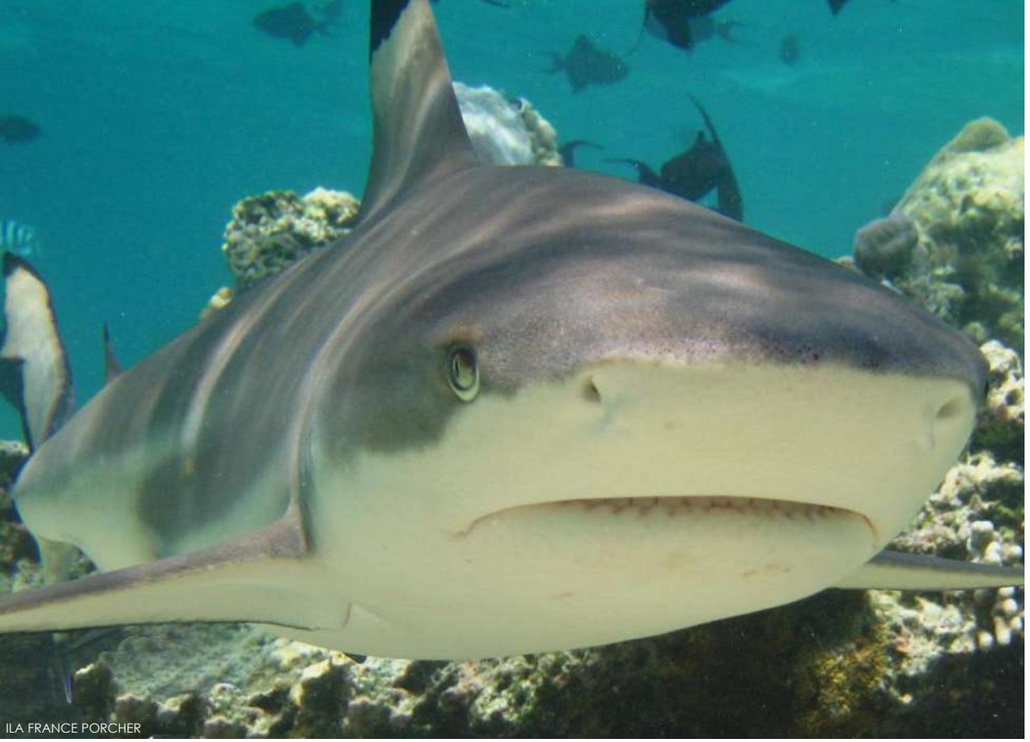
Startling finding

The startling finding was that the numbers of herbivorous fishes were significantly reduced on the reefs where the sharks had been killed. Herbivorous fishes graze on the algae that grows on dead coral, and as a result, they are more numerous when natural disasters have resulted in coral death. The feeding activities of the various types of herbivorous fishes keep this algae at a minimum and help the coral to regenerate. The team found that the loss of sharks resulted in fewer herbivores, both in the damaged and the undamaged reefs.

The scientists are unsure why shark loss resulted in the presence of fewer herbivorous fish in the coral reefs and believe that it is due to an ecological cascade effect propagating down the food chain. But whatever the mechanism may prove to be, the presence of sharks is revealed as vital to the regeneration of coral reefs in the wake of destruction.

In addition to natural disasters, increasing numbers of human settlements and their burgeoning population are putting more pressure on these fragile ecosystems through climate change, pollution and habitat destruction. As a result, reefs often suffer multiple stresses. Therefore, maintaining healthy populations of reef sharks should be an important goal in plans to ensure not only the health but also the resilience of coral ecosystems. ■

SOURCE: PLOSONE.ORG


ILA FRANCE PORCHER

Blacktip shark on reef


ILA FRANCE PORCHER

Bleached coral





Exposure

—How Long, How Deep, How Cozy?

FILE PHOTO: CHRISTIAN SKAUGE

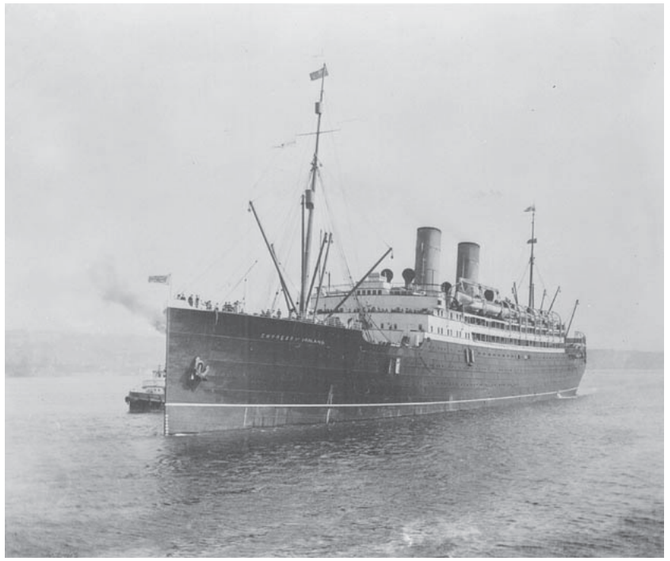
Text by Steve Lewis
Photos by Christian Skauge
and Peter Symes

— The following is an exerpt from Steve Lewis' latest book entitled, Staying Alive: Application of Risk Management in Scuba Diving.

The Royal Mail Ship, *Empress of Ireland*, was an ocean-going luxury liner on her way to Liverpool from Quebec City when she sank in the Saint Lawrence River, 14 minutes after colliding with a Norwegian collier in the early morning fog of 29 May 1914. She had 1,477 people on board—passengers and crew—and the accident claimed the lives of 1,012, more than 800 of them passengers.

I've had the privilege to dive on the wreck several times; the first was in the aftermath of Hurricane Hortense, which blew its way up the eastern seaboard of North America, and although it did not hit Rimouski directly, turned that late Quebec summer into a mini-maelstrom. The weather was awful—windy, wet and bleak. It had kept us out of the water and holed up in a small hotel for days, playing euchre and praying for a break in the weather. When a narrow window of opportunity finally opened up early in the morning on our last scheduled day in French Canada, we suited up on at the dock, threw our gear onto our charter boat, and hoped for the best.

The dive was fantastic—truly historic, but my most vivid memory is staring at my dive computer towards to end of it and seeing that I had earned 45-minutes of decompression. The water was between 3°C and 5°C. I had on inadequate thermal underwear, the current changed direction every few minutes and carried a force that varied from the relative comfort of flag-waving three-quarters of a knot to an extremely



WIKIMEDIA COMMONS

RMS *Empress of Ireland* lies in 40 metres (130ft) of water in the Saint Lawrence River

unfriendly "hold your hat on Maude, we're going for a ride." The only up-side was a seal that seemed to delight in smart-bombing us relentlessly and at regular intervals throughout the various stops from about nine metres to the surface. It took a liking to my fins.

Lessons learned

I learned two lessons about "exposure" that day: never rely solely on a personal dive computer to track your decompression obligation (especially a second-generation dinosaur) because there might be a better way; and the speed at which time passes follows a curve proportional to falling water temperature.

Exposure in the context of diving and more especially risk management in diving, relates to surfacing safely without suffering decompression stress, hypothermia, heat-stroke, or wounding from passing critters, and without drifting off into the cosmos far from your lift back to harbor.

The focus in most texts is primarily on the part of a dive that begins around the time we leave the bottom and ends when we are back on the surface (or more correctly, when our surface interval is over and we know we are safe from DCS). This is the usual focus since DCS is a real risk on all dives even those on which the broader issues such as staying warm and comfortable, surviving other environmental conditions such as current, boat traffic, wildlife, and even being able to pee when the need arises are less compelling!

So, to conform to convention, let's start with that pesky decompression thing.

Following that first dive on the *Empress*, I understood viscerally that to follow a dive computer blindly and without question was not the best possible option. It can get one in over one's head, figuratively and literally. The PDC I was using—a demo from a European manufacturer—suggested I stay in freezing water and horrible conditions for far longer than necessary. Thankfully, my buddy and I carried lots and lots of "spare" decompression gas: most of which was consumed by the time our computers cleared us to surface, since both our respiration rates were easily double our norm.



SUPPLIED BY WATERPROOF

Back in those days

Bear in mind, this episode was back in the dawn of personal dive computers (PDCs). They were reasonably new and those that did not lock-up when their user exceeded the no decompression limit (NDL), had strangely and well-padded degrees of conservatism built-in.

Adding 80 percent

What made the issue worse was that the user had zero jurisdiction over which level of conservatism was used. It seemed that each manufacturer had its programmers conditioned to think like litigation lawyers. If the Buhlmann algorithm (and they all seemed to use Buhlmann back then… it was free after all) called for four minutes at six metres followed by 12 minutes at three, it would add automatically something along the lines of a three-minute stop at nine metres and increase the duration of "real stops" by 80 percent or more. So effectively, on a dive that would merit a stodgy 16 minutes of deco time on tables, would have an ascent time twice as long using a PDC.

Exposure in the context of diving and more especially risk management in diving, relates to surfacing safely without suffering decompression stress, hypothermia, heat-stroke,...



"...It seemed that each manufacturer had its programmers conditioned to think like litigation lawyers."

HOMEMADE

Adjustable conservatism

Modern PDCs are much more user-friendly even allowing divers to adjust levels of conservatism to suit their particular needs and proclivities. I wear one—occasionally two—especially for cave diving and when using a closed-circuit rebreather (CCR); however, I never dive without consulting custom dive tables created by using proprietary decompression software. This ensures me and my dive buddies are perfectly clear what the penalty we'll have to pay for hanging about as long and as deep as called for in the dive plan. It's simply part of our understanding of exposure and its control.

Ascent behaviour

I want to explain something called ascent behavior. It's a technique that came about because of the way I felt after that *Empress* dive, but before we go down that pathway, it's worth spending a few minutes explaining what works for me when it comes time to plan my personal decompression dives.



V-Planner decompression planning software now runs on most platforms, including tablets such as the iPad and smartphones

I never dive without consulting custom dive tables created by using proprietary decompression software.

Deco software

I use V-planner. It is a software program originally created for PC's running Windows but which now runs on smart phones and tablets such as iPad.

When V-planner was first launched by a guy called Ross Hemingway in the summer of 2001, there were other versions of custom decompression software on the market, and they worked okay, but the switch from those to V-planner was almost epidem—at least in some circles. The reason was that V-planner is based on the original research of Yount and Hoffman at the University of Hawaii. It uses *bubble mechanics* and *dual-phase gas behavior* to model what happens in a diver's body. For many technical divers, this seemed to be a better way than the old Haldanian tenets to model what actually happens to their body during a dive (—see box, ed). I certainly felt more comfortable using decompression software based on this research than something known to be based on a faulty premise, which all Neo-Haldanian programs were. In short, bubbles do form in a diver's body during decompression, so best to adopt ascent behavior that accounted for them.

VPM was further developed by Yount, Eric Maiken, and Erik Baker, and following diver feedback on earlier versions of V-planner, Baker did more modifications and produced the VPM-B algorithm in 2002. Since then, V-planner software has used the VPM-B algorithm.

VPM stands for *Varying Permeability Model*. The B suffix simply indicates a more conservative interpolation. The Coles Notes (Canadian student guides —ed.) version is that VPM describes the change in state of the surface tension of the tiny bubbles of gas that form inside a diver as he or she ascends. If you read on, you will be introduced to my dump-truck analogy, and I am loath to spoil things by getting all scientific and geek-like here, so let's just say that VPM-B has become the most widely used bubble model decompression software among technical divers. It seems to work for a lot of people and has produced tables for some stellar exploratory dives. Your experience may vary but I've used tables from V-planner to guide me through more than 1,200 trimix dives without incident.



The focus in most texts is primarily on the part of a dive that begins around the time we leave the bottom and ends when we are back on the surface.

In use

Using the software is very simple and the interface is extremely easy to learn and user-friendly. The most important first step is to configure it in a way that suits

According to Haldanean models no bubbles are formed during asymptomatic decompression. The dissolved gas is eliminated ***while*** in the dissolved phase.

Haldanean models assume exponential ingassing and exponential outgassing and simulate the human body using several compartments with different saturation half-times.

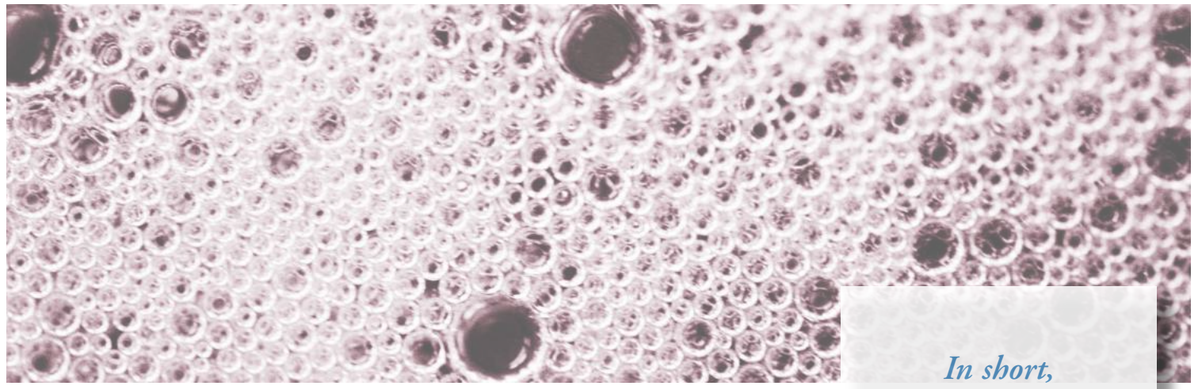
For example, tissues such as joints, which are slow to take up dissolved gases and slow to release them, have a long saturation half-time (on the order of many tens of minutes) while the opposite is true for highly adoptive fluids like the blood.

By contrast more recent models, which are supported by experimental observation, assumes that bubbles are formed during most asymptomatic decompressions, and that gas elimination must consider both dissolved and bubble phases.

The VPM model presumes that microscopic bubble nuclei always exist in water and tissues that contain water. Any nuclei larger than a specific "critical" size, which is related to the pressure (or dive depth), will grow upon decompression (when the diver ascends again).

Secondly, the bubble is permeable, meaning dissolved gases from the tissue compartment can move across the bubble's surface and into the bubble (where it becomes a free gas).

Thirdly, the surface layer of the bubble has specific properties that affects the permeability—the bubble is stabilized by a surfactant. ■



In short, bubbles do form in a diver's body during decompression, so best to adopt ascent behavior that accounted for them.



your needs, including the *conservatism factor*. I do not intend to offer a blow-by-blow user-guide here, but for illustration only, here's a quick overview of what I usually do when using it to cut tables for open-circuit dives.

I set the conservatism in the mid-range. I believe the Nominal setting (zero conservatism) is the pure algorithm with each ascending "margin of safety" (from 1-5) making adjustments to the calculated critical bubble radius. In other words, the more conservative it's set, the smaller sized bubble the program will allow to form in the diver's body (all hypothetical of course) during the ascent up the water column to the next stage of his or her decompression

Settings

There are close to 40 user-adjustable settings. For example: oxygen narcotic or not; the oxygen depth of gas switches; extended stops after switches; depth of last stop; and overall descent and ascent rates.

A good exercise (and V-planner is one of the best teaching tools for students of decompression because of this flexibility) is to set up a sample dive and play with settings to see what differences some of these user-controlled variables make.

There are close to 40 user-adjustable settings.

Nineteen minutes more

As an example, the total run-time (head disappearing underwater until it pops back to the surface) for a simple 50-minute dive to 30 metres (100 feet) breathing an EAN32 (a typical tourist cave dive in North Florida), and with the conservatism set Nominal, is 65 minutes.

The program calls for a three-minute and 20-second stop at six metres (20ft), followed by nine minutes at three metres (10ft).

If we simply crank the conservatism to level 5 (the most conservative) the same dive with exactly the same gas warrants an 84-minute runtime with a five-minute stop at nine metres (30 ft); nine minutes at six metres (20ft); and 18 minutes at three metres (10ft). Since the bottom time for both dives is the same 50 minutes, the 19-minute difference in their runtime is ALL additional ascent time: 15 minutes of ascent time for Nominal conservatism compared to 34 minutes at level 5.

Which one is correct? I have no idea, what will work for you. In fact, there is no hard answer to that question. Certainly, the 84-minute runtime is the safer option—at least at first blush. However, when we consider safety, we have to take into account oxygen loading, specifically CNS percentage. (Actually, in this instance there is virtually no difference since the additional stop time is at a depth that delivers an oxygen partial pressure far below 1.0 bar. However, there may be a need for additional gas volume or better thermal protection. How would those extra minutes feel to a diver with a leaking drysuit for example?

How would those extra minutes feel to a diver with a leaking drysuit for example?

Oddly, the level of conservatism has a greater effect on runtimes than variations in the constituent gases being breathed. Here's a classic example of "ideal-world-think" vs. what actually happens on dive trips.

Oddly, the level of conservatism has a greater effect on runtimes than variations in the constituent gases being breathed.

The plan is a wreck dive for 25 minutes to 60 metres (about 200ft). A standard gas for this dive uses an 18/45 trimix (18 percent oxygen and 45 percent helium), with an EAN50 and pure oxygen as decompression gases. The total runtime for this dive at level 3 conservatism would be 77 minutes.

...set up a sample dive and play with settings to see what differences some of these user-controlled variables make.

In the field (on location), partial-pressure mixing can present challenges especially when gas supplies are limited. So let's assume that the gas chosen to do the dive is an 18/35—ten percent less helium. There may or may not be a noticeable difference to narcotic loading at depth (worth a test sometime, perhaps) but surely we will see a difference in the ascent profile. Not at all. The profile kicked out by V-planner for the same dive using 18/35 instead of 18/45 delivers a 77-minute runtime. This is not an error, it's simply the way the mathematics work. There is a slight variation in the shape of the ascent curve at the shallower



PETER SYMES



PETER SYMES



stops, but really not enough to worry much.

Therefore, the net effect of taking ten percent of the helium out of the mix is negligible.

However, if I flip the level of conservatism from +3 to Nominal and then back to +5 the runtimes vary considerably. Nominal conservatism, 18/45, nets a 68-minute runtime for the same 25-minute bottom time! At +5, same profile, same gases, the runtime becomes 86 minutes. (By the way, it's the same kind of story using 18/35—67 minutes and 84 minutes, respectively).

Playing this type of "what if" game with decompression software has taught me a couple of lessons that I feel are valuable.

However, if I flip the level of conservatism from +3 to Nominal and then back to +5 the runtimes vary considerably.

Implications

Perhaps the most important is that getting all twisted and upset when my local fill station hands my sidemount cylinders back to me with an 18.4/42.9 trimix when I asked for an 18/45 is simply no big deal. I can not only use it and probably not know the difference at depth, more critically, I do not have to cut and learn new tables: The ones I already have in my head and backed up in my wetNotes will do just fine… and I know they work because I've "wet-tested" them several dozen times.

By the way, the same is essentially true with decompression gas. While on location a while back, our team ran out of oxygen and had to top off EAN 50 cylinders with compressed air. When analysed we each had something close to an EAN40. Apart from being able to switch from backgas to decompression gas about six metres (20ft) earlier/shallower, our ascent times were identical to those we had been running all week using EAN50.

This is NOT presented here to condone sloppy practices or lax controls but simply to point out that in the grand scheme of things, it's important to focus on what matters, and a couple of points here and there with one's breathing gases can be immaterial when it comes to decompression times.

Perhaps this illustrates that decompression schedules are inherently sloppy and not something a scientist or engineer would put their signature to. From a control point of view, deco schedules are horribly ill-defined. You could be forgiven for thinking that a huge difference in gas contents would make as much difference as cranking up or down a virtual control knob that influence the size of a hypothetical bubble. But it does not. What I find a sobering thought is that decompression calculations can deliver so many different outcomes and each of them is as "correct" as the other.

In the field (on location), partial-pressure mixing can present challenges especially when gas supplies are limited.



Perhaps the key "take-home" messages from that little self-congratulatory pat on my back above is that my primary dive tables are in my head. That may be a function of the fact that a 60-metre dive using the gases mentioned is not something I've done several dozen times, but possible closer to three or four hundred times. It may also be that I have taught myself deco-on-the-fly and ascent behavior. Knowing these two techniques makes the task of remembering deco schedules very, very simple.

After the *Empress* dive, when the feeling of cold left my body and I got sensation back in my extremities—probably a couple of months later—I started to think about what an ascent schedule (a decompression plan) actually was, and what it represented. Until then, I'd never truly given profound thought to why or how a decompression algorithm worked. A strange admission since I was a trimix diver and teaching decompression diving. I'd read the books and listened to the lectures, and even had a couple of conversations with decompression theory 'experts' such as Bill Hamilton and John Cray, but I still thought that decompression was more science than the alchemy and black arts it actually is. I had much to learn. ■

In the grand scheme of things, it's important to focus on what matters

Steve Lewis is an active technical diver and instructor based in North America. He is an author, blogger and workshop host with a special interest in diver education and the development of safe diving protocols. He first tried sidemount scuba as a young dry-caver in the United Kingdom, and now many decades later, carries a TDI sidemount cave instructor rating and is an open-water/overhead environment Sidemount Instructor for PSAI. See ***Techdivertraining.org***



Edited by Don Silcock

On the Rise

Flourescent

Night Diving



Text and photos by Steffen Beyer

Fluorescence night dives, or fluoro, UV and glow dives, as they are also known, are becoming increasingly popular as more and more dive centres offer scuba divers and underwater photographers the chance to experience this unique underwater phenomenon.

There are also an increasing number of vendors offering diving equipment for use on these special dives, and the purpose of this article is to explain the basics, background, techniques and equipment associated with this interesting aspect of the underwater world.

The basics—what is it?

Fluorescence is the capability of certain materials to absorb light transmitted on one wavelength and then emit it again nanoseconds later on a different wavelength. The phenomenon occurs in certain living organisms, various minerals and in petrified fossils.

Fluorescence should not be confused with either phosphorescence, which is the capability to store light and then emit again over time such as on the dials of our diving gear or watches, or bioluminescence where light is produced by living organisms when they consume energy.

Underwater fluorescence is usually identified with green, and indeed it is the most common colour for reasons that will be explained, but it is also possible to see red, orange and yellow fluorescence.

The background

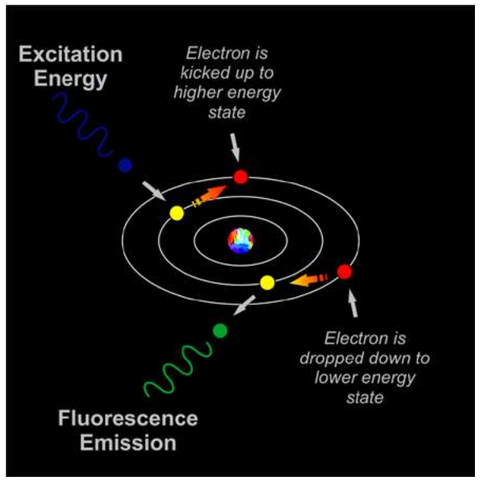
—Once upon a time in Torbay…

The fluorescence phenomena is believed to have been first discovered in marine creatures back in 1927 when a certain Charles E.S. Phillips noticed some glowing anemones in a tidal pool on the beach at Torbay, in the southwest of England.

The bright green colour they were emitting caught his eye, and he took some samples back to his laboratory where he used a light source together with a filter called "Wood's Glass", which absorbs visible light but allows ultraviolet light to pass through, to establish that the anemones



photo & video



Fluorescence schematic (right); Red fluorescing anemone in daylight (far right)



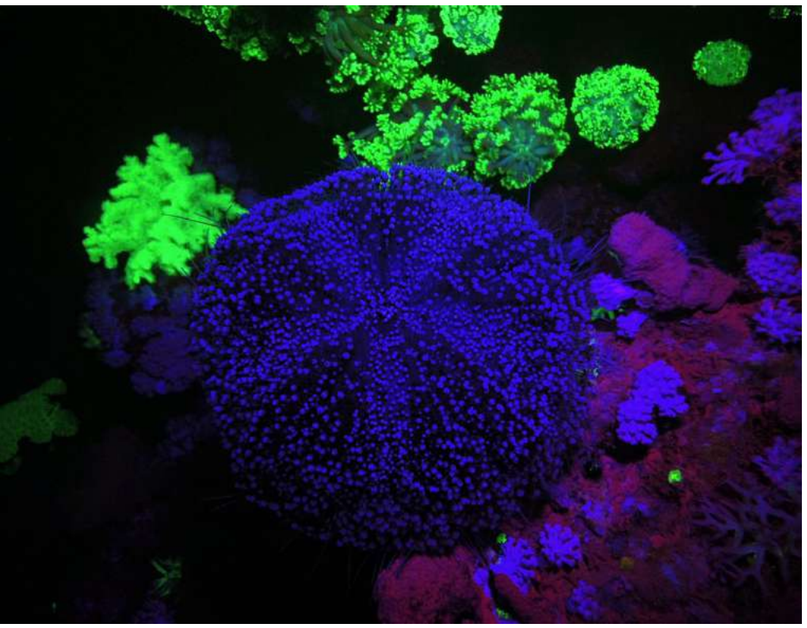
were in fact fluorescent.

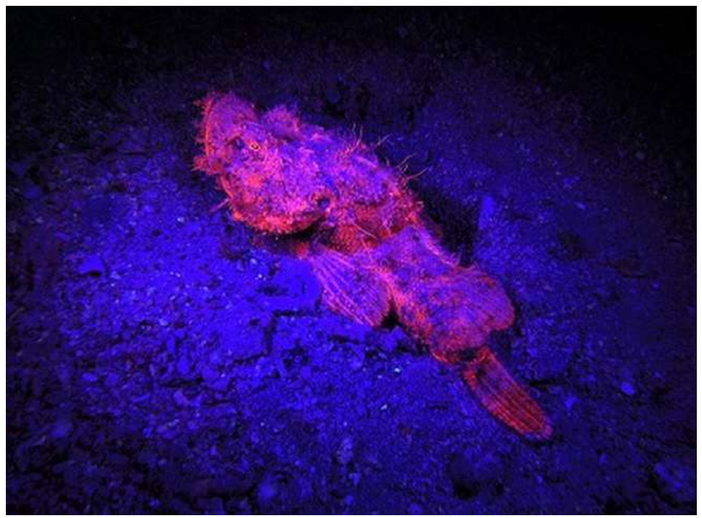
Then in the 1930s, the Japanese marine biologist Siro Kawaguti established that the most common coral pigments also in marine creatures fluoresced in green, followed in 1955 when those pigments were first described and formally recognised as a protein—coining the name "Green Fluorescent Protein" or GFP.

During the late 1950s, as more people started to scuba dive, the phenomena became more widely known, and articles started to appear in publications such as *Skindiver* and *National Geographic* showing the use of "blacklight" ultraviolet underwater torches to observe it.

In 1963, Sir Arthur C. Clarke, the renowned author and diver, further popularised the phenomenon when he described his experiences with fluorescence in his science fiction novel *Dolphin Island*.

Probably the most well-known example of fluorescence from those early days, and one which still puzzles many to this day, are bright red anemones at depths well beyond where the colour has completely disappeared from the visible spectrum. Just ask any underwater photographer about the puzzling results from their efforts to capture an image of such anemones.





Sea urchin (above) and scorpionfish (center) show fluorescent properties

Ultraviolet and blue light 101

While it is possible to see fluorescence underwater during the day, it really is at its eerie best after dark, but you will need a light source to stimulate those proteins! For many years ultraviolet (UV), or "blacklight"—light which in not visible to the human eye because of its relatively high frequency—has been synonymous with viewing fluorescence, largely as a result of the work done by Dr Rene Catala in the late 1950s at New Caledonia's Noumea Aquarium.

But in the early 1990s, research by Dr Charles Mazel in the cold waters of Massachusetts and the warmer climes of the Bahamas, established that blue light was much better than UV. What Mazel found was that blue light (high energy visible light with a frequency between 400 and 500nm) was much more effective at exciting those proteins to fluoresce, and he went on to start a company called NightSea in 1999, which manufactures equipment for viewing and photographing fluorescence—be it underwater or in the laboratory.

Although much more efficient than ultraviolet, there is a downside to using blue light, as the fluorescence has to be viewed through a yellow barrier filter to block out the blue light reflected back to you, which tends to overwhelm the actual fluorescence. Plus high energy visible light has been linked to age-related macular degeneration.

The yellow filter is mounted on the face mask and basically makes it safe to view the blue light induced fluorescence, while greatly enhancing the overall experience—you can see much more fluorescence with the filter than without it.

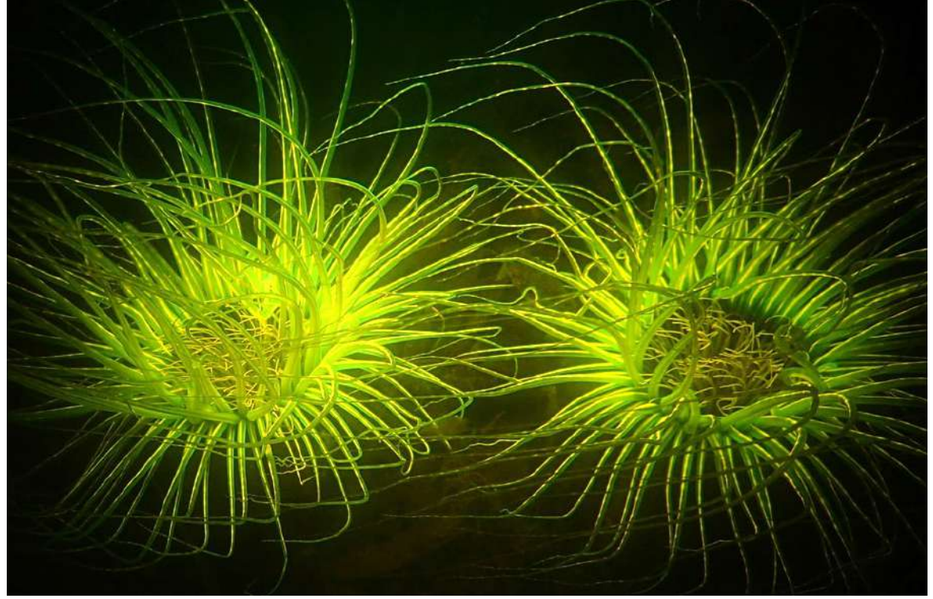


silver



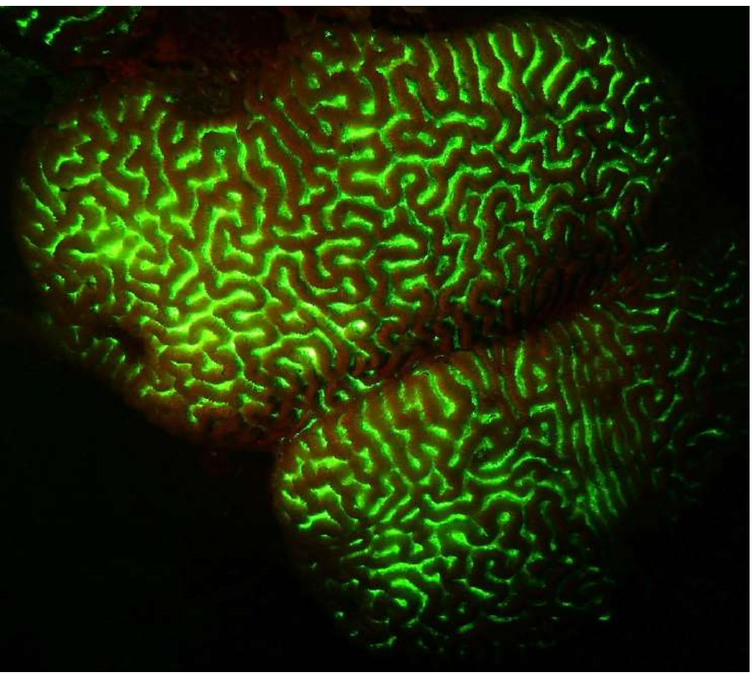
www.seacam.com

Anemones fluorescing (right); Brain coral fluorescing (lower left)



Why is the fluorescence there?

Fluorescence occurs in many marine organisms such as coral, tunicates, barnacles, sponges, anemones, jellyfish, clams, nudibranchs, cephalopods, shrimp, crabs, worms and fish—to name but a few. It also is found in some fresh water organisms, and it seems obvious that the phenomenon must provide some form of benefit to all those creatures, but unfortunately research into what benefit this might be is still in its infancy.



However, there are some preliminary hypotheses and findings, one of which is that some studies suggest that fluorescence in corals may act as a form of sunscreen by protecting the corals and their symbiotic algae against harmful UV radiation.

Another hypothesis states that fluorescence allows corals to transform the only light available to them, namely blue light, into such wavelengths as can be used by their symbiotic algae for photosynthesis, allowing the corals to dwell successfully at greater depths than their competitors without such a capability can, giving them an evolutionary advantage to survival.

Yet another is that fluorescence in reef fish may help them to visually merge with their coral backgrounds so as to make less conspicuous to predators.

And a recently published study shows that the health of corals correlates with their fluorescence, which means that the latter can be used as a measure of the former.



Feather star fluorescing

Photographing fluorescence

To photograph fluorescence underwater a normal camera and strobe is used, but two additional special filters are required—one on the strobe and the other on the camera. The strobe filter converts the normal white light output in to one of intense blue light, which stimulates the fluorescence and allows it to be photographed.

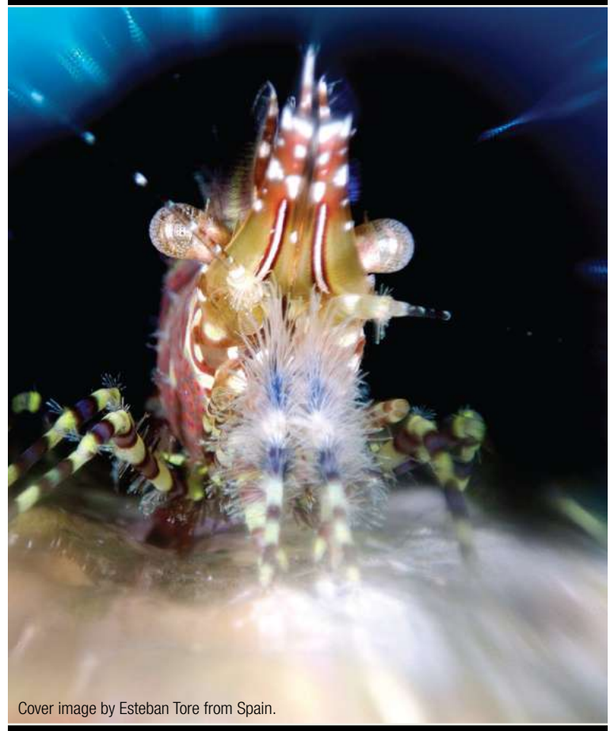
While the one on the camera is a yellow filter, which allows the sensor to record the image in the same way the barrier filter allows the human eye to view the blue light induced fluorescence.

Once suitably equipped, the physical logistics of night time fluoro-photography need to be given some thought. Specifically, you will need a traditional white light source to find your way around the actual site and a blue light one to initially stimulate the fluorescence so it is visible.

Prior to switching light sources the yellow barrier filter on your mask needs to be in place so that you can see the fluorescence properly, but once the filter is in place that is all you can see and everything else is pitch black.

There are various solutions to this, with some divers opting for the more expensive option of two separate torches, while others have a blue dichroic filter on a traditional torch so that blue light can be switched to white as required. Alternatively a phosphor filter can be used on a blue light torch to

The HP Red Sea and World Shoot-Out 2012 competition album is now available!



Cover image by Esteban Tore from Spain.

Stunning images submitted by HP Red Sea & World Shoot-Out 2012 nominees and winners were all gathered into one album, featuring color and creativity at their best.

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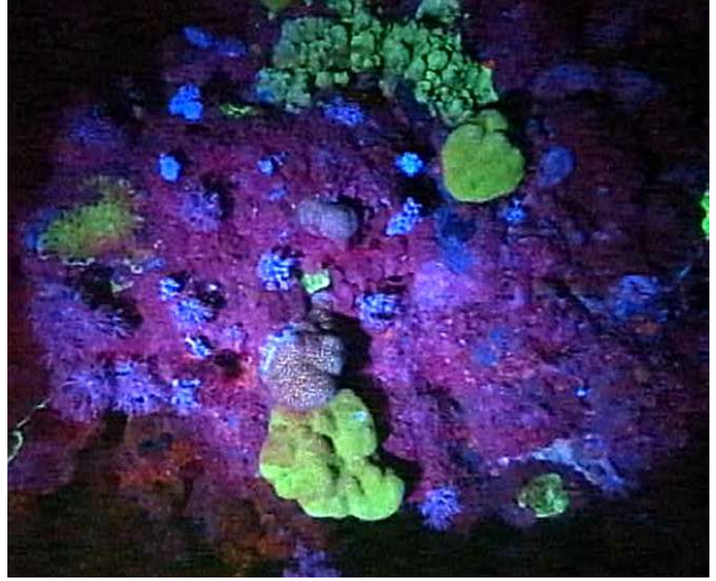
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Fluorescent coral without blue filter

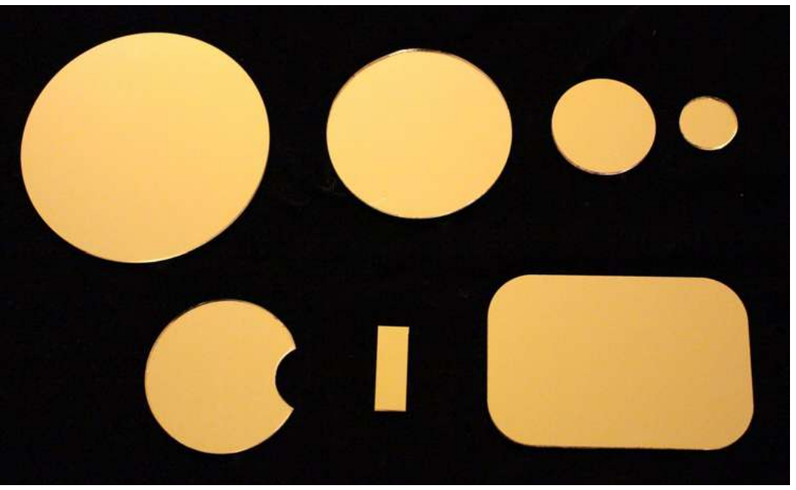


Fluorescent coral with blue filter

convert it to white light.

Contrary to what one intuitively thinks is the correct white balance setting, "Fluorescent Light" should not be used and Auto should be selected instead. Because the overall levels of illumination are not high with fluoro-photography, it is best to increase the camera's ISO setting to make its sensor more sensitive to the available light and smaller apertures are preferred.

Interestingly, as any reflected blue light is absorbed by the yellow camera filter, fluoro-photography is not as susceptible to backscatter as white light photography. Therefore, blue light strobes do not need to be positioned as far away from the optical axis of the camera as they are in white light photography.



Dichroic or interference filters of different shapes and sizes

Let there be (blue) light!

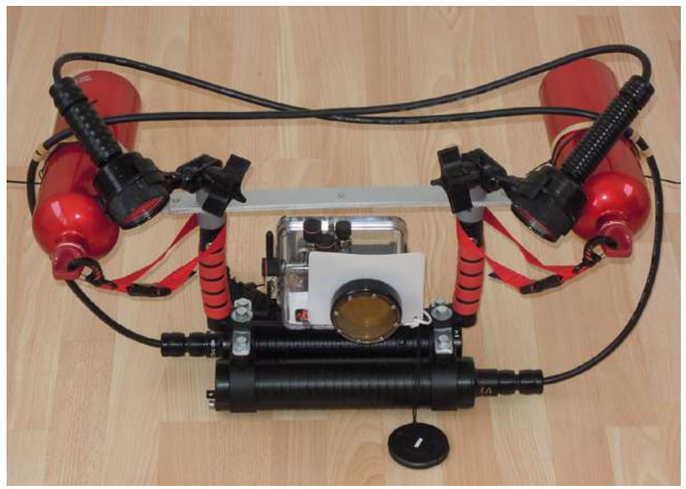
Night time fluorescence diving and fluoro-photography is indeed an interesting and exciting new aspect of the underwater world, which will continue to attract interest because of its uniqueness. Our eyes and senses are attuned to seeing things as they are illuminated and reflect light back to us, but with fluorescence the light is being emitted from the object itself and all else is blackness—a truly strange and enthralling experience! ■

Steffen Beyer has been a keen scuba diver since 1988. He graduated from Aachen University in Germany where he studied computer science and biology. In 2004, he worked as a patent examiner in the field of "computer-implemented inventions" at the European Patent Office in The Hague, Netherlands.

Inspired by Sir Arthur C. Clarke's book, Dolphin Island, in autumn of 2010 the Beyer began building his own fluorescence torches, because he could not find any commercially available UV dive lights.

In order to get as close to the experience described in the book as possible, Beyer initially exclusively used UV LEDs and built torches of increasing power, first with a single LED of about 395-410 nm and 1 Watt, then a torch with two LEDs with 365 nm and about 6 Watt, and finally one with 4 quadruple LEDs (equivalent to 16 single LEDs) at 365nm and 46 Watt.

Together with the dive instructor and physicist, Lynn Miner, Beyer founded ***www.FireDiveGear.com*** *in May 2012, in order to develop high quality yet affordable equipment for fluorescence diving and fluoro-photography.*



The author's current camera set-up



The author's torch with 18 blue Cree LEDs and a dichroic blue filter



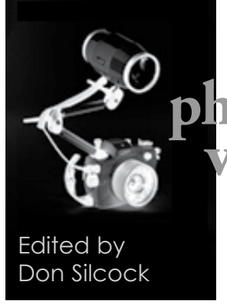


photo & video

Edited by
Don Silcock

PRODUCT SHOTS
COURTESY OF THE
MANUFACTURERS

Sea & Sea EOS 70D Housing

Sea & Sea has released their new housing for the Canon EOS 70D. The MDX-70D housing is made from aluminium and features the company's new internal optical YS converter, which converts the camera's TTL electronic signal into a fiber output. The housing features a quick control multi-function button, leak sensor and an externally accessible port lock. ■



Nauticam S120 Housing

Nauticam has announced the release of their new housing for the very popular Canon PowerShot S120 compact camera. The NA-S120 housing features access to the camera's front command dial, a 67mm thread on its lens port to allow the attachment of accessory lenses and fiber optic bulkheads for strobe triggering. ■



Nauticam OM-D E-M1 Housing

The march of the mirrorless cameras continues, and following Sony's recent announcement of the first full-frame versions comes the new Olympus OM-D E-M1 camera. Olympus has built on the tremendous success of the first OM-D, the E-M5, a camera that impressed virtually everybody that used it with its excellent functionality and images. But the E-M5 was aimed at the "enthusiast" market—keen photographers who were looking for most of what a DSLR offers, but in a small package. This time Olympus is looking for the E-M1 to tempt the high-end enthusiasts and professionals looking for that smaller package, and so far the signs are very positive they will achieve that. Nauticam has responded to the new Olympus in the usual record time and has announced the release of the new NA-EM1 housing. The housing is designed to make the most of the E-M1's capabilities and looks more like a fully-fledged DSLR housing with its attached set of handles. ■



Nauticam Blackmagic Pocket Cinema Camera Housing

Nauticam has released their new housing for the Blackmagic Pocket Cinema camera. The very highly regarded Pocket Cinema camera cab record 1920x1080 30P video in the high quality lossless CinemaDNG RAW and editing friendly Apple ProRes(TM) formats. It is also capable of an incredible 13 stops of dynamic range. The Nauticam NA-BMPCC housing provides access to the main camera controls such as record, focus, and lens control—all of which are placed within finger reach from the grips. Nauticam has also angled the housing's handles forward by 15 degrees for comfortable use in a level, swimming position. ■



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Sea & Sea RX100 Housing



Sea & Sea has released their new housing for the very highly regarded Sony RX100 compact camera. The MDX-RX100 is made from aluminium and can accommodate versions 1 or 2 of the Sony camera using a bumper pad kit that is supplied with the housing. The housing also features a flash deactivation lever, a multi pad controller and a control ring for the camera's front command dial. ■



Ikelite D610 Housing

Ikelite has announced that it has updated its housing for the Nikon D600 to accommodate the revised D610 model. Although externally identical to the D600 housing, the new D610 has updated circuitry to enable the use of Live View underwater. The D610 housing has 200-foot depth rating and is very competitively priced at US$1,600. ■

Gates Sony Z100 housing



Gates Underwater Products has announced their new housing for the Sony Z100 4K professional camera. The new housing features complete access to all the Z100's controls, including manual focus, iris and white balance. The buoyancy and trim of the housing can be adjusted via the use of trim weights, and the housing can be outfitted with an HD-SDI surface feed. ■



Fantasea G16 Housing

Fantasea has released their new FG16 housing for the Canon Powershot G16 compact camera. Unlike the Canon housing for the G16, Fantasea's approach is to provide full access to all camera controls underwater, plus the housing is also supplied with a double fiber optic port and a moisture detector as standard. The FG16 is priced at US$499.95 and in some regions of the world, Fantasea is offering housing and camera bundles. ■





Nauticam G16 Housing

Nauticam has released their housing for the Canon PowerShot G16 compact camera. The NA-G16 housing offers access to both front and rear control dials on the camera, a 67mm thread on its port for wet lens mounting plus fiber optic bulkheads for strobe triggering. The housing also features a single 16mm threaded port for attaching an accessory vacuum system or electronic strobe triggering bulkhead. ■

Aditech MVHS-FS700 Camcorder Housing

Aditech has announced their new housing for the Sony NEX-F700 and FS100 camcorders. The Mangrove MVHS-FS700 housing is made from marine grade aluminum, which has been machined and anodized, while the rear cover is machined from solid Delrin. The housing features a control system that uses the camera's LANC control and all the controls are accessed via 12 external push buttons, which provides good user feedback via the camera's touch screen. Review and framing are achieved via a 3.5 inch (9cm) TFT rear mounted monitor. The Mangrove MVHS-FS700 housing is available now at a retail price of EU€3,119. ■



Blu Rivard



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P O R T F O L I O

Blu Rivard


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Paradise Fever, by Blu Rivard. Oil on canvas, 24x20 inches


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Passion for Paradise, by Blu Rivard. Oil on canvas, 30x40 inches
PREVIOUS PAGE: *Journey thru Paradise*, by Blu Rivard. Oil on canvas, 30x40 inches

Based in Southern California, American artist Blu Rivard is passionate about the underwater world—a realm of wonder which he captures in vivid oil paintings on canvas. An avid scuba diver, he found inspiration for his art in his diving adventures in places such as Australia, Asia and islands of the South Pacific. His passion for the beauty of life in the sea led to a desire to help protect the oceans and the fragile ecosystems of the reefs.

Text by Gunild Symes
Photos courtesy of
Blu Rivard

A keen observer of nature and the play of light on natural forms, Rivard has developed a body of work that reflects his interest in the sea and its many inhabitants.

"The sea and its residents fascinate me in many ways," he said. "Each has a role to play in the scheme of things."

Leaving his native Detroit in the late 70's, Rivard came to live in Southern California and developed a love of the sea and its many creatures.

"The first time I saw reef fish, I was hooked," he said. "I needed to understand how and why they were so colorful. So, I started to study marine biology and oceanography. The more I learned, the more I wanted to learn. I soaked it up like a sponge.

"Of all the creatures, turtles are probably most dear to my heart. They are majestic but yet docile creatures that seem to convey a sense of

Blu Rivard



Serene Surrender, by Blu Rivard. Oil on canvas, 24x36 inches

ancient wisdom."

For a time, Rivard lived in Guam, where he explored the natural wonders of the Pacific Rim. While he had many diving adventures, Rivard is hard-pressed to claim a favorite location.

"I really have no absolute favorite dive location," he said. "They're all fascinating and unique in their own way. I've been fortunate to dive in so many wonderful locations around the world—the California coast, Hawaii, the Great Barrier Reef, Micronesia, Bali, the Philippines, Fiji and the Grand Caymans amongst them."

In the future, Rivard hopes to dive in Papua New Guinea, Thailand and the Red Sea, he said.

Art with a message

In his art works, Rivard seeks to communicate his passion for the diversity and beauty found in marine ecosystems.

"My paintings are oil canvas," he said. "This enables me to achieve the realism for which I am known. I love detail and diligently seek to reveal my passion to the viewer."

With his artwork, Rivard reveals a world not seen by many people.

"When my first image was published (*Send In The Clowns*, 1989), it allowed me to share with others the magic of a world unknown to most," he said. "A significant percentage of the population will never experience planet Earth as I have been fortunate enough to do. Long ago, a close friend sug-



Into the Light, by Blu Rivard. Oil on canvas, 20x16 inches



Splash, by Blu Rivard. Oil on canvas, 20x16 inches



The Ascent, by Blu Rivard. Oil on canvas, 20x16 inches



Pacific Treasures, by Blu Rivard. Oil on canvas 30x24 inches

gested I share my art. Little did I know something that gave me intense pleasure would resonate with so many others."

Creative process

In his creative process, Rivard uses underwater camera equipment to get source images that inform his paintings. He uses Nikonos IV and Nikonos V cameras. Lenses he uses include a 15mm fisheye lens, 28mm, 80mm and 35mm as well as extensions. For illumination, he uses four Ikelite Strobes A51s.

"Although I hold an underwater photography certification," he said. "I don't shoot photos to be compositions in their own right. I photograph marine life in different poses and various sections of coral that I think would be compelling in my paintings."

Being true to the forms of nature and the shapes of living things is important to Rivard who sees artistic value in the details.

"All along, I try to portray these life forms in a biologically and anatomically correct manner," he said. Although, he admitted, "Occasionally, I use a little *artistic license*."

Saving the oceans

Over the years, the oceans that have inspired Rivard's art works have also inspired him to take action. For the past 13 years, he has served on the Honorary Board of Governors of PADI's conservation organization, Project AWARE.

"Conservation. Now that's hugely important to me," he said. "We live on a planet where too many seem more intent on exploiting and destroying, not discovering and enshrining.

"Much of it is selfishness and greed," he continued. "Something owned is generally not something shared. Worse,



Land Down Under, by Blu Rivard. Oil on canvas, 20x16 inches

it becomes ever more challenging to clean up the mess exploiters leave in their wake."

Rivard sees art as an answer—a way to raise awareness about the plight of our oceans.

"Why art?" he asked. "Well, look around you! See what I see! We're highly visual creatures and have been since the dawn of time, as ancient cave drawings remind us. I try to inspire others to positive action with my art."

But what are the challenges artists face today in creating work that will get people thinking?

"I think the challenges most artists face today could be characterized as 'The Triple E'—exposure, the economy, and the economy!" said Rivard. "The benefits to being an artist today is that more people are becoming aware of the messages art conveys."

In the end, Rivard said his artistic mission is not unique but quite necessary. "We all have a responsibility to this liquid planet as its custodians," he said. "What most concerns me is the ocean. Every form of life depends on it." ■

For more information or to purchase art work from the artist, please visit: ***www.blurivard.com***



Tortuga Point, by Blu Rivard. Oil on canvas, 24x30 inches