



GLOBAL EDITION  
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Number 31

Scotland  
**Scapa Flow**

Pascal Bernabé's  
**Extreme Diving**

Kurt Amsler's  
Photo Tips  
**Caves & Caverns**

Portfolio  
**Marcelo Tatsuyoshi Kato**

British Columbia  
**Shookumchuck**

# East Africa

BOTSWANA TANZANIA MOZAMBIQUE

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COVER PHOTO: Purple ochre sea stars and painted anemone,  
Skookumchuck Rapids, British Columbia, Canada by Barb Roy  
(CONTINUED ON PAGE 4)



Join Kurt Amsler's efforts to save Indonesia's endangered sea turtles  
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Scapa Flow. Photo by Lawson Wood



# contents

**20**  
TANZANIA: AFRICAN  
SAFARI & PEMBA ISLAND  
BY SCOTT BENNETT

**69**  
TECH TALK: EXTREME  
DIVE EXPLORATION  
BY PASCAL BERNABÉ

## columns...

**14**  
WRECKS  
SEEING SHIPWRECKS...  
BY ROB RONDEAU

**33**  
ZANZIBAR: DIVING  
UNGUJA & PEMBA ISLAND  
BY CHRISTOPHER BARTLETT

**79**  
SCAPA FLOW WRECKS  
SCOTLAND  
BY LAWSON WOOD

**16**  
WRECKS  
CULTURAL HERITAGE  
BY ROB RONDEAU

**41**  
TANTALIZING TOFO  
MOZAMBIQUE  
BY CHRISTOPHER BARTLETT

**91**  
UW PHOTOGRAPHY:  
CAVE & CAVERN  
BY KURT AMSLER

**76**  
TURTLE NEWS  
& ECOLOGY  
EDITED BY BONNIE MCKENNA

**49**  
DIVING THE DELTA:  
BOTSWANA'S OKAVANGO  
BY TONY WHITE

**101**  
PORTFOLIO:  
MARCELO  
TATSUCHIYO KATO  
BY GUNILD SYMES

**97**  
UNIQUE DIVE SITE:  
SKOOKUMCHUCK, BC  
BY BARB ROY

**57**  
CONSERVATION SUCCESS:  
MARINE PROTECTED AREAS  
BY ARNOLD WEISZ

**plus...**  
EDITORIAL 3  
NEWS 5  
WRECK RAP 13  
EQUIPMENT 54  
BOOKS & MEDIA 56  
WHALE TALES 67  
SHARK TALES 89

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# Time to get wet

Most of us, at least in the Western world live removed from nature. As we commute to work on busy highways or sit packed tight in mass transit systems we may catch our only glimpse of blue sky and perhaps even some greenery before return home to sit in front of a flat screen.

We may watch awesome footage from some of nature's most stunning spectacles on BBC, National Geographic or Discovery Channel, if we are not surfing Xray-Mag.com and other websites to get our daily dose.

If we live near to the coast chances are that we once in a while will go diving on a Sunday or weekend, and we will probably go on a couple of dive trips each year. But essentially we live removed from nature.

We don't depend on it for our livelihoods in the same manner that the farmers and fishermen, which many of our grandparents were, and we don't see the daily changes and impoverishment of our underwater habitats. Ninety percent of the fish stocks available to us in the year 1900 are now gone due to over-fishing and other mismanagement. We only realise this because of measurements, statistics and science. Without that most of us wouldn't be able to tell the difference, because we haven't seen how diverse and densely populated the sea can really be under natural circumstances. Except perhaps if we are so lucky to travel to some of those

remaining spots where the marine life is still plentiful and diverse.

Experiencing these locations first hand, by perhaps going on a dive trip to some exotic location is just one step, one that is not available to all of us as resources, nature's and probably our own financial means as well. But even more important is the realisation of what a

enforcing strict quotas, no-take zones and marine protected areas will ultimately enable us to revive fishery in many areas, albeit this time in a wiser and sustainable manner. It has only been encouraging to see how fast nature can bounce back, if only we allow it to heal. It seems so in the tropics, and lately we have heard that the had-dock was coming back.

But we must not allow ourselves to become lulled into a false sense of security by these occasional bits of good news. Encouraging as they may be, we crave and cling on to good news and tend to placate ourselves with a false sense that everything is going to be okay. I think many of us have a hard time standing all the many doomsday news we get through the news, and we just need to close our eyes to a big part of it all, because otherwise we can't cope or function.

Legendary ocean explorer, Jacques Yves Cousteau, once said, "People protect what they love." Jean-Michel Cousteau later added "We can't protect what we don't yet

understand. With understanding comes appreciation, and once we treasure what we see, we will move to protect it.

So, get out of the couch and get your dive gear dusted off. Surely there is a reef, a stretch of coastline or beach somewhere near you that needs your loving attention.

— Peter Symes, Editor-in-Chief



"It's not as deep on this side" dive cartoon by syndicated cartoonist and diver, Ralph Hagen. Find it and more on t-shirts at **The X-RAY MAG Store**. Big discounts for retailers and clubs. A percent of all sales goes to ocean conservation. Click on the image to order direct.

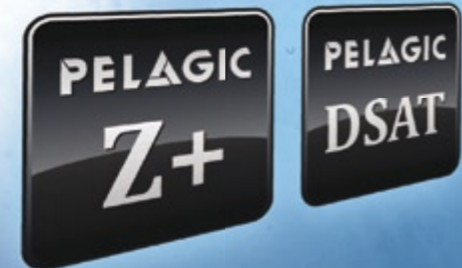
diverse natural world is worth, both in terms of medium range economic gains as well as our long term survival as a species.

Whale-watching tourism brings in billions of dollars in revenue, and the value of the marine mammals alive outstrips the value of them dead by several orders of magnitude.

Fish stocks being restored through



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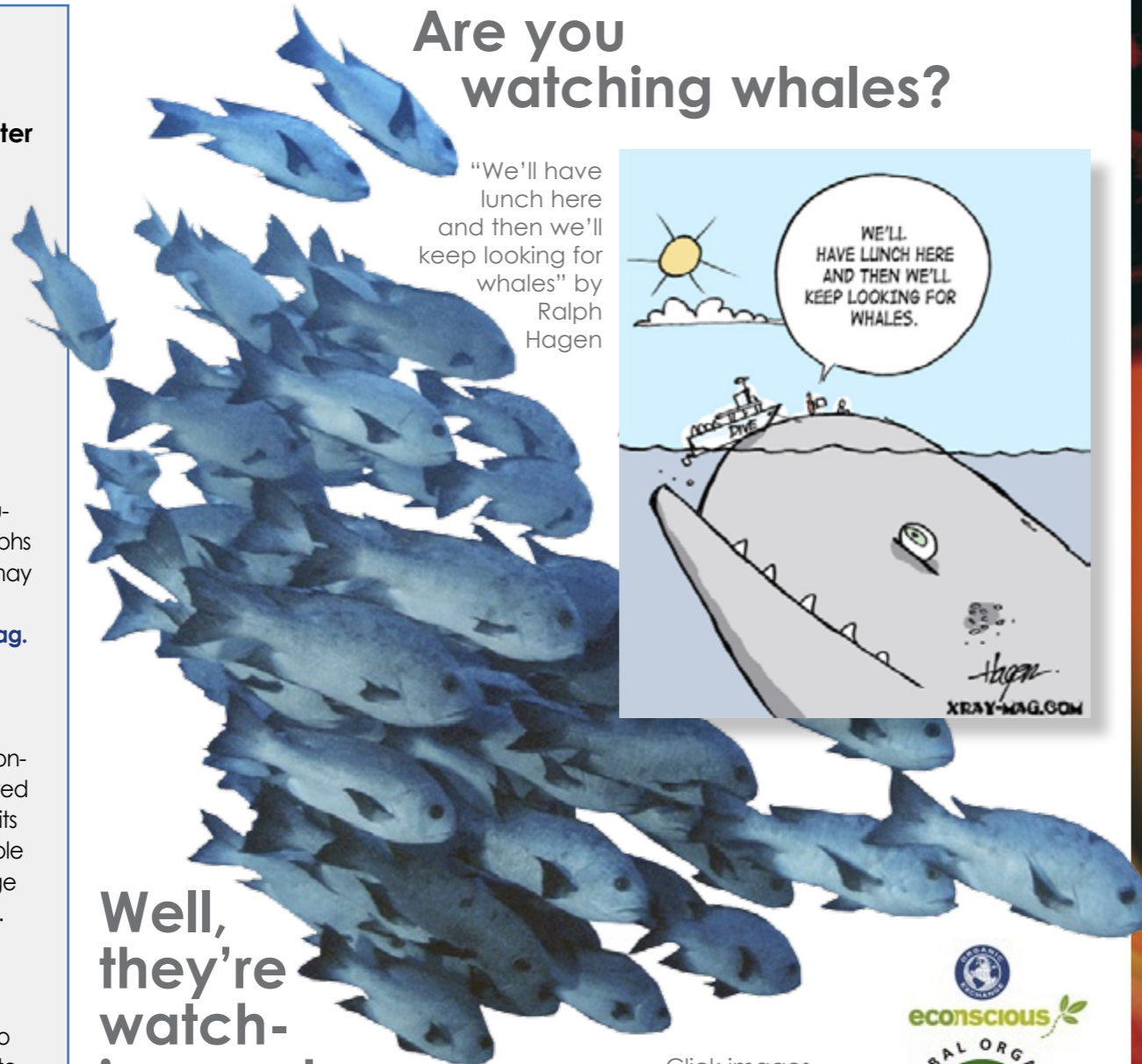
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## Are you watching whales?



"We'll have lunch here and then we'll keep looking for whales" by Ralph Hagen



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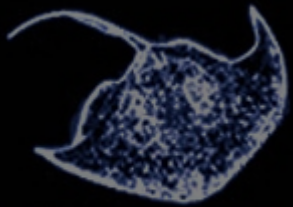


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X-ray mag

News edited by Peter Symes & Arnold Weisz

# Good NEWS

Reporting by Michel Ribera

**Wold salmon is back in the Seine and returning to the French capital for the first time in almost a century. In 2008, 260 individuals were observed by video at the fish pass at Poses dam, upstream from Rouen, and in October 2008, a specimen of 7 kg was caught at the dam at Suresnes, near Paris. A great number of other migratory fish species have also reappeared in Paris.**

Historically the Atlantic salmon, *Salmo salar*, used to migrate up the Seine River for part of the year to spawn. But increased pollution of the water and the building of dams after the First World War saw their number dwindle, and by 1970, there were only three species left in the Seine's dirty waters, which washed up hundreds of tonnes of dead fish per year.

But a major clean-up project in the past 15 years—including the building of a water purification plant—has turned the tide for the river's marine life. According to the Union Interdepartmental Clean Agglomeration Parisienne (SIAAP), there are now 32 species of fish in the Seine, against three in 1970.

### 32 species

Along with the iconic salmon, hundreds of sea trout, shad and lamprey eel have been spot-

ted glinting in the Parisian sunlight this year, with the number of fish species in the river ballooning, officials say. "This year the numbers have exceeded anything we could have imagined," said Bernard Breton, secretary-general of France's National Federation for Fishing. "I would not be surprised if we had passed the 1,000 mark [for salmon]," he told AFP news agency.

Scientists at the French National Institute for Agricultural Research say the return of the salmon is significant—it is a "bellwether species" giving signals about its habitat's state of health. Analysis of their scales concluded that the salmon had spent between a year and a half and three years in the ocean.

Mucus attached to the scales were used to determine the geographical origin of fish. The

comparison, conducted by the doctoral student Charles Perrier, indicates a certain cosmopolitanism: more akin to fish populations in Lower Normandy, frequenting the rivers near the Seine. Others come from more distant basins, such as the Allier. Others came from foreign rivers. ■

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The Seine and Notre Dame Cathedral from the left bank



# Salmon returns to Paris

# Fragile and rare coral reefs on Galapagos to be protected

Some of the world's rarest and most fragile coral reefs and the economies that depend on them will be better protected thanks to a major international marine project led by the University of Southampton.

The three-year, government-funded, Darwin Initiative project, *Galapagos Coral Conservation: Impact Mitigation, Mapping and Monitoring*, was led by Professor Terry Dawson from the

University of Southampton's School of Geography. The aim was to assist the Ecuadorian government in protecting the last remaining extensive Galapagos coral reefs of the northern Wolf and Darwin Islands and how they can be managed in a way that still supports the economic activities that are so important to the Galapagos Islands.

## Improving management

The coral reefs of the Galapagos Islands contribute significantly to species richness and diversity in the Galapagos Marine Reserve (GMR). They

support thousands of species, including many rare and endemic corals. In addition, these reef ecosystems are major hotspots with remarkable numbers of sharks, tuna, turtles and dolphins all ecologically linked to the area's reef complexes. However, their distribution has been strongly affected by extreme climatic events over the last 30 years, especially El Niño events where extensive coral reefs were reduced by 95 percent in 1982–3, with further mortality in 1997–8 due to increased sea surface temperatures as a result of ocean warming.

In addition to the natural threats to the Galapagos, the islands have also become a very popular tourist destinations, being visited by everything from cruise ships to divers. The project also engaged the fishing and tourism industries for improved management of the marine environment through capacity-building of tourism, dive guides and fishers, and established permanent mooring buoys to avoid boat anchor damage.

"This step forward demonstrates how relatively modest external aid can empower applied marine research and lead to management policy. Such steps are critical if natural ecosystem function is to be conserved to maintain Galapagos's intrinsic value and contribution to the wellbeing of future generations," says Professor Dawson.

The Galapagos Islands are experiencing an increase in tourism and suffering as a result. From 2001 to 2006, flights into the Galapagos increased 193 percent.

## New species discovered

The project also discovered new species both to science and to Galapagos, including zooanthid species from the genera *Hydrozoanthus*, *Parazoanthus*, *Antipathozoanthus* and possibly *Epizoanthus*, although the latter may be an entirely new species as yet undescribed.

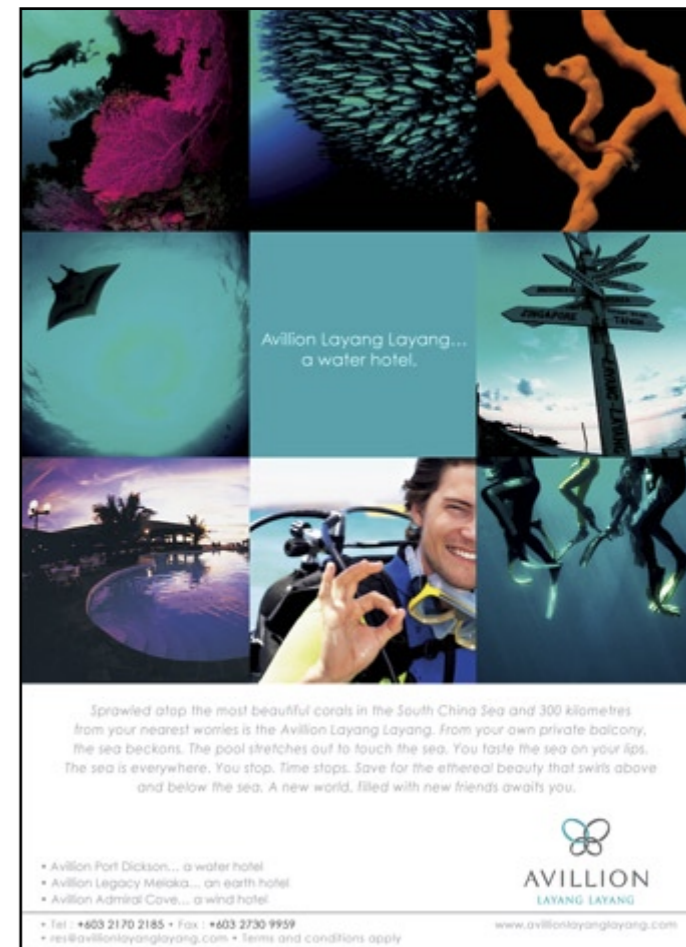
Other reef-building corals have been identified, which are new to Galapagos, including stony corals as *Pocillopora effusus* and *Pocillopora inflata*, and the leaf coral, *Pavona chiriquiensis*. In addition, a possible new gorgonian of the genus *Pacificorgia* (*Octocorallia: Gorgoniidae*) species has been collected, together with a new reef-building coral, *Leptoseris sp.*

The coral species *Gardineroseris planulata* was thought to have gone extinct during the 1997-98 El Niño event, but the project "rediscovered" several separate, but small colonies at the Wolf and Darwin island sites.

This project is not the only one that has been discovering new species at the Galapagos Islands. The National Museum of Natural History (NMNH), part of the Smithsonian Institution, discovered numerous new species—including fishes, sea and sun stars, urchins and mollusks—and documented many species of marine life not previously known in the Galapagos Islands, during their 1999-2000 expedition. It seems like these Pacific islands still have more secrets to reveal, even though it has been 174 years since Charles Darwin arrived in the Galapagos Islands on 15 September 1835. ■



Anemone, North Marchena, Galapagos Islands



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## Healthy surroundings aid coral recovery

**Bleached corals bounce back to normal growth rates faster when they have clean water and lots of sea life at their side, a United States university study indicated.**

Better overall ocean health means corals are better able to recover from bleaching events, a recent study by scientists at Scripps Institution of Oceanography at University of California-San Diego, suggests.

The study showed Mountainous star coral on reefs in Honduras and Belize was able to recover from a major bleaching event and grow normally within two to three years when the surrounding waters and reef were relatively

healthy, the scientists reported. By contrast, corals living with excessive local impacts, such as pollution, couldn't fully recover even after eight years. ■ SOURCE: PLOS ON

## Corals prefer to stay close to home

A recent study published in *Evolutionary Applications* by Australian biologist, Jim Underwood, has found surprisingly that despite the fact that corals cast their eggs and sperm haphazardly into the oceans, certain species of coral show remarkable fidelity to their home range.

Underwood sampled DNA from coral reefs in the Indiana Ocean and found that individual corals located in the same group of reefs are more closely related than previously thought.

These results suggest that since most recruitment of these Indian Ocean coral populations comes

from other locally sourced coral, one cannot depend on genetic material from distant populations of corals to replenish or restore degraded local populations. In these regions, marine reserves that maintain high local genetic diversity should be favoured. ■

## Coral Sunscreen

Dermatologists say that sunscreens are among our best weapons against skin cancers. Still, sunscreens aren't enough to block out the sun completely. The solution, scientists believe, lies in the natural sun-defense strategies that microbes, plants, and other organisms have evolved.

Compounds that absorb and neutralize ultraviolet beams are ubiquitous in nature, from flavonoids in plants to the melanin that colors human skin. Some of the first sunscreen ointments, developed in the early 1900s, contained UV absorbers such as quinine from the bark of South American cinchona trees and cinnamates from cinnamon trees.

**Corals sunblock**  
More recently, research-

ers have studied compounds from creatures that bask continually in the tropical sun: coral reefs.

In the mid-1980s, environmental biochemist, Walter Dunlap, and a colleague at the Australian Institute of Marine Sciences in Townsville, Queensland, reported that corals rely on powerful UV-B absorbers, known as mycosporinlike amino acids, or MAAs.

### Fisheyes

"Corals that grow on the surface of the ocean have very, very high concentrations of these compounds," Dunlap says. "But as you go deeper, the concentrations diminish." MAAs, it turns out, are found in just about every marine organism. Fish even have them in the lenses of their eyes. ■

### Coral offers effective new pain relief

Traditional painkillers like aspirin and even morphine often do little to take the edge off neuropathic pain. Neuropathic pain, which follows damage to the nerves, can be debilitating and is hard to control even with heavy-duty painkillers like morphine.

But research in the *British Journal of Pharmacology* suggests the newly

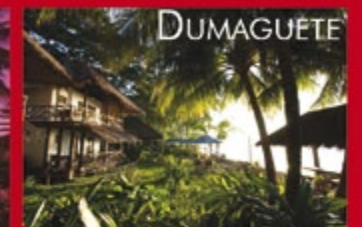
tested chemical which comes from *Capnella imbricata*, also known as Kenya Tree Coral, could provide relief.

Called Capnellene, the compound is isolated from soft coral collected at Green Island, a small island near Taiwan.

The Taiwanese scientists report promising early trial results in rats. ■

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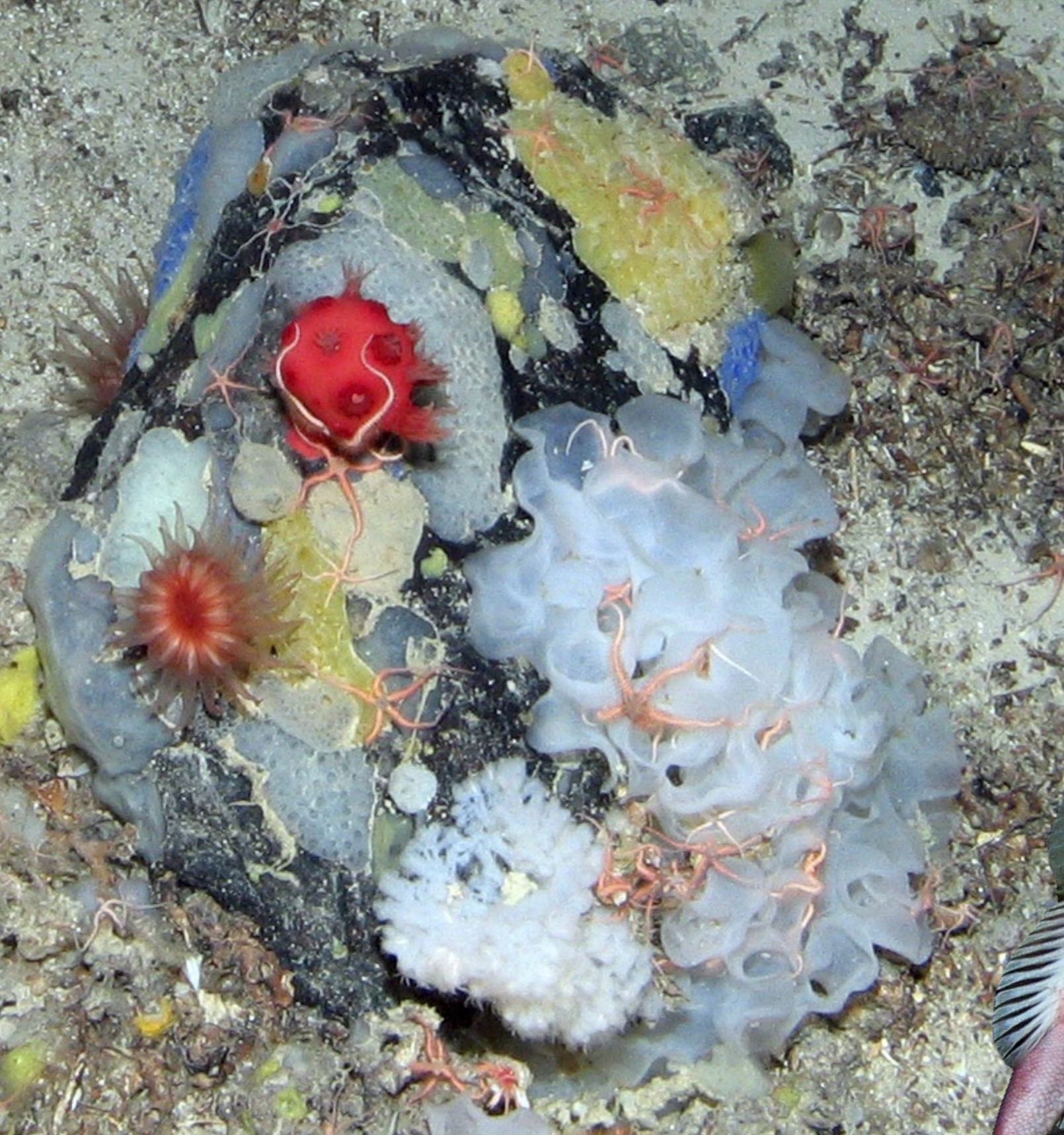
# Pristine coral reefs discovered in UK waters

Throughout July, a team of seven marine scientists from JNCC, the British Geological Survey, and the University of Plymouth spent four weeks at sea exploring the seafloor and recording their discoveries.

The team used state-of-the-art technology to map the seafloor in two of the least studied areas of our seas. Anton Dohrn Seamount, the first area under the spotlight, is an extinct underwater volcano rising more than 2100 metres from the seabed, reaching its summit at a depth of 600m. This ancient volcano is in striking contrast to the surrounding flat seabed and creates ideal conditions for an abundance of fish, coral and sponges. The second area was around Rockall Bank, where there are steep cliffs and pinnacles, shrouded in cold water coral reefs with pink and purple brittlestars and yellow sponges.

As well as delicate and ornate sea fans, the reefs were formed





when we were planning the survey, we really hoped that we would find evidence of these habitats. We're delighted that we discovered such pristine examples, and I think the images we've captured show some of the amazing habitats that we have in our deep, several different types of coral, including *Lophelia pertusa*," said Neil Golding, JNCC's Offshore Survey Manager.

Following these discoveries, JNCC will consider recommending them for protection, in order to ensure that these rare and fragile habitats can be preserved into the future. ■

## Scilly Island underwater survey turns up rare sponges, corals, slugs and anemones

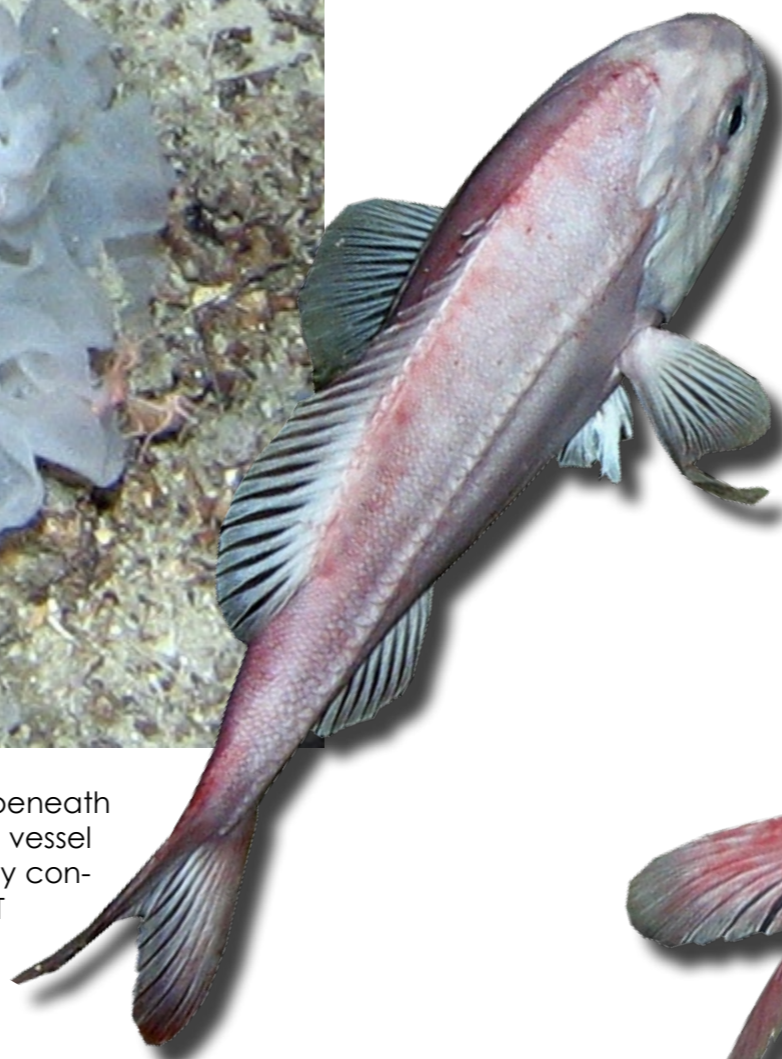
**Divers from Cornwall, Devon and the Isles of Scilly have surveyed the reefs and tidal channels around the Isles of Scilly including sites that had never previously been dived.**

The information gained from the surveys feeds into local and national databases and will be used for conservation. Although it has long been known that the Isles of Scilly are important for marine life, the Marine Biodiversity Project offers an unprecedented opportunity to find out where the richest sites are and what these marine communities are made up of.

The surveys looked at sites on all sides of the islands including the Crim Rocks, which are exposed to the full force of the Atlantic. These dramatic reef walls are smothered in anemones and hydroids, and during the survey, hosted large numbers of red nudibranch sea slugs that were breeding and laying eggs.

In the tideswept channels, the team recorded diverse red sea-

weeds and burrowing anemones in the sandy seabed. Whilst on the more sheltered rocky reefs the sponges, pink sea fans and potato crisp bryozoans flourished. Football sea squirts and yellow cluster anemones were highlights of some of the dives, and the team were lucky to spot the tiny sea fan anemone growing on some of the sea fans. But nothing could beat finding the rare sponge that expert marine biologist, Dr Keith Hiscock, first saw and photographed on these reefs back in the late 1960s; the slime sponge topped off the week. Dr Hiscock has long recognised the importance of the Isles of Scilly for marine life, and led surveys in the 1980s that catalogued the seabed marine life at 46 intertidal and 67 subtidal locations. ■



by hard corals, similar to those that built Australia's Great Barrier Reef. In addition to the abundant corals, a truly wide range of animals including sea urchins, basket stars, orange feather stars, yellow sponges and fish were seen living on these reefs.

The majority of the reefs were pristine, appearing completely untouched by human activity. These incredible reefs were filmed using high-tech camera equipment lowered nearly two kilometres (twice the height of Mount

Snowdon) beneath the flagship vessel of the survey contractor MMT AB.

"At the beginning

# King crabs go deep to avoid hot water

A study reveals temperature as a driving force in how king crabs have evolved and spread globally over tens of millions of years. Now rising water temperatures could force king crabs, which thrive in water between 1 and 4 degrees Celsius, to seek deeper water.

Researchers from the National Oceanography Centre, Southampton, have drawn together 200 years' worth of oceanographic knowledge to investigate the distribution of a notorious deep-sea giant—the king crab. The results, reveal temperature as a driving force behind the evolution and distribution of these major sea floor predators.

## Old but cool

In deep seas all over the world, around 100 species of king crabs live largely undiscovered. The fraction that we have found

includes some weird and wonderful examples, such as the *Paralomis seagrantii*, which has its eight walking legs and claws entirely covered in long fur-like hairs. The related group *Lithodes megacanthus* grows to lengths of 1.5 metres, and has 15 to 20cm long defensive spines covering its body. At temperatures of around 1- 4°C, these crabs thrive in some of the colder waters on Earth, living and growing very slowly, probably to very old ages. Only in the cooler water towards the poles are king crabs found near the water surface—though tempera-

tures found around some parts of the Antarctic (below 1°C) are too extreme for their survival.

## Soft or hard

A paper, published 15 years ago in *Nature* is thought to show that king crabs evolved from shell-bound hermit crabs—similar to the familiar shoreline animals. Soft-bodied, but shell-free intermediate forms are found only in the shallow waters off Japan, Alaska, and western Canada. By looking at 200 years' worth of records from scientific cruises and museum collections, Sally Hall and

Sven Thatje from the University of Southampton's School of Ocean and Earth Science at the National Oceanography Centre discovered that the soft-bodied forms can live at temperatures about ten degrees higher than the hard-bodied forms, but that both groups can only reproduce when temperature is between 1°C up to 13-15°C.

"It seems that

most shallow-water representatives of this family are trapped in the coastal regions of the North Pacific because the higher sea surface temperatures further south prevent them from reproducing successfully and spreading," said Dr Thatje.

In order to leave this geographic bottleneck and spread around the world, the shallow water ancestors of current deep-sea groups had to go deep and adapt to the challenges of life in the deep sea. The process of adaptation to constant low temperatures (1-4°C) prevailing in the deep sea seems to have narrowed the temperature tolerance range of the crabs, where they have emerged to the surface waters in the Southern Hemisphere. With differences of only a couple of degrees in temperature affecting the distribution of the king crab, it is difficult to predict the consequences of range expansion in the warming waters around the Antarctic Peninsular region.

## Important commercially

King crabs are of great commercial value, and fisheries are established in high latitude regions of both hemispheres. The red king crab, or so-called Kamtsjakta crab (*Paralithodes camtschatica*), is one of three commercially exploited king crabs in the

eastern North Pacific Ocean. This is changing, as this crab species was found only in the North Pacific Ocean until 1961, when Soviet scientists began an eight-year release programme into the Murmansk Fjord to add to the area's value base for residents. Since then, the crab has ranged eastward and westward throughout the southern reaches of the Barents Sea.

Norway and Russia first

introduced regular commercial harvesting of the red king crab in the 2002-3 season, although the biological impact of this introduced species still is under hefty discussions in Norway.

Understanding their evolutionary history and ecology is key to supporting sustainable fisheries of these creatures. Recent range extensions of king crabs into Antarctica, as well as that of the red king crab in the Barents Sea and along the coast off Norway emphasize the responsiveness of this group to rapid climate change, said research student Sally Hall. ■

*Only in the cooler water towards the poles are king crabs found near the water surface*



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*We hope that our efforts and people's generosity will, together, honour Cillian's memory, as well as all the children who suffer serious illness.*

# World's Longest Scuba Dive

**In memory of a son and nephew, two Irish brothers are to make a daring scuba dive in an attempt to enter the Guinness Book of World Records and raise funds for sick children.**

Declan Devane has been motivated to take on the fundraising challenge in memory of his two year-old son Cillian, who died on 6 February this year.

Declan, along with his brother Paul Devane, hope to spend 40 hours underwater, under the supervision of dive-coordinator, Gary Jennings, and with the help and support of Scubadive West and a team of support divers. To set the record, the brothers will

not be permitted to break the surface of the water for the duration of the attempt.

What sets this dive apart from other attempts is that it takes place in open sea rather than an aquarium or pool. In the uncontrolled natural environment, the divers will be exposed to the elements and a water temperature of less than 15°C. The team are therefore attempting to claim the Guinness World Record™ for the world's 'Longest cold, open salt-water SCUBA dive'.

Declan wants to honour his son's memory and help other children who suffer serious illness. "By raising funds for St. Raphael's Children's Ward at Beaumont Hospital where Cillian was cared for so well, and for CD's Helping

Hands, which supports the families of sick children, we hope to give something back to those who helped us when our little boy was sick."

The Devane brothers have already had huge support from the scuba diving community, who are providing a range of standard and specialist equipment for the world breaking attempt. ■

**'The World's Longest Scuba Dive' will begin at Scubadive West Dive Centre off the West coast of Galway, Ireland, on Saturday, 10 October 2009. The world record attempt aims to raise funds for the St. Raphael's Children's Ward at Beaumont Hospital and the charity CD's Helping Hands.**

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# MIDE 2009



Each year, a bigger show room had to be booked

Report by Peter Symes

## Malaysia International Dive Expo keeps expanding. The 2009 edition saw a strong and lively attendance.

Reviewing dive shows has never come easy to me. Such a big part of the experience is about being there and capturing the ambience and dynamics without just rubbing it in that you missed the party has always been quite a challenge. But this is the rare pleasant exception from the rule.

MIDE is one of the young and rising dive expos on the planet, and the way things have been going lately, it is becoming one of the biggest, if not *the* biggest, dive expo in region. Certainly, it is already a force to be reckoned with. As an international exhibitor who, as one of the very few media doing so, tour the United States, Europe and Asia dive expos, we can tell the difference. This is where we have to go to find the new dynamics in the field.

It is encouraging to witness the youthfulness and enthusiasm of the local dive community and see how new markets are developing before our very eyes. I am only half-heartedly sorry to acknowledge that by comparison, they make the attendance at many European and US expos stand out like grumpy retirees. But mostly, I feel encouraged by taking part and hope that the rest of world will watch and learn.

I have to hand it to the organiser for the manner in which they have somehow managed to draw in the general public whole families at a

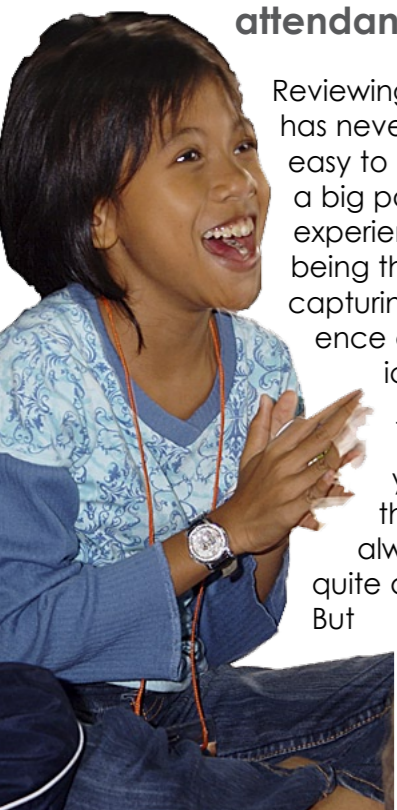
time and especially for giving so much attention to the children. The kids were captivated and an enthusiastic audience.

MIDE isn't a show where new innovations get presented first—that role still falls almost exclusively to DEMA in the United States—nor can it boast having a stellar range of speakers. But more presentations will be added next year and admission is still free.

I think the show is vastly underappreciated by the international diving community, in particular the big brands and manufacturers who seem to be missing out on a very opportune moment to get a foot in the door. As far as we are concerned, we have already booked our space for next year where the show is projected to grow well past 200 exhibitors. ■

More images and impressions will be posted on X-RAY MAG'S website shortly. Visit: [www.mide.com.my](http://www.mide.com.my)

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# Five ancient Roman shipwrecks found

Underwater archaeologists in Italy working with an American archeological expedition group belonging to the Aurora Trust have discovered the wrecks of five ancient commercial Roman vessels in the Mediterranean, with their cargo still largely intact.

Resting at a depth of 100 meters, and being covered under some 3 to 5 meters of mud and sediment have protected the wrecks from being destroyed, and they are thought to be fairly well preserved state. The ships also sank without capsizing allowing examination of the cargo in almost the form it had been loaded. The biggest of the ships discovered is about 20 metres long (60 feet).

## Amphorae

The ships, which date from between the 1st century B.C. and the 4th century, carried amphorae—vases used for holding wine, olive oil and other products—as well as kitchen tools and metal and glass objects that have yet to be identified, Italy's Culture Ministry said.

The oldest of the ships has a cargo of wine amphorae from southern Italy, some stacked in their original position, AURORA said. Another one was carrying moratoria, large bowls used to grind

*"They are between 1,600 and 1,900 years old, and were laden with - among other things - jars for carrying wine, olive oil and fish sauce."*

grains. Another was loaded with African amphorae carrying garum, a fish sauce that was a delicacy in ancient Rome.

## Safe haven?

The spot was highly trafficked, and hit by frequent storms and dangerous sea currents.

According to the information made available at the **Aurora Trust website**, the teams lead archaeologist, Timmy Gambin, suggested that the ships probably tried to reach a safe harbor, but didn't make it on time. Ventotene, where they sunk, belongs to a small archipelago half way between Rome and Naples and was used as shelter in the Tirrena Sea during thunderstorms. In Roman times, the place was also used as exile for noblemen; Emperor Augustus sent his daughter, Julia, to Ventotene for adultery charges, and the Italian dictator Benito Mussolini used it as a prison camp. ■

ITALIAN CULTURE MINISTRY AND THE AURORA TRUST



Archaeology officials say they have found five well-preserved Roman shipwrecks on the seabed off the coast of Ventotene, a small Mediterranean island, with their cargo of amphorae, pots and other objects largely intact. Amphorae are believed to be of Spanish origin, dating back to the first century A.D.

ITALIAN CULTURE MINISTRY AND THE AURORA TRUST



The cargo of amphorae, pots and other objects date from the 1st century B.C. to the 4th century and carried wine, kitchen tools and some metal and glass objects that have yet to be identified, Italy's Culture Ministry said.



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# Seeing Shipwrecks With Sound

**How does one go about finding a shipwreck? It's a question that's been asked ever since there have been shipwrecks!**

Until the mid 20th century, there was really only one way though—by touch. Searchers would drag the bottom with hooks attached to ropes until they found something. Or, divers

would swim down to the bottom to identify what was there.

This later tech-

*"...it can also produce images of shipwrecks so detailed that you'd swear they're photographs!!"*

nique is still used today! But, when the water is too deep or dark neither method is very effective.

The use of sonar developed during WWII as a means of detecting enemy submarines. An electric sound was projected from a vessel on the surface. When the sound made contact with a solid object underwater it would make an audible "ping"—which most movie-goers are familiar with.

But the problem with early "echo" sonar was that it couldn't distinguish between a submarine lying on the bottom, a big rock, a shipwreck or something else.

After the war, geo-scientists in both the public and private sectors saw the potential for using sonar for mapping the seafloor. Side-scan sonar quickly became the norm.

## Side-Scan Sonar

Side-looking transducers send out signals in pulses. The transducers receive the sound that is reflected off the bottom or off objects on the seafloor. The data is transmitted to a graphic recorder that displays an image of the scan. It displays continuous scans and creates detailed pictures of the seafloor at relatively shallow depths.

Lower frequency systems provide wide swath coverage and are used to create mosaics of the entire survey area. Higher frequency systems can provide higher resolution images.

## Multi-beam Sonar

Originally called "swath echo-sounders", multi-

beam sonar systems were developed by the United States Navy to map large swaths of the deep ocean—to assist American submarines navigate underwater. Echo data is collected and integrated with the precise location and attitude of the survey vessel through the use of a Global Position System and an Inertial Motion Unit. By integrating the vessel's attitude measurements with the timing of the sonar echo, a very accurate bathymetric record can be produced.

As multi-beam sonar technology improved, higher frequency systems suitable for

high-resolution seafloor mapping were developed. Today, multi-beam sonar is used mainly for geological and oceanographic research and offshore oil and gas exploration. But, it can also produce images of shipwrecks so detailed that you'd swear they were photographs!

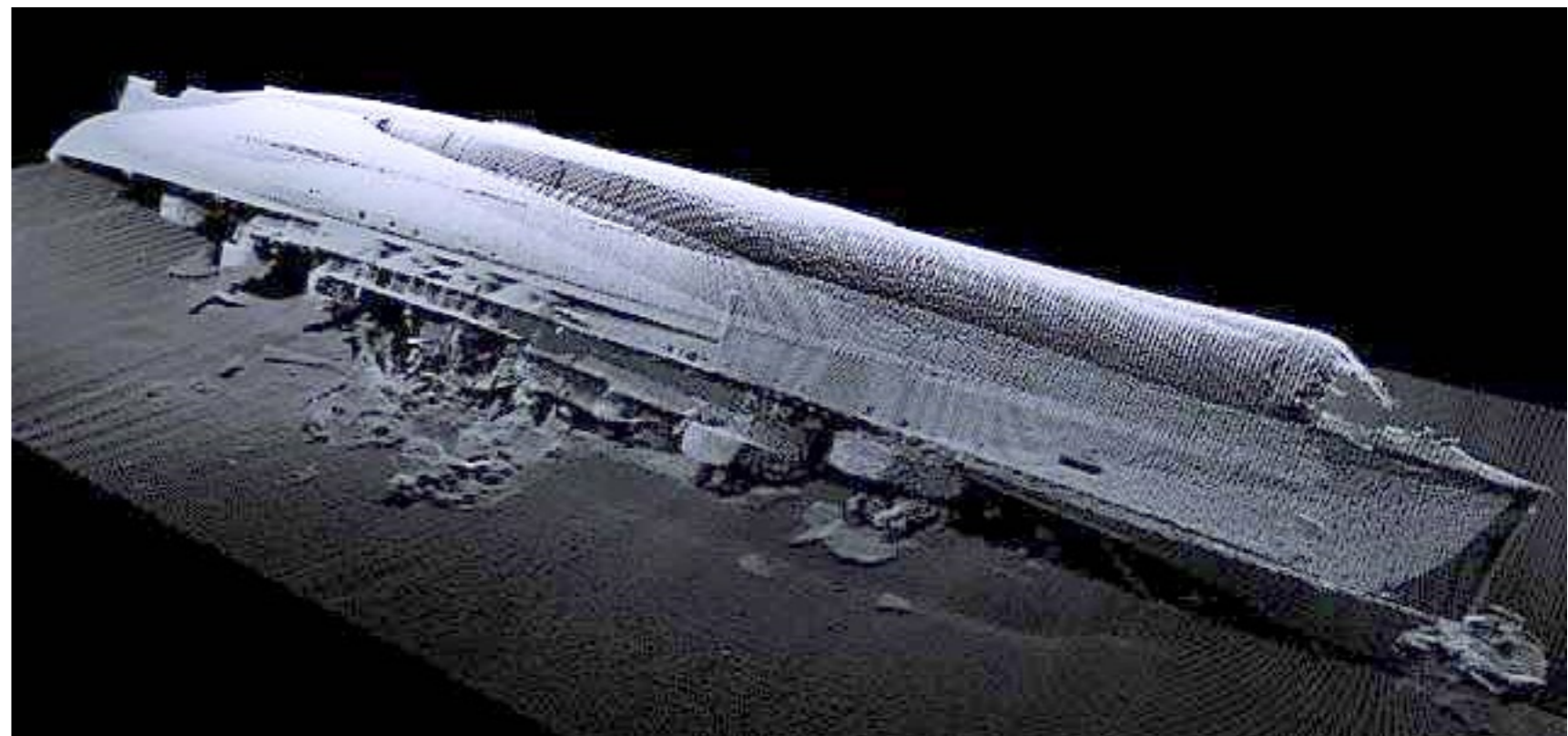
## Sub-bottom Profiling

Sub-bottom profiling systems allow its user to see what's beneath the seafloor. Like side-scan and multi-beam sonar, a sound source emits a signal vertically down into the water, and a receiver monitors the return sig-

nal that has been reflected. When it penetrates the seafloor, the acoustic signal is reflected when it encounters the boundary between two sedimentary layers. The rate at which sound travels through sediments differs and can be measured.

Today, the majority of sub-bottom profiling systems operate at a low frequency. These can penetrate the seafloor down hundreds of meters. Such systems are well suited for geophysical applications in very deep water.

However, existing systems aren't good at identifying objects buried underneath ▶



This almost iconic image of the *Royal Oak* has been made with the latest in multi-beam sonar technology by a UK group, ADAS, [www.adus.org.uk](http://www.adus.org.uk). The *Royal Oak* rests in Scapa Flow which is featured in another article in this issue

Text by Rob Rondeau  
Marine Archaeologist  
ProCom Diving Services



the seafloor. The higher a sub-bottom profiler's frequency, the better its imaging ability.

But, depth penetration is reduced substantially. In order to achieve the image resolution needed to identify buried artifacts, the "business end" of the profiler can only be several meters above the seafloor. This rules out the use of a towed or vessel-mounted array.

ProCom Diving Services is presently developing a high frequency sub-bottom profiler for deepwater use. The plan is to mount the profiler underneath a submersible. It will emit a narrow acoustic beam downward. The submersible will be able to maintain a constant "shallow altitude" of only a few meters above a wreck site at depth. This will allow the profiler to make detailed images that depict small, buried features in the top few meters of sediment.

At least this is what we're trying to accomplish. We expect to conduct field trials of the proto-type in early 2010.

### The Future

The use of sonar technology, in its various forms, holds exciting promise for the field of marine archaeology. It's helping archaeologists study sites, specifically to determine if they're worthy of excavation.

The ability to precisely map the seafloor, and beneath it, in three dimensions is critical for understanding shipwrecks as archaeological sites. ■

## Iron steamer found off Victoria's coast —could it be the *Glenelg*?

The Southern Ocean Exploration diving team, after hours searching for the wreck, found it at the last minute, almost calling search off.

According to group leader, Mark Ryan, the discovery led to "yelling, screaming, and more than a few high fives on the boat", mainly because the dive's difficult conditions and the wreckage being at 32 meters deep.

The divers recovered a plate from the shipwreck to confirm the wreck's identity, and the location and dimensions of the ship suggest it is in fact the *Glenelg*, which vanished in 1900 during a routine run along the Victorian coast, between Bairnsdale and Melbourne. The *Glenelg*, thought to be one of Victoria's worst maritime tragedies, left 31 people dead and only 3 survivors, and the inquiry made never explained what caused the ship to sink. Now some answers might surface.

Group leader Ryan said, "The three survivors from the *Glenelg*

said in their official report that the hull plating had separated at the stern and filled the ship up with water, and we believe that is correct."

It all started with the discovery of an unusual dinner plate, something that aroused the interest of the divers and led them to contact the Heritage Victoria's Maritime Unit. According to the institution, the plate found suggested that the wreck could belong to the Tasmanian Steam Navigation Company, and as it was purchased by the Union Steam Ship Company, the documented proprietors of the *Glenelg*, the ship's identity has a good chance of being verified.

Ryan said the dive team will return to document the find with photos and video footage, but there is no reason to remove any more artifacts.

"Apart from that, it'll just be down there forever," he added. ■



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Text by Rob Rondeau  
Marine Archaeologist  
ProCom Diving Services

**One June 3, a United States federal court judge made history when he ordered a Florida-based treasure hunting company to return 17 tonnes of gold and silver coins to Spain. Odyssey Marine Exploration of Tampa made the spectacular find off the coast of Portugal in 2007. Odyssey refused to divulge the**

# Returning cultural heritage to its rightful owner

**identity of the shipwreck the coins came from or its location. But the company was forced to do so last year by the same judge, Magistrate Mark Pizzo.**

Earlier this summer, the government of Spain successfully argued that, under the terms of international Sovereign Immunity, it never abandoned or otherwise relinquished its ownership of the *Nuestra Senora de las Mercedes*, which sunk during a sea battle with the British Navy in 1804. At the time of its loss, the *Mercedes* was sailing back to Spain from South America.

Odyssey has said that it will appeal Judge Pizzo's ruling and will "vigorously defend" its right to the treasure. The 500,000 plus coins remain under lock and key in the company's warehouse.

### Finders Keepers?

This isn't the first time that the "owner" of cultural artifacts has refused to return said to its country of origin. Typically, their position is

that they were doing the world a favor—saving the items in question from the ravages of time and/or the environment. When it comes to shipwrecks, this is often referred to as the "tides and time" argument.

This is the case with, arguably, the world's most famous case of "questionable ownership", the Elgin Marbles. They are a collection of classical Greek marble sculptures from the Parthenon and other buildings on the Acropolis of Athens in Greece. They were removed by laborers working for Thomas Bruce, the 7th Earl of Elgin, in the early 19th century and were later sold, by him, to the British government.

Elgin, who was the British ambassador to Greece at the time, argued that if he hadn't taken what he did, when he did, they would have been destroyed. The practice at the time was for Athenians to burn ancient marble for its lime, which they then used to make concrete for new buildings.

Air pollution over the years has also taken its toll on the Parthenon's remaining sculptures.



The stuff of dreams! Financially significant artifacts recovered from shipwrecks off the coast of Florida

In Britain, Elgin was criticized for his actions, labeled by some as vandalism. Others described him as a looter. After much public debate, the British government purchased the Elgin Marbles in 1816 and placed them on display in London's British Museum—where they remain to this day.

### Legitimacy?

However, the modern-day state of Greece argues that the Parthenon sculptures were removed illegally. It challenges the authenticity of the government document that Elgin alleges he was issued, allowing him to remove the artifacts. Elgin destroyed the original.

### Goodwill Gesture

The remains of the great Egyptian pharaoh, Ramesses I, had been lost to history until they were found on display in a tacky "Freaks of Nature" tourist exhibit in Niagara Falls, USA, in the mid 1990s. The three thousand year-old royal mummy eventually made its way to Emory University in Atlanta, Georgia.

In 2003, Ramesses I was returned to Egypt with full official honors—a gift from the people of Atlanta to the people of Egypt.

"It was simply the right thing to do," said the university museum's curator, Peter Lacovara.

Since then, the general director



An 18th Century Spanish gold coin similar to ones found at the wreck site of the *Nuestra Senora de las Mercedes*

Elgin Marbles on display at the British Museum in London.



WIKIPEDIA PHOTO.



of Egypt's Supreme Council on Antiquities, Zahi Hawass, has put other museums around the world on notice, saying that he expects Egypt's cultural artifacts returned. The G'psgolox Pole, a native mortuary pole from British Columbia, Canada, now resides at a museum in Stockholm, Sweden. The Canadian government allowed the totem pole to be exported to Sweden in the 1920s. Today, the people of B.C.'s Kitimaat First Nation want their pole back!

The Swedes have agreed to do

this, but on the condition that a suitable museum is built to house it.

Museums, from Los Angeles to the Vatican, have recently repatriated art and artifacts deemed important to a nation's cultural heritage.

In recent years, technological advancements have allowed treasure hunters to find and salvage many shipwrecks. This has led to the loss of many particularly valuable archaeological sites, according to Koichiro Matssura, the director general of UNESCO.

Escalating prices on the inter-

national market for shipwreck artifacts is also adding to the problem. International auction houses hawk gold artifacts and jewelry recovered from Spanish galleons. And online, a person can buy 8th century Chinese ceramics looted from a shipwreck in Indonesia or coins from a 17th century shipwreck found off the coast of West Africa.

As Matssura points out, artifacts from marine archaeological sites are not treasure to be discovered only by those who have the ability to appropriate them. ■

## 800 year old Chinese artifacts to be recovered

**Marine archaeologists have recently been given the green light to recover more artifacts from China's most ancient wreck.**

Discovered in 1987, off the Yangjiang coast, the wreck now dubbed Nanhai No 1, which sank around 800 years ago, is believed to have been one of the oldest and biggest merchant vessels sunk in Chinese waters. The vessel, iden-

tified as belonging to the Song Dynasty (960-1279) was accidentally discovered during drainage performed by a Sino-British archeological team, who was searching for a 17th century Dutch vessel, the *Rhynsburg*, believed to have sunk some 40 kilometers off shore.

Since 2007, the 30-meter long wreck has been placed submerged in China's Underwater Archeological Center's sealed pool which is 64 meters long, 40 meters wide and about 12 meters deep.



It is filled with seawater and silt in order to replicate the site's original conditions where it rested for centuries. Construction on the Marine Silk Road Museum began in early 2006, costing 170 million yuan (US\$ 25 million).

Chinese experts hope to find rare archeological treasures, hidden in the ship's cabins. Archaeologists have already recovered more than 4,000 artifacts from the vessel, including 1,000 porcelain artifacts, many made to feature foreign patterns and styles, and a gold chain, almost two meters long and weighing around one kilogram—also silver ingots and about 6,000 copper coins. ■



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## NAUI's new HQ finally gets the go-ahead

NAUI Worldwide is happy to announce that the construction of their new building has officially started. The building is located off the I-75 business corridor in Tampa, Florida. After a long process of meetings with local government officials and miles of red tape, permits were finally obtained and ground has been broken.

# Nitrox online course

Since its introduction in 1996, the PADI Enriched Air Diver Specialty course has been the most popular PADI specialty certification. This popularity has only been rising, and to meet this demand, the PADI organization has launched the PADI Enriched Air Diver Course Online. This online delivery, when combined with course revisions that include a computer-

only option, simplifies the teaching process and enables students to get back in the water sooner using Enriched Air. This translates into more Enriched Air student divers and customers.

The PADI Enriched Air Diver Course Online (available in English) follows the same format used in the PADI Open Water

Diver Course Online. Student divers enroll and complete all knowledge development online, including all components of the newly revised PADI Enriched Air Diver Manual and Enriched Air Diving video. Then, they complete practical application sessions and open water training (which is still optional, but recommended).

Not only is the course available online, the content itself has been revised, so it is now based on using a dive computer. Although using the Recreational Dive Planner and DSAT Equivalent Air Depth and Oxygen tables remains an option, divers taking the revised specialty course now focus on learning how to properly set and use an enriched air capable dive computer to plan and execute their dives. The new Enriched Air Diver Manual, video and exam also fully support the dive computer option. ■



## New Standards

Two new ISO Standards have just been agreed upon for diving. ISO (International Organization for Standardization) is a global body with 161 member countries who aim to align their national business practices with those agreed in ISO standards for various fields. Six ISO standards for diving have been in place for several years already, equating, in the PADI system, to PADI Scuba Diver, Open Water Diver, Divemaster, Assistant Instructor, Open Water Scuba Instructor and Dive Center/Resort. The two new standards equate to the PADI Discover Scuba Diving programme and Enriched Air Diver course.

These two new standards are designated as follows in the ISO system:

- Requirements for training programmes on enriched air nitrox (EAN) diving (ISO 11107)
- Requirements for introductory training programmes to scuba diving (ISO 11121)

When PADI members conduct an Enriched Air Diver course or run a Discover Scuba Diving programme, they can also claim to meet the requirements of these ISO standards. This can be a major advantage when dealing with customers, travel operators and even local governments, as ISO is seen as an independent standard of quality.

For more details of ISO member countries, visit: [http://www.iso.org/iso/about/iso\\_members.htm](http://www.iso.org/iso/about/iso_members.htm)

- Each ISO standard represents a statement of minimum competency for a level of diver or a service that has been agreed on by an international group representing the diving industry. By being able to show compliance with these standards, you have increased liability protection.

- They enable consumers to make comparisons regarding a product (in this case diver training), allowing them to compare it with an independent benchmark.

- ISO standards may be used as a tool by organizations such as tour operators to help them make decisions as to which training agencies or businesses they want to partner with.

- Countries or local governments sometimes decide to impose regulations on scuba diving. They are more likely to use the ISO standards as a basis for these than to invent new ones, and if we must have regulations, it is far better to have meaningful, workable ones. ■

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Edited by  
Scott Bennett



## Is Your Carry-On Bag Legal?

Don't run the risk of being forced to 'gate-check' a fragile and valuable item you hoped to carry onto a plane.

Many luggage stores sell suitcases described as 'carry-on', but these suitcases are sometimes larger than the size most airlines will accept. Not only are luggage stores and manufacturers not always truthful whether their bag is legally sized or not, but they also frequently mis-

measure their bag. Their measurements generally are for the inside of the main compartment, and assume that any external pockets are of zero thickness, rather than stuffed full of things (which can easily add another inch or more) and ignore any external framing such as

wheels and carry handle (which can also add another couple of inches). The safe maximum size is 115 cm (45 inches), in the form of a 56 x 36 x 23 cm (22 x 14 x 9 inch) bag. Some airlines allow up to as much as 140cm (55 inches), but most do not. ■

—How about this for something different?

## Helicopter Scuba Diving in Curacao



HTTP://DIVECHARTERCURACAO.COM/

This is one of the bits we stumbled upon by accident. Experience the thrill of flying in a helicopter in full dive gear.

Dive Charter Curacao is, according to their website, the only dive operator in the world that makes helicopter diving possible for all divers. For everybody's safety and fun, the operator requires a minimum certification level of Open Water and recent dive experience, or relevant dive experience. It is important that you are comfortable with your equipment and that you carry the correct amount of weights. Depending on your experience level, you can choose between several dive sites.

The divers usually are taken to the sites in pairs and are dropped into the water at a height of around ten feet. They descend immediately and enjoy their dive. When they surface, they join the dive boat, which is there waiting to pick them up.

The flight takes you through the center of the town, under the big Juliana bridge. Prices start from 250\$. Groups can get discounts. [divechartercuracao.com](http://divechartercuracao.com) ■

## What could get you upgraded

The following advice are totally unsubstantiated but according to seasoned travellers this is what could get you picked for an upgrade the next time you fly.

- 1. Dress properly.** Worn jeans, a stained t-shirt and down-at-heel shoes won't do the trick. An ironed shirt and decent-looking pants will increase your chances for an upgrade.
- 2. Collect airlines member cards.** Get hold of as many member cards as possible. If you can accidentally show a card, it gives the impression that you are not only a loyal customer but may also have enough air miles to deserve an upgrade.
- 3. Make yourself important.** It is kind of cheesy, but it

works. Use your title or conduct yourself in a cool and nonchalant manner but don't be arrogant.

**4. Come late.** Make it to check-in and the gate in the last minute. You run the risk of being bumped off the flight all together if you arrived too late. But you may also be fortunate enough to turn up just at that very moment when the attendants start looking for prospects to upgrade on today's flight. And there you stand. **D5.**

**Have good manners.** Probably the best advice. Be polite and smile to the attendants in the situations where everyone else is giving them

a hard time over long queues or delays. Ask about their day and thank them for their assistance when you ask about how long the flight is. Perhaps that will land you on business class. ■



## South Africa regulates shark diving and whale watching

The issuing of permits to regulate whale watching and shark cage diving businesses will begin this month, the South African environmental affairs department said mid August.

Boat-based whale watching would be allowed in 27 coastal areas, while Great White diving would be limited to Seal Island in False Bay, Dyer Island in Gansbaai, Quoin Rock at Quoin Point, Seal Island in Mossel Bay, and Algoa Bay in the Port Elizabeth area.

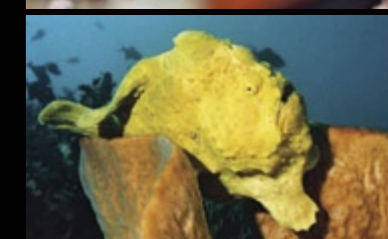
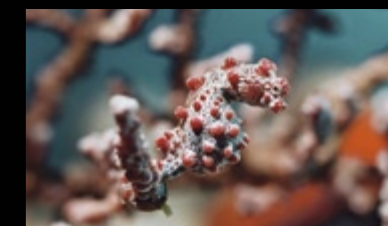
"The policies are aimed at providing and improving regulatory and compliance frameworks in both sectors, growing both sectors through the allocation of a greater number of permits and transforming the industries," the department said in a statement. ■



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Text and photos  
by Scott Bennett

**Kilimanjaro, Ngorongoro Crater, the Serengeti...** boasting a wealth of natural beauty that reads like a lexicon of African icons, Tanzania is a wildlife enthusiast's dream destination. However, this rich bounty isn't limited to just the land, as the warm waters fringing its coast are home to some of the most spectacular reefs in all of East Africa.

Having dived exclusively in the Asia-Pacific region, I was eager to experience an entirely new destination. While perusing the exhibitor list at last year's DEMA show, the exotic name of "Swahili Divers" virtually leapt up to grab my attention. Sauntering over for a look, I met owners Farhat and Francisca Jah. Known to friends as Raf and Cisca, both are long-time Africa enthusiasts with their base of operations on the island of Pemba situated in the Indian Ocean off the Tanzanian coast. Separated from the mainland by the deep, cold waters of the Pemba Channel, the island is regarded as one of the supreme jewels in Tanzania's diving crown. The thought of a dive trip combined with a safari proved irresistible, and I was sold on the spot!

Despite its somewhat far-flung location, Pemba proved surprisingly easy to get to. From my home base in Toronto, Canada, the trip took less than 17 hours plus a stopover in

Zebras and flamingos,  
Ngorongoro Crater

# *Jewels of* Tanzania

## *African Safari & Pemba Island Diving*





Amsterdam. The international gateway is Dar es Saalam, the country's largest city and home to over three million inhabitants. My late night arrival necessitated an overnight stop in the city. The thrill of finally being in Africa made for a very sleepless night.

The next morning, it was back to the airport for my domestic flight to Pemba. The island, along with neighbouring Unguja (the main island, informally referred to as Zanzibar) and a host of smaller islands comprises Zanzibar, a separate state within the United Republic of Tanzania.

After boarding my ZanAir island-hopper, it was only a 20-minute flight to Zanzibar, where we had had a brief stopover before resuming the journey to Pemba. My visit also coincided with the advent of the rainy season. Enroute, we skirted an immense

thunderstorm before finally landing at Pemba's diminutive terminal.

Compared to the bustle of neighbouring Zanzibar, the atmosphere on Pemba was decidedly sedate. Pemba's fertile countryside is blessed with undulating hills of verdant green interspersed with fertile valleys and forests. Coconut palms dominated the landscape along with a myriad of mango, breadfruit, and banana and clove trees. The dominant crop on the island, cloves, were introduced by the Omani Arabs from Mauritius. Over three million clove trees are found throughout the island and is now a bigger producer than Zanzibar itself. Clove smuggling is considered a very serious offence on the island—a fact reinforced by the numerous police checkpoints passed on the way.

Driving north from the regional

capitol of Chake Chake, the roads became progressively rougher with oxcarts providing the primary form of vehicular transport. Nearing our destination, the road entered the verdant confines of the Ngezi forest. Home to the island's last expanse of protected forest, the reserve hosts prolific wildlife, including five endemic bird species. Dense stands of red mahogany towered above, while vervet monkeys peered down from the lofty branches. After a scenic 90-minute drive, we finally reached the turnoff to the resort.

Established in 1999, Swahili Divers had its original base of operations in the town of Chake Chake. Then, in October 2006, Raf and Cisca opened their newly built Kervan Seray Beach

Reef scene at Manta Point (right)  
Close-up of nudibranch (above)





## Tanzania

Resort on the northwest coast of the island. Accommodation is in simple but comfortable bungalows featuring spacious four-poster beds draped with mosquito netting. The outdoor bathrooms are equipped with showers providing solar-heated water. Electricity is available in the evenings between 6:00 and 11:00pm, and for those that absolutely cannot live without it, internet access is available via satellite. The 30-40 staff members come from Chake Chake and the nearby village of Makangale.

Upon checking into my room, I soon came across some of the local wildlife, albeit of the creepy-crawly variety. Moving languidly across my outdoor bathroom floor was a decidedly hefty millipede that was big enough to put on a dinner roll.

As the burgeoning humidity was starting to take its toll, Cisca asked if I'd like to sample a local cold drink. Always eager to partake in the local cuisine (providing it isn't endangered), I readily agreed. Moments later, I was presented with a brown bottle emblazoned with the lyrical name of Stony Tangawizi. Sounding like the name of a Flintstones character, I was pleasantly surprised to discover a crisp flavour reminiscent of ginger beer. I ended up having a lot of them over the ensuing week.

### Diving

Separated from the African continental shelf by sheer walls that drop down to



**ZANZIBAR HISTORY**  
Lured by the promise of trade and conquest, ships from Arabia, Persia, India and as far away as China have plied Pemba's waters for nearly 2000 years. Known as 'Al Jazeera Al Khadra' (the green island, in Arabic), Pemba, along with neighbouring Zanzibar, has long been at the centre of the most affluent trade empire in East Africa. Carried by the

monsoon winds, Arab and Persian trading dhows carried beads, cloth and Chinese porcelain to the African coast returning heavily laden with gold, ivory, spices and slaves. The dhows have been a mainstay throughout Pemba's history, and to this day, remain an enduring attribute of the East African coast.

Pemba's first settlements were established by the Shirazi Persians who arrived before the 10th century. Intermarriage between Shirazis and indigenous Africans gave birth to the

Swahili culture. The name Swahili is derived from the Arab word sawahil, which means 'coast'. Derived in part from Arabic, Swahili soon became the dominant language in the region and eventually went on to become the national language of Tanzania.

The Portuguese occupied the island in the 16th century before being displaced by Omani Arabs in 1698. In 1832, Sultan Seyyid Said was so captivated by the Spice Islands that he shifted his capitol from Muscat to Zanzibar, where he and his descendants ruled for over 130 years.

The 19th century saw the dawn of European colonialism in East Africa, with various countries eager to gain a foothold to exploit the region's riches. The British arrived on the scene, forcing the Sultanates of Muscat and Zanzibar to separate and then administering the islands in the name of the Sultan.

Zanzibar was also the starting point for the great European expeditions, with legendary explorers such as Burton, Speke and Livingston passing through as they set out to map the continent's unexplored interior. Due in part to the efforts of Livingston and many others, the slave trade was finally abolished in 1873. Today, Islam is still the dominant religion and the island remains fairly conservative. ■

LEFT TO RIGHT: Skunk Anemonefish; Two Band Clownfish (inset); Monocled Hawksfish





Blood Spot Squirrelfish (left inset); Reef scene at Maziwe Reserve (above); Anemonefish and scuba diver (right)

over 300 metres, Pemba's northwest coast is dominated by a series of barrier islands separated by three passages: Ngao, Fundo and Uvingi. At high tide, large volumes of water flush through the passages, bringing in the big fish and providing nutrients for abundant coral species. Wall and drift dives are the order

of the day, with a wide variety of easily accessible dive sites. After a day of rest, I was eager to get in the water. Well, not TOO quickly. At high tide, the exposed shoreline consisted of a large swathe of jagged exposed limestone. The still wet surface necessitated careful negotiation, but my camera and I made it to the boat without incident. Transport was courtesy of the resort's Tornado Rigid inflatable boat. As polyurethane and the hot African sun proved incompatible, the tubes had been replaced with specially designed buoyant fiberglass pontoons. As there wasn't a ladder, getting on board proved to be somewhat interesting as I'm not, shall we say, petite. Hopping in from the shallows wasn't a problem, but hauling myself

aboard in deep water proved to be a challenge, to say the least! Our first destination was a mere ten minutes away. Situated adjacent to a historic old lighthouse dating from 1901, Swiss Reef turned out to be one of those proverbial high-voltage drift dives you always hear about! Within moments of descending, the powerful current propelled us over a series of undulating ridges rising from the seabed. A kaleidoscope of colourful reef fish swam effortlessly amongst abundant tubastrea corals, but I soon realized photographing anything would be a near impossibility! I forgot about the camera and just enjoyed the dive for the sheer joy of it. At one point, a large bommie offered just enough protection from the raging current that I could stop and photograph a large school of yellow sweepers.

That evening, dinner was held in a large open thatched-roof bure overlooking the waters of the Pemba Channel. I arrived just in time for a spectacular sunset, the sky ablaze with intense hues of red, orange and yellow

silhouetting the distant peaks of the Usambara Mountains on the mainland. Everyone sat at the same table, creating a friendly communal atmosphere. After a sumptuous meal of freshly caught red snapper, my Zanzibar spiced coffee



LEFT TO RIGHT:  
Reef scene at  
Bunker dive site;  
Powder Blue  
Surgeonfish; Fire  
Dartfish; Map of  
Pemba Island



was interrupted by a maniacal cackling resembling the laughter of a demented clown. Seeing my perturbed expression, Cisca laughed and told me it was merely a greater galago, more commonly known as a bushbaby. Members of the primate family, these cat-sized creatures resemble the lemurs found on neighbouring Madagascar.

At that moment, Raf brought out a bottle of Turkish ouzo, also known as raki. The word Ouzo is a derivative of uzum, which is Turkish for grapes. The raki, in combination with my malaria medication, infused my sleep with dreams of Dali-esque proportions that even a wailing bushbaby couldn't penetrate!

The remainder of the week was spent exploring the area's superlative dive sites. The nearest passage to the resort is NgaoGap, a ten-minute boat ride away. End of the World and D F Malan boasted hard coral gardens of unparalleled diversity, with table and staghorn corals growing everywhere with reckless abandon. Cabbage corals were all over the place, stacked atop one another like tiers of a marine wedding cake, while rocky outcrops played host to numerous sponges, anemones and bubble corals.

A bit more challenging was Rudy's Wall, situated right at the gap's

entrance. According to Raf, this site is not dived very often due to the strong currents that converge here. One day we lucked out, arriving right at the verge of the slack tide. Entering the water, the surface chop was fierce and it took some effort to descend down the mooring line. The effort was well worth it as the walls were adorned with luxuriant fan corals garbed in pastel hues of pink, orange and red. Nearby was Emilio's Back Passage, which featured a gigantic fissure hewn into the sheer vertical wall.

Many divers could easily fit into it at once with room to spare.

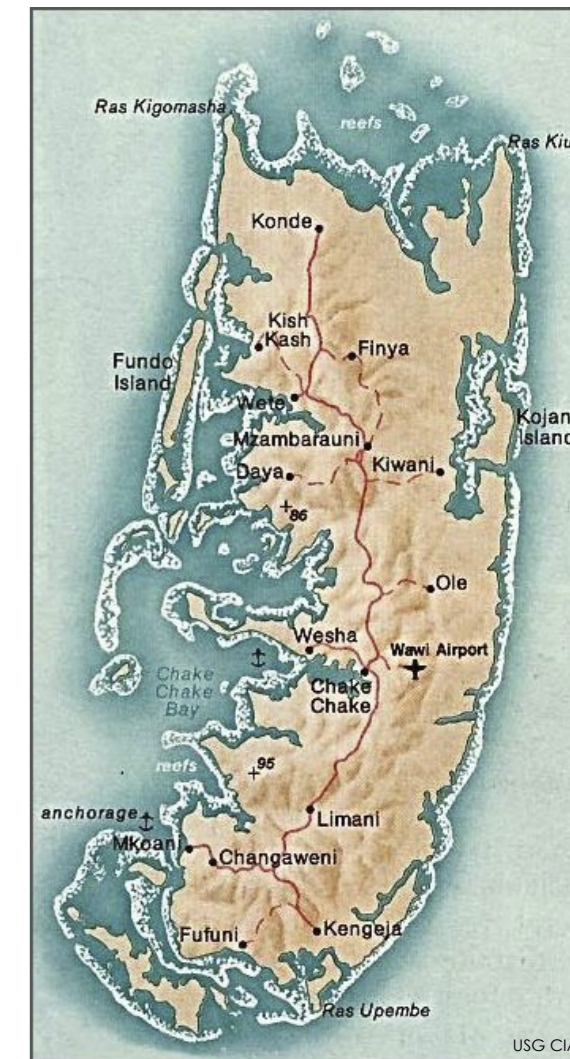
A bit further afield lay Fundo Gap. If anything, the sites here proved to be even more spectacular! Manta Point featured a wall descending to 28m, with the reef top at 6-8m depending on the tide. Alas, the congregations of mantas that used to frequent the area are long gone, the unfortunate victims of over fishing. Nevertheless, this was a stunning site boasting a tremendous variety of hard corals and abundant fish life. A few weeks before my arrival, a great hammerhead was sighted just off the wall, as was a juvenile manta.

Deep Freeze gets its name from the cold upwellings surging up from the depths. Here, my borrowed 5mm suit proved to be most useful indeed! Yellow fan corals adorned the precipitous drops offs, while schools of yellowtail fusiliers congregated in the blue just off the wall. At the current-swept point, large schools of jacks and barracudas are routinely encountered. Although I missed them, I did spot a couple of big Napoleon wrasse. Maddeningly, they proved to be just as camera-shy as their Pacific cousins.

The deep waters of the Pemba

Channel attract a large number of game fish species. On one occasion, as Mohamed maneuvered the boat into anchoring position, we saw the unmistakable silhouette of a sailfish erupt from the surface. Alas, it didn't make a repeat appearance underwater.

One of the real pleasures of Pemba was observing a lot of new fish species. While many Pacific notables were present, such as Moorish idols, coral trout, oriental sweetlips, regal and emperor angelfish, there was also myriad of Indian Ocean specialties. After one dive, I asked what the powder blue surgeonfish was. I was bemused to discover it actually WAS a powder-blue surgeonfish!



USG CIA





Reef garden at Manta Point (left)  
Yellow sweepers (below)

MAZIWE ISLAND MARINE RESERVE

There is also some good diving to be had off the mainland. Situated just off coast about 15 nautical miles east of Pangani town, Maziwe Island was established as a marine reserve in 1975. Communities living in the vicinity of the island are actively involved in conservation activities. At one time, the island had extensive forest cover of coconut palms and large casuarina trees. Used by local residents as a place for rituals, the island was eventually overrun with goats and chickens. That, coupled with the clearance of the island's vegetation, resulted in irreversible erosion before finally submerging between 1978-79.

The reserve is biologically diverse with more than 200 species of fish and 35 species of hard and soft corals. Maziwe's undersea environment is markedly different than Pemba, with large sandy areas punctuated by coral bommies draped in a thick mantle of sponges, anemones and hard corals. Schools of juvenile barracudas, yellow sweepers, anthias, damselfish and sweetlips congregate in abundance while nooks and crannies provide shelter for nudibranchs, flatworms, shrimps and dragonets.

A number of resorts and guesthouses allow easy access to the reserve. I stayed at The Tides Resort, a luxurious resort right on the beach featuring stylishly appointed bungalows framed by swaying coconut palms. Diving is arranged by Kasa Divers, located at the Emayani Beach Lodge. Owners Kerstin and Wim are extremely knowledgeable about Maziwe's dive sites and can arrange trips to the reserve. ■



Other colourful denizens included Alland's anemonefish, ring-eyed hawkfish, lyretail hogfish and an exquisite Indian sand wrasse, its vivid red body accented with white spots encircled with black. Pemba is also home to some absolutely monstrous titan triggerfish. I'm eternally grateful that none of them exhibited aggressive behaviour!

**Topside attractions**

Although it would have been easy to spend all day in the water, I also wanted to experience some of Pemba's terrestrial attractions. One afternoon, Laura from reception drove me up the coast to visit the lighthouse I'd seen on the first day. Despite only being in the country a short time, she handled the land rover like a true pro, effortlessly negotiating the copious ruts and

potholes during the bumpy 20-min trip. Upon arrival, we were immediately thronged by a gaggle of curious children who stayed with us for the remainder of our visit.

The lighthouse certainly boasted a unique design—it's towering central column surrounded by an intricate network of rusted metal struts and beams. Nearby, an ancient looking corrugated metal structure housed several families, including that of Ali, the youthful-looking lighthouse keeper. He immediately asked if I wanted to go up to the top. As heights aren't my favourite thing, I wasn't particularly enamored by the idea but threw caution to the wind and decided to go for it.

Once inside, the heat was downright oppressive as I started the precipitous climb up the constricting 30m spiral

staircase. Once at the top, my discomfort was forgotten in seconds. Complimented by a refreshing cool breeze, I was rewarded with a spectacular panorama encompassing the entire northern end of the island. Ali then gave a charming, well-rehearsed speech on the lighthouse's history before we headed back down again.

On the way back, we made a detour to Vumawimbi Beach on the other side of the peninsula. Azure waters lapped a powdery white-sand beach fringed with coconut palms, while offshore, a small flotilla of Arabian-style dhows bobbed in the gentle surf. The only thing missing from the idyllic scene was hordes of tourists. Welcome to Pemba!

As well as being actively involved in the local community, the resort even has its own fire engine. The "Green Goddess" is a circa 1950's army vehicle



CLOCKWISE FROM TOP LEFT:  
Flatworm, Maziwe Reserve;  
Indian Sand Wrasse; Rose  
Phyllidelia nudibranch

that Raf shipped from the UK. Fire drills for the staff members are held on a regular basis. One afternoon, while watching the proceedings, I learned a valuable lesson: NEVER leave a camera bag unattended in the immediate vicinity of a fire hose. At one point, a staff member accidentally let go, and the wildly flailing hose scored a direct hit on my hapless camera bag. The blast flipped it upside down, spilling several lenses on to the soggy ground. Miraculously, nothing was damaged (but definitely a bit cleaner).

**Misali & Kashani Islands**

For my last full day of diving, Raf had something special planned: a full day excursion to Misali Island. All week long, I'd practically been salivating at the string of superlatives used to describe Misali's undersea treasures, so I couldn't wait! It was also a full boat. The previous evening, the number of guests virtually

doubled in one fell swoop and a number of them were divers. Along with Raf, dive guide Mohamed and the boatman, there were nine divers on board for the 45-minute trip.

As it turned out, our destination was not Misali itself, but a special site known only to Raf. Situated past the Uvingi Gap, the small island of Kashani was alluring enough above water, its shoreline encircled by waters of the most exquisite hue of turquoise. It also takes the prize for the most unlikely name for a dive site I've ever heard: Slobodan's Bunker. It turns out Raf discovered the site the day Slobodan Milosovic was apprehended.

As we arrived just at the tail end of the slack tide, everyone had to gear up quickly in order to maximize our dive time before the currents became too strong.

Although the name "bunker" conjures up visions of drabness, Slobodan's

proved to be anything but. Entering the water, I was instantly spellbound by a site of staggering diversity. Resembling the knuckle of a gigantic hand with the fingers outstretched, the coral- shrouded

walls were the epitome of exuberance.. Tubastrea, whip, table and soft corals jostled each other for space along with tube and barrel sponges. A school of blackspotted sweetlips hovered

I spun around to see a large Napoleon wrasse. Moments later, a school of five swam by further below with one of the divers in hot pursuit. Boasting a gigantic, humped forehead, the male fish

above one large tubastrea, joined by bronze soldierfish and blood-spot squirrelfish. Nearby, a large map puffer waited patiently as a cleaner wrasse performed its duties while vast swarms of basslets observed the proceedings. Startled by the unexpected appearance of our group, a large potato cod bolted for the safety of the depths.

Upon hearing some frantic tank banging,



leading the entourage was the largest specimen I've ever seen. I started to follow until I checked my computer; I was already at 26m. The other diver was already well beneath me, the fish beneath her and the bottom plainly visible beneath all of the above. It was at that moment I realized the visibility was easily 40m! I thought it would be a good idea to ascend to shallower water. Unfortunately, the dive ended way to soon. I could have easily spent the rest of the day here.

After a shore interval on a blindingly white beach, we headed for our final dive at a site called Atta Turk just off Uvingi Island. This time, I was set up for macro, and there was plenty to keep my camera occupied. Two-band clownfish, porcelain crabs, pipefish, fire dartfish, flatworms and a host of other critters kept my shutter clicking for the

duration of the dive. The highlight was an exquisite nudibranch with a semi-transparent white body etched with a patchwork of yellow lines. Wow!

### Ngezi Forest stroll

On my last afternoon, I arranged a walking tour through the nearby Ngezi Forest. At one time, swathes of forest once dominated much of the island, but starting in the mid 19<sup>th</sup> century, much was cleared for clove cultivation. Encompassing 1440 hectares, the reserve was established in the 1950's to protect last remaining stands of the island's indigenous forest.

It is home to abundant wildlife including vervet monkeys, blue duiker (a small forest antelope), hyrax, marsh mongoose and several species of bats including the endemic Pemba flying fox. The Portuguese introduced pigs

several centuries ago, but as the local population abstains from eating pork, their numbers increased exponentially. The reserve is also home to a myriad of birds, five of which are endemic.

After checking in at the park office with ranger Ali, I went on a walk with my guide Ali (I was beginning to wonder if that was the only first name on the entire island). Within moments, we came across what seemed to be the reserve's most numerous resident. The damp pathway was strewn with a plethora of giant millipedes.

Upon entering the confines of the forest, the humidity packed an immediate wallop. Clusters of epiphytic ferns shrouded the trees, while an extraordinary array of writhing vines cascaded down to the expansive buttress roots below. Ali could name every tree, many of which were used

Lighthouse view (above); Pemba at sunset (top left)

for medicinal purposes by the local people.

After a sensational week, it was time to bid Pemba adieu. Raf and Cisca were gracious hosts and the relaxing atmosphere and good company made my departure difficult to say the least. The island made for a unique introduction to Africa but a highly memorable one.



## African safari

No trip to Tanzania would be complete without experiencing some of the country's spectacular national parks and reserves. Protecting a remarkable 25 percent of the country, they are home to an extraordinary diversity of wildlife. The hard part was deciding where to start!

Before leaving home, Cisca put me in touch with Bush2Beach, an Arusha



-based safari company run by Chris Piller and his partner Ingrid Vaes.

Gateway to the northern safari circuit, the city of Arusha is the country's safari headquarters with over 200 government-recognized safari companies (and half as many again that aren't). They arranged an incredible personalized itinerary that not only included icons like Ngorongoro and the Serengeti, but also some lesser-known destinations such as the Usambara Mountains and Mkomazi National Park, the country's newest. Joining me was John, my Tanzanian driver. With 15 years game-spotting experience under his belt, I knew I was in good hands.

**Usambara Mountains.** Our first stop was the Usambara Mountains, situated inland from the Swahili coast near the Kenyan border. One doesn't usually think of rainforest in savannah-dominated east Africa, but the Usambaras rise from the surrounding plains like an archipelago of forest-clad islands. They are part of the Eastern Arc Mountains,

a string of 13 ancient ranges that are the oldest in East Africa. Often dubbed "Africa's Galapagos", these mountains contain the highest number of endemic species in all of Africa. While large animals are conspicuously absent, the area is a treasure trove of endemic species, particularly, birds, reptiles and amphibians.

**Amani Nature Reserve.** Tucked away at the eastern end of the ranges, the Amani Nature Reserve is a botanical wonderland. Opened in 1997, the reserve protects 10,000ha of the most extensive montane rainforest to be found in Tanzania. A series of excellent walking trails offers sublime forest scenery and outstanding birdwatching. At the last count, 340 species have been recorded here including 19 endemics. Noteworthy residents include silvery-cheeked hornbills, Fischer's touraco, Usambara eagle owl and a host of sunbirds, starlings and flycatchers. Chameleons are especially prolific and the area is the original home of a flower known the world over: the African violet.

LEFT TO RIGHT: Smiling boy; Masai woman; Swahili Divers base

Several hours to the west, the Western Usambaras provide a totally different experience. Much higher in elevation, they also boast a very different look with extensive stands of eucalyptus trees carpeting the slopes.

The steep-sided valleys are home to a diverse patchwork of cultivated farmland, plantations and patches of indigenous forest. Situated at 1400m, the town of Lushoto is the gateway to the region. A number of German colonial buildings dating from the early 20<sup>th</sup> century can be found rubbing shoulders with colourful local markets.

A number of nature reserves offer a plethora of scenic walking trails through lush native forest brimming with birdlife and cascading waterfalls. Lying at the edge of the Usambara massif, the Irete Viewpoint offers stupendous views across

the arid Masai Steppes 1000m below. Numerous resorts cater to frequent tourists, particularly expats, who come here to escape the sweltering heat of the nearby coast.

**Mkomazi National Park.** Despite being in the country for nearly two weeks, I had yet to experience the quintessential African bush. That introduction was made in a rather unique and special place. Mkomazi National Park is Tanzania's newest, having been established in 2007. With its northern boundary adjoining Tsavo National park in neighbouring Kenya, the park was initially established as a Game Reserve in 1951. Mkomazi takes its name from Pare tribe's word for "scoop of water", in reference to the dry conditions.

Lying in the shadow of the Usambara





Elephants at Arusha (left)  
View of Ngorongoro (below)

continent's fifth highest peak, rising to an elevation of 4,566 metres. The luxuriant montage forest is inhabited by prolific birdlife, blue monkeys and red duiker. It is also one of the best places in the country to see the striking black and white colubus monkey. We were even fortunate to observe one on the ground, looking the entire world like a misplaced skunk as it scampered across a grassy clearing enroute to a nearby tree.

On the way back down, we rounded a corner to discover four elephants grazing in a clearing at the forest's edge. "You are VERY

lucky," intoned John with a smile as most visitors to rarely encounter elephants.

Further north, rolling grassy hills encircle the serene beauty of the Momela Lakes, whose shallows are often awash with the pink hues of thousands of greater and lesser flamingos. Other birdlife includes crowned cranes, Egyptian geese and a myriad of herons and egrets. Due to the absence of lions, it is one of the few parks in Tanzania that allow walking safaris, albeit with an armed guard. Exploring the park on a 90-minute walk was a definite highlight of my entire trip.

I could have easily spent a few

days here. Due to my incessant picture taking, we didn't get to visit all the stops on our itinerary. Ngurdoto Crater, whose steep, rocky cliffs enclose a broad marshy floor dotted with herds of buffalo, will have to wait until next time. However, the park had one final surprise in store. Just as we reached the park gate at sunset, I turned to see that the veil of cloud had dispersed, revealing Kilimanjaro's imposing snow-capped summit.

**Ngorongoro Crater.** Undoubtedly, one of Tanzania's crown jewels is the Ngorongoro Crater. Not actually a national park, the crater is



and Pare Mountains, the park encompasses 3700 square kilometers of semi-arid savannah dotted with acacia scrub and baobab trees. It is home to a number of dry country species rarely encountered elsewhere in Tanzania, including fringe-eared oryx, lesser kudu and the gerenuk—a gazelle distinguished by its habit of standing tall on its hind legs to reach for acacia leaves utilizing its elongated neck. Other residents include giraffe, hartebeest, Grant's gazelle, elephant, zebra and dik-dik (a diminutive antelope). An unexpected bonus was a close encounter with a female cheetah and her two cubs; I was told that cheetahs weren't even known to live in the park. White-bellied go-away birds, martial eagles, red-billed hornbills, black bellied bustards, ostrich, secretary birds and lilac-breasted rollers are just a few of the 450 species of birds.

The animals here tend to be skittish, as they have long associated people and vehicles with guns. While viewing wildlife may not be as easy as in some of the big parks, it provides an opportunity to

experience an unspoiled landscape with virtually no tourists. Mkomazi doesn't share her secrets easily, but when she does, it is truly special.

**Arusha National Park.** Another overlooked gem lies virtually on the doorstep of the city of Arusha. Only 40 minutes from the bustle of the city, Arusha National Park offers an enthralling assortment of habitats ranging from savannah and acacia woodlands to rolling hills, lakes and mountain slopes shrouded with lush rainforest, allowing visitors a chance to experience a broad range of environments in a relatively compact area. The diverse animal population includes, giraffes, zebras, buffalos, baboons, elephants, hippos, leopards, hyenas, waterbucks, warthogs and a wide range of antelope species.

The dominating feature is the imposing silhouette of Mt. Meru, its summit and eastern slopes protected within the confines of the national park. While not attaining the lofty heights of its more illustrious neighbour, Kilimanjaro, it is the

LEFT TO RIGHT: Leopard in tree on the Serengeti; African Buffalo at Ngorongoro Crater; Giraffe portrait at Arusha; Male lion on the Serengeti; Wildebeest on the Serengeti (bottom)



a part of the Ngorongoro Crater Conservation area, which encompasses an area of 8300 square kilometres. Ngorongoro is a place of superlatives. Standing at the viewpoint at 2300m is nothing short of awe-inspiring. Stretching 23 kilometres across, this vast natural amphitheatre is

the world's largest intact volcanic caldera. A proverbial Garden of Eden, the crater floor is home to an estimated 25,000 large mammals. All the mainstays are here including elephant, lion, hippo, warthog, ostrich, buffalo, spotted

hyena and some impressive bull elephants sporting some of the biggest tusks to be seen in East Africa. One of the most notable (and endangered) residents is the black rhino. Poached to virtual extinction throughout East Africa, Ngorongoro is one of their last strongholds in Tanzania. Rigorously protected, there are estimated to be 19-25 individuals inhabiting the crater. There is one prominent absentee, however: giraffes. This is due to the relative lack of acacia trees, whose leaves are their favourite food.

I was initially disappointed to discover we only had one full morning at the crater. Then, I discovered why; entry fees to the park are a whopping US\$200.00 per vehicle—and that's not necessarily for the whole day. If you leave the crater and come back later in the day, the fee is charged again. Apparently, this increase was initiated to help reduce tourist traffic, which, can look like a traffic jam at rush hour. During my visit in the wet season, tourists were few, and the crater floor was a vibrant carpet of lush green grass. While some cynics may liken the experience to a gigantic safari park, this is no zoo! The predators mix freely with the





prey, creating an unparalleled wildlife experience that is not to be missed.

**Serengeti.** Bordering Ngorongoro is Tanzania's most famous national park, the world-renowned Serengeti. A World Heritage Site, its name is derived from the Masai word "siringet", meaning empty place. The sense of space is overwhelming, with endless skies presiding over a vast plain teeming with wildlife. It also plays host to one of the greatest wildlife spectacles on the planet. Commencing at the end of April, up to one million wildebeest congregate in the park's southern section before commencing their migration to Kenya to follow the rains. Joining them are several hundred thousand zebra and numerous species of gazelle .

A characteristic feature of the park's southern areas the distinctive outcrops of granite boulders called kopjes. They are especially popular with lions, which perch imperiously atop the large granite boulders. Those who bemoan lions' lack of activity in zoos will be surprised to discover they are just as active in the wild, as they

usually sleep 20 hours a day. Lying on their backs with legs splayed, they resemble giant housecats, although their inoffensive appearance would change dramatically if a person decided to exit the vehicle.

Other large cats make their home in the park. A keen eye may reveal the telltale tail of a leopard lounging high in an acacia tree, while cheetahs are often observed sitting on rocky outcrops scanning the horizon for prey.

The junction of the Seronera and Orange rivers boasts a deep pool that is a favourite haunt of hippos. Lazing about in the water, their generally placid demeanor belies the fact that they kill more people in Africa each year than every other large animal combined. Crocodiles are also frequently encountered here, although they give the hippos a wide berth. Bird life is especially prolific with over 500 species present. After three days of non-stop photography, both my camera and I were exhausted.

With its seemingly infinite bounty of attractions both over and under the water, Tanzania was unlike any destination I have visited before. Three weeks flew by

in a heartbeat, but the experience will last a lifetime. It's definitely a journey I will undertake again. ■

NOTES

*Visas can be obtained on arrival, but are best applied for in advance. However, not all foreign visitors require visas, so it's best to check with the Tanzania government website for any additional information. A number of domestic carriers service Pemba daily via Zanzibar. I flew with ZanAir. The vast majority of these flights employ small aircraft such as Dash 8's, so baggage weight is limited to around 15kg. This may prove to be a problem if you are travelling with heavy gear, so it is recommended that you contact the airline well in advance for any special requirements. The combined flight time is around 50 minutes. Swahili Divers can arrange transfers to the resort. Visit: [www.tanzania.go.tz/visa](http://www.tanzania.go.tz/visa)  
Swahili Divers [Swahilidivers.com](http://Swahilidivers.com)  
Bush 2Beach Safaris [Bush2beach.com](http://Bush2beach.com)  
Tides Resort [Thetideslodge.com](http://Thetideslodge.com)  
Kasa Divers [Emayanilodge.com](http://Emayanilodge.com)  
ZanAir [Zanair.com](http://Zanair.com)*

CLOCKWISE FROM TOP LEFT: Flamingos at Arusha; Crowned Crane at Arusha; Lilac-Breasted Roller at Mkomazi



# fact file



## Tanzania



SOURCES: US CIA WORLD FACT BOOK, SCUBADOC.COM

**History** Tanganyika and Zanzibar came together to form the nation of Tanzania in 1964 shortly after attaining independence from Britain in the early 1960s. In 1995, one-party rule came to an end with the first democratic elections held in the country since the 1970s. However, two contentious elections since 1995 were spurred by Zanzibar's semi-autonomous status and popular opposition. Despite international observers' claims of voting irregularities, the ruling party won. Government: republic. Capital: Dar es Salaam

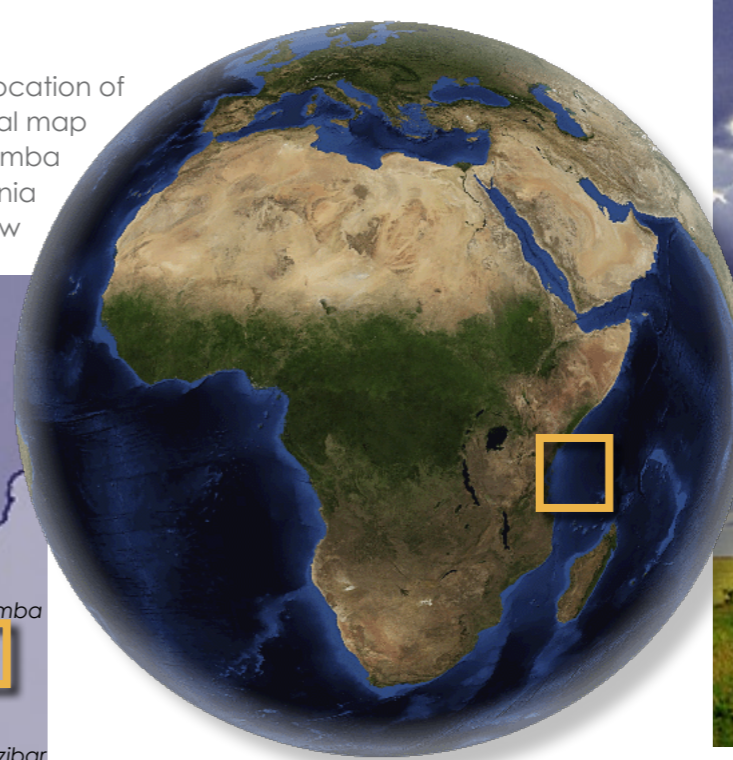
**Geography** Tanzania is located in Eastern Africa and borders the Indian Ocean, between Kenya and Mozambique. Terrain includes vast plains along the coast, a central plateau, and highlands in the north and south. Coastline: 1,424 km. Lowest point: Indian

Ocean 0m. Highest point: Kilimanjaro 5,895m. Note: Kilimanjaro marks the highest point in Africa. The mountain is bordered by three of the largest lakes on the continent: Lake Victoria (the second-largest fresh-water lake on the planet) in the north, Lake Tanganyika (the second-deepest lake in the world) in the west, and Lake Nyasa in the southwest.

**Economy** In terms of per capita income, Tanzania is in the bottom ten percent of the world's economies. The economy depends mostly on agriculture, which makes up more than 40% of GDP, contributes 85% of exports, and gives jobs to 80% of the work force. However, topography and climatic conditions limit cultivated crops to just 4% of the land mass. Industry in the country traditionally featured light consumer goods and the processing of agricultural products. Funds from the World Bank, the IMF, and bilateral donors were provided to rehabilitate Tanzania's out-of-date economic infrastructure and to reduce poverty. Long-term growth through 2005 saw an increase in industrial production and a substantial rise in output of

Kervan Seray Resort  
[www.kervansaraybeach.com](http://www.kervansaraybeach.com)

RIGHT: Location of Tanzania on global map  
BELOW: Location of Pemba Island on map of Tanzania  
FAR RIGHT: Serengeti view



**Environmental issues** Marine habitats are threatened by destruction of coral reefs. Other issues include soil degradation, deforestation, desertification, marginal agriculture suffer regional droughts, wildlife is threatened by illegal hunting and trade, especially ivory. Tanzania is party to: Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Desertification, Endangered Species, Hazardous Wastes, Law of the Sea, Ozone Layer Protection, Wetlands

**Currency** Tanzanian shillings (TZS)  
Exchange rates: 1EUR=1,893.23TZS;  
1USD=1,315.00TZS; 1GBP=2,234.24TZS;  
1AUD=1,105.57TZS; 1SGD=917.059TZS

**Population** 41,048,532 (July 2009 est.)  
In poverty: 36% (2002 est.) Living with AIDS: 1.4 million (2007 est.) Ethnic groups: mainland - African 99% (of which 95% are Bantu consisting of more than 130 tribes), other 1% (consisting of Asian, European, and Arab); Zanzibar - Arab, African, mixed Arab and African. Religion: mainland - Christian 30%, Muslim 35%, indigenous beliefs 35%; Zanzibar - more than 99% Muslim. Internet users: 400,000 (2007)

**Time** UTC+3

**Language** Kiswahili or Swahili (official),

minerals, with gold at the head. Banking reforms in recent years have helped increase investment and private-sector growth. Natural resources: hydropower, tin, phosphates, iron ore, coal, diamonds, gemstones, gold, natural gas, nickel. Agriculture: coffee, sisal, tea, cotton, pyrethrum (insecticide made from chrysanthemums), cashew nuts, tobacco, cloves, corn, wheat, cassava (tapioca), bananas, fruits, vegetables; cattle, sheep, goats. Industry: agricultural processing (sugar, beer, cigarettes, sisal twine); mining of diamond, gold, and iron, salt, soda ash; cement, oil refining, shoes, apparel, wood products, fertilizer

**Climate** Tropical along the coast; temperate in the highlands. Natural hazards: drought and flooding during the rainy season on the central plateau

Kiunguja (name for Swahili in Zanzibar), English (official and primary language of commerce, administration, and higher education), Arabic (widely spoken in Zanzibar), several local languages. Note: Kiswahili (Swahili) is the native tongue of the Bantu people living in Zanzibar and adjacent coastal Tanzania. The language's vocabulary draws on a variety of sources including English and Arabic, even though Kiswahili is Bantu in structure and origin. Kiswahili is now the lingua franca of central and eastern Africa. However, local languages are usually the first language of most people.

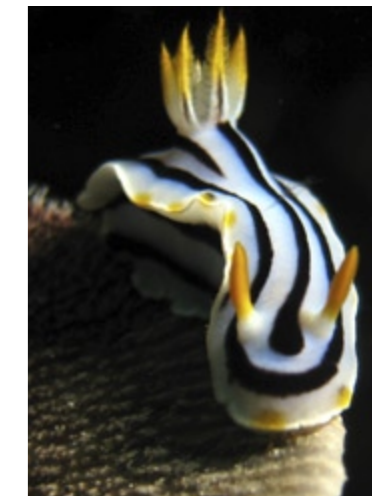
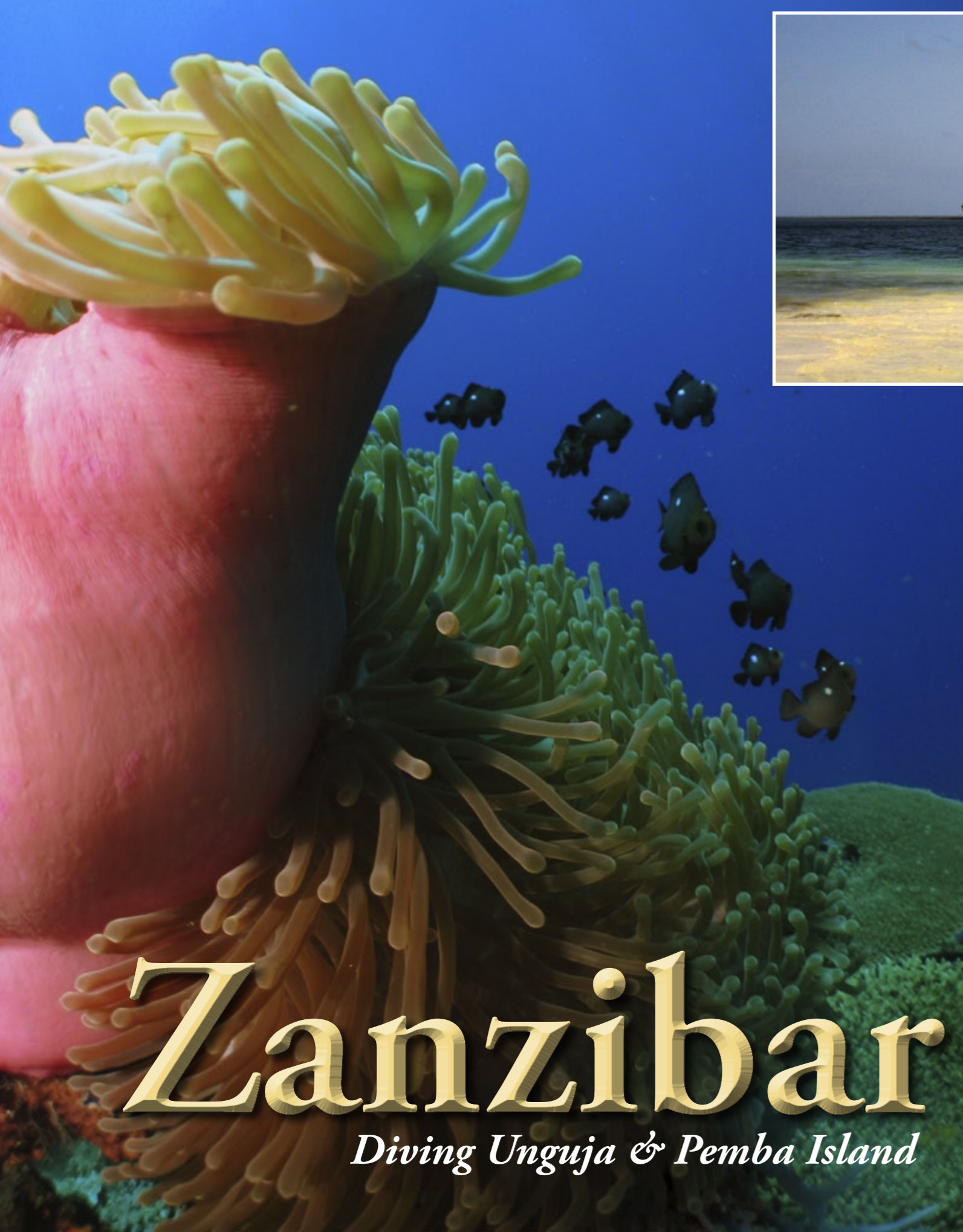
**Health** There is a very high degree of risk for: food or waterborne diseases such as bacterial diarrhea, hepatitis A, and typhoid fever; vectorborne diseases such as malaria and plague; water contact diseases such as schistosomiasis; and animal contact diseases such as rabies (2009)

**Recompression Chamber**  
EAST AFRICA HYPERBARIC CENTRE  
Zanzibar, Tanzania  
Tel: +9255 (0)77 330 0865

**Links**  
Pemba information  
[www.pemba.net](http://www.pemba.net)  
Tanzania Tourism Board  
[Tanzaniatouristboard.com](http://Tanzaniatouristboard.com)







CLOCKWISE FROM FAR LEFT: Magnificent anemone; Fishing dhow in channel; Chomodoris lochi on lattice coral; Marbled cleaner shrimp; Flatworm; Chromodoris africana nudibranch on sponge

# Zanzibar

*Diving Unguja & Pemba Island*

**The spacious, purpose-built dhow slid through the calm Indian Ocean. We were briefed sitting under the shade area of the deck, then kitted up and went through our buddy checks before a giant stride took us into the 30°C sea. Looking down, I could just make out the dive site, an old British lighter, 27 metres below me. It was 9:30 a.m. and the day was going fantastically.**

Text and photos by Christopher Bartlett

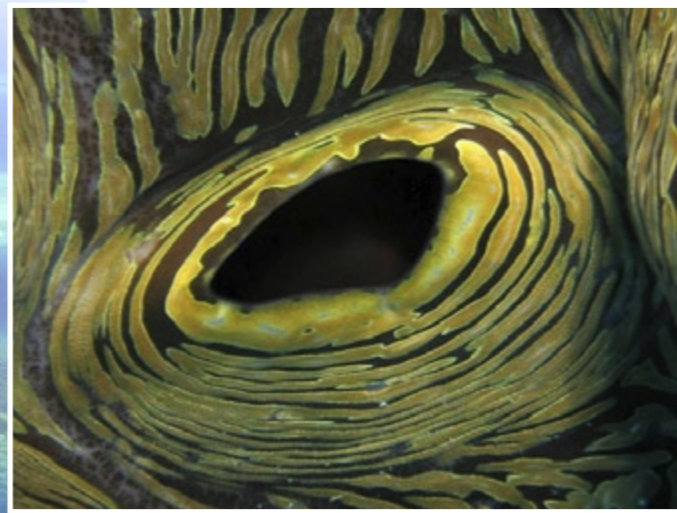
I'd started the morning in Dar-es-Salaam and caught a Coastal Airways Cessna 182 for the 20-minute 07:30 flight to Stone Town on the west coast of Unguja, more commonly known as Zanzibar, for some low-level sunrise shots of the outlying reefs. Ten minutes in a taxi, and I was kitting up at One Ocean Divers, a mug of coffee steaming next to me.

One Ocean started 16 years ago, and in 1999, it was taken over by Aussie Gary Greig and his South African wife, Gail. From one dive shop in Stone Town, they now operate from four other resorts around the island. Kit was dished out whilst more coffee was brewed and then consumed, before we were walked

past the palm trees, down the small beach, and onto the waiting dhow. On the leisurely cruise out to a reef near Bawe Island, acquaintances were made and the loudmouth been-there-done-it-all-in-25-dives Harvard post-grad Italian diver was quickly identified and avoided as a buddy.

The wreck itself was a tad disappointing. Although the briefing by Amani had covered all the essentials and had been thorough in terms of safety procedures, no indication of the size of the wreck had been given. Hence, my initial thoughts of "With a lifeboat that size, it must be a huge wreck" soon turned to disappointment when Amani went straight for it. It was host to a large school of





CLOCKWISE: Zanzibar's west coast; Detail of giant clam; Featherstar; Scorpionfish; Bifurcated flatworm; Healthy table corals; Diver with large gorgonian fancoral; Starfish

our best to convince our Italian expert that a Stonefish sting really would spoil his day, it was time to pull on our shorties again.

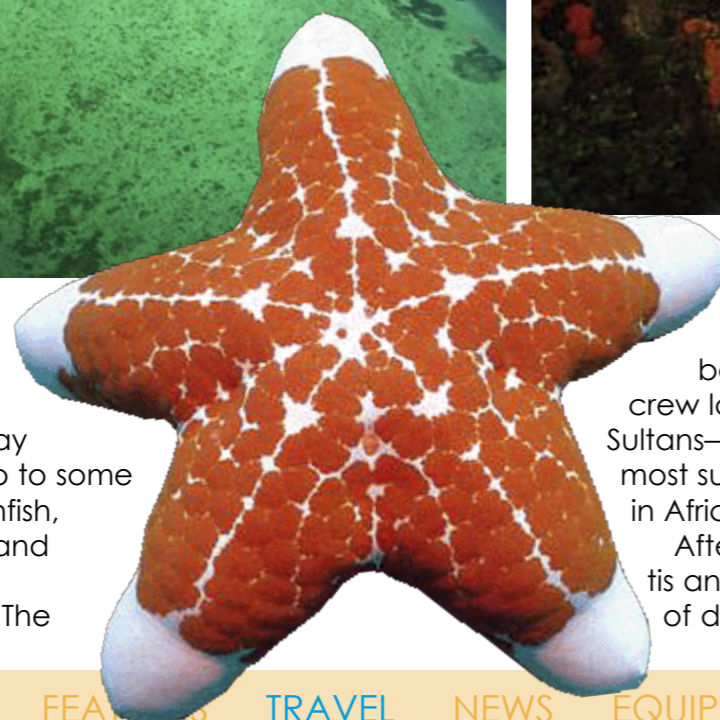
The visibility was around 15 metres, and the site deserved its moniker. Table and plate corals adorned the reef, and we spotted common lionfish, lots of nudis, an undulated moray eel, a hermit crab, huge gorgonian fans, a giant clam, and two blue spotted rays. However, the highlight of the dive was the large remora that took a fancy to Captain Fantastic's bare leg, his squeals being



striped eel catfish and long strands of whip coral (that numbered one less after some unusual buoyancy "skills" from the Adriatic).

Following the dive plan, we then finned away following the contours of the sandy bottom up to some outcrops of reef, home to a bearded scorpionfish, and an assortment of triggerfish, butterflyfish, and coachmen.

By the time we'd started puttering along to The



Aquarium at Murogo Reef (how many Aquariums are there around the world?), our bellies were grumbling, and the crew laid out a spread fit for Omani Sultans—once rulers of Zanzibar and the most successful slave and spice traders in Africa.

After samoosas, spring rolls, chapatis and fresh fruits and a leisurely spot of digestion during which we tried





## Zanzibar

### Stone Town

Back on shore in Stone Town, there is a bit of sightseeing to do. Central Stone Town is a labyrinth of narrow streets and alleyways, flanked by crumbling mansions and mosques. The main attractions are the massive Zanzibari wooden doors, Mercury's restaurant and bar (Freddy of Queen fame is Unguja's most famous son) by Big Tree, the House of Wonders, the Omani Fort, Tippu Tip's house, the Hamamni Persian Baths, and the fish market (conservationists beware: you will find sharks here). The night food market in Forodhani Gardens is alleged, by the same guidebook that I used in Dar es Salaam, to host the best food market in East Africa. If the guidebook was written for flies, this is undoubtedly true.



vaguely reminiscent of dolphin chatter as he trashed around trying to avoid its attempted love bites. Back on the dhow, he was informed that remora like to live on sharks, and that one is never very far from the other. "I could've been killed then", he shrieked. "If only," thought I.

The reefs around Stone Town are fairly plentiful and other, larger wrecks exist, too. And whilst any aficionado of Bass Lake would gawk in amazement at the coral formations and the fish life, the reefs have suffered greatly from plagues of crown of thorns, draining the coral of any colour.

### Matemwe & Mnemba

Situated close to Mnemba Atoll, a shallow expanse of coral reef with a tiny heart-shaped island on its western fringe surrounded by some step drop-offs, Matemwe is

the "must-dive" of Unguja. With average viz 20 metres or better, there are a multitude of sites to dive, and its calm conditions make it suitable for novices and experienced divers alike.

One Ocean's centre here was on the premises of the Beach Village where standard rooms are comfortable and clean. The Shamba suites are huge and charm-



CLOCKWISE FROM ABOVE: Omani Fort; Mosque minaret and Anglican cathedral towers dominate the skyline of Stone Town. The cathedral was built over the old slave market; Typical Stone Town alleyway; Tinga tinga artist displays his work; Breakfast view of Stone Town from Hotel Kiponda; Forodhani Gardens, deserted in daylight, becomes a hive of activity in evenings with the food market; Detail and full view of Stone Town's famous doors



Zanzibar



a relaxing atmosphere that even the open water students were looking like seasoned veterans.

If it was a haven of peace and tranquility on the boat, under it, the ocean was buzzing. With great viz, our first site was West Bank. Starting at six metres and then rolling down into a 50m drop-off, it was covered

After another dhow-diving lunch taken anchored over a snorkelling site that had several divisions of sergeant majors flitting over it, it was time to visit Turtle Reef. The site was not one unbroken reef, but rather coral mounds interspersed with sand, where unusual sightings included two left-eyed flounder, a huge octopus in some rocks, and a grand total of zero turtles between eight divers. However, lionfish fans were delighted; there was an abundance of these delicate-looking but venom-carrying members of the scorpionfish family.

Having returned along the same road due to extra-low tides, instead of in the dhow, beers were cracked around the poolside bar and new arrivals greeted like distant cousins, before dinner and a relatively early night under the sleep-inducing whirl of the strategically positioned fans. If you want to treat yourself, the Shamba suites are well worth the extra 50 dollars, and for a special romantic night for two, the honeymoon suite is even more secluded and

ingly decorated. Located next to the beautiful infinity pool a few paces from the beach, it also had excellent equipment, friendly and efficient service.

After a bumpy 45-minute drive to the launch site in a daladala and transfer to another purpose-built diving dhow, the MV Jessica, the divers carried on the banter from the night before. More flat sea and baking sunshine make for such

in reef fish and eels, hard and soft corals, and large schools of fusiliers. There were the intriguing juvenile black snapper, damselfish in the staghorn coral, royal and emperor angelfish, chocolate dips, blue spotted rays, two-bar clown fish. Thumbing through the fish book back on the dhow, it was a case of "Saw that, saw that, saw that, loads of them, two of them, few of those, etc..."

Striped eel catfish (above); Color-changing octopus attempts to attract a mate



CLOCKWISE FROM TOP LEFT: Green turtle with Remora fish; Spotted lionfish; Matemwe Beach Village; Rock lobster

# Zanzibar



garden eels stick their heads out of the sand and start swaying to the tune of an invisible snake-charmer.

## Kendwa

I caught a ride across the top of the island where there are two resorts to choose from. Nungwi was a dusty village that has rapidly grown into the most frequented and fashionable (read promoted) resort on the island. It has the liveliest nightclubs and the greatest selection of restaurants, but is also overrun by tourists and has poor swimming beaches. For divers, there are a few local sites, but the best dives involve a long dhow trip to Mnemba.

The less-publicised resort of Kendwa has a huge beach that is ideal for bathing even at low tide, offers a choice of eight places to stay,

ranging from thatched bandas at 15 dollars a night, to air-con en-suites, has six restaurants, is the location of the only dive centre using zodiacs (rubber ducks), and has some great local reefs. By operating with the faster craft, Scuba-Do can get their divers past Nungwi, round the tip of the island, and onto Mnemba dive sites in just under 30 minutes—quicker even than from Matemwe, which overlooks the atoll.

The dive center is situated next to the excellent Bikini Beach Bar and very reasonable Sunset Bungalows (50 USD for a spacious en-suite double with a traditional Zanzibari bed that could sleep four). The BCDs weren't as new as those at One Ocean, as they were coming up for replacement,



CLOCKWISE FROM TOP LEFT: Kendwa Beach is the longest in the north, good for a long walk; Weedy Scorpionfish; Bommie at End of the World dive site; White mouthed moray eel near Kichafi



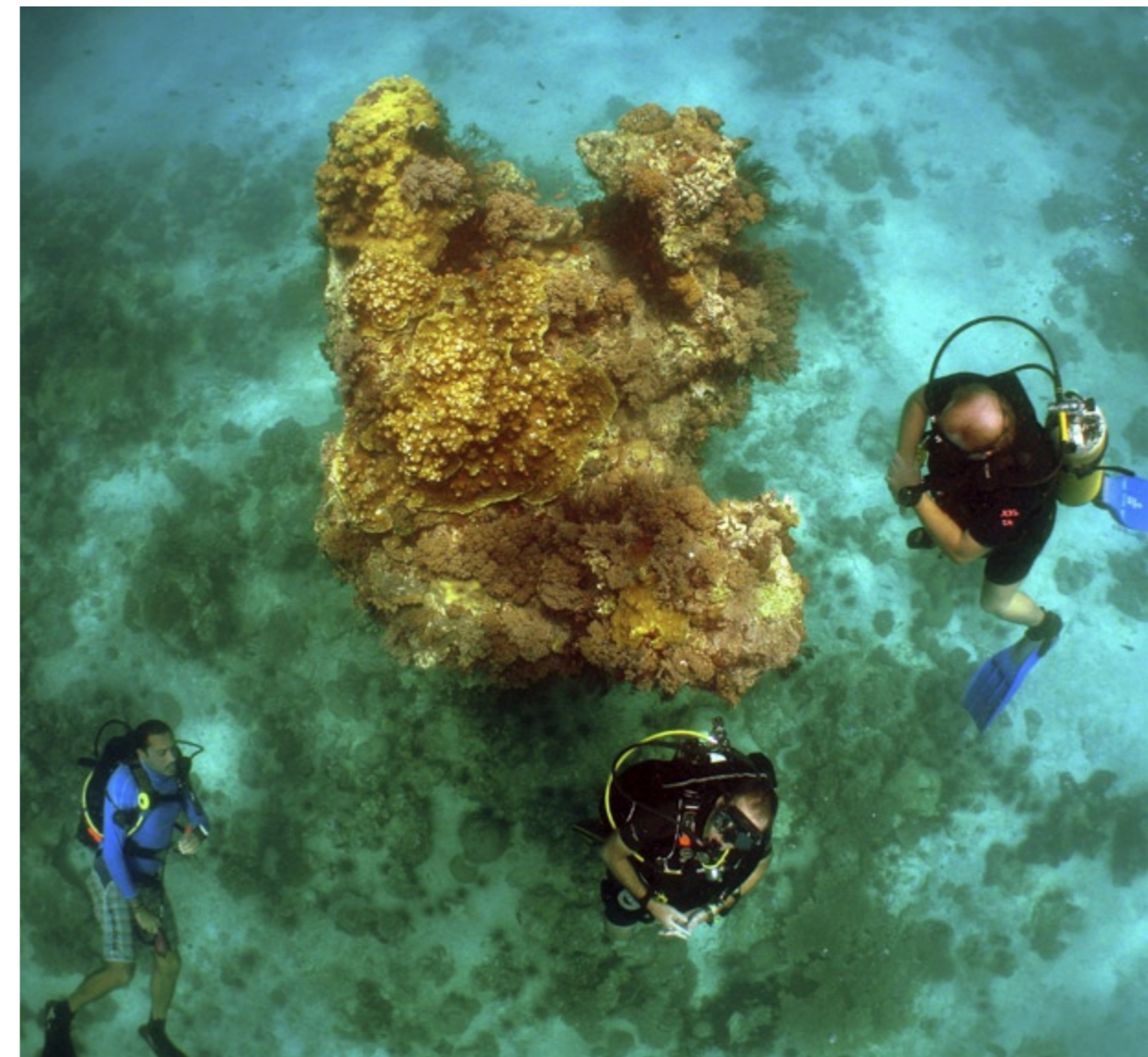
Porcupinefish swimming slowly above the table corals, false stonefish hid on the rocks whilst peppered and white-mouthed morays skulked in crevices; paperfish swayed gently in rocky recesses, rock cod went about their business and, looking off into the beautiful blue, a napoleon wrasse cruised by unperturbed by a school of kingfish.

The last dive was at Mnemba's take on The Aquarium. With a more open seascape, it was like being in the aquarium rather than looking in to it. We drifted on the gentle current from one outcrop of coral to another, marvelling at the size of the schools of fusiliers and the number of green turtles. In total, twelve individuals were observed, including three resting on one outcrop, with remoras being cleaned by accompanying wrasse attached

to their carapaces.

has its own plunge pool, beach access, and chef. Fully refreshed and as relaxed as a rasta in a ganja pile, it was time to blow bubbles at Mnemba again. Small Wall was home to

As we eventually moved off the site, the dive master led us to a vast sandy patch. Not the ideal spot for a safety stop you think, until hundreds of





## Zanzibar



CLOCKWISE FROM ABOVE: Yellow Margin Moray eel in lattice coral; Coral crab; Durban dancing shrimp; Diver on one of Pemba's signature walls

cent of a fantasy world.

Hunga was the home to even bigger schools of snapper, and the impressive crocodile flathead that can be found in significant numbers resting on the sandy bottom in gullies and between bommies. Rare finds included sea-horses, a Mauritius scorpionfish, and a Weedy scorpionfish. Visibility was between 15 and 25 metres, and the water was still a balmy 29C.

Post-diving, one of the bars would generally have something going on, and they could all be reached by walking down the beach; the only hazard at night being either nausea or hysteria brought on by the insincere declarations of local playboys to female tourists. With reduced travelling time and morning and afternoon dives with a long shore-break in between, Kendwa is also more suitable for mixed parties made up of divers and non-divers, children and adults.

### Pemba Island

The 35-minute half-empty flight yielded some more picture-postcard aerial shots of uninhab-

ited islands and the reefs, before touching down in Chake Chake—Pemba's biggest town, half-way up the west coast at the end of a long mangrove-lined creek.

The airport was a small ramshackle affair, and despite a plethora of attractions including atmospheric ruins, primeval forest, unique bird species, deserted beaches, and some of the best diving in the Indian Ocean, Pemba probably hosts less than 100 tourists at any given time.

Swahili Divers and the Kervan Saray eco-resort on the northwest coast are run by Farhat Jah, a seemingly eccentric mixture of Turkish and Indian heritage with a resolutely British upbringing, and his Dutch wife, Cisca. Known by locals as Mr. Raf—and just Raf to anyone else—there is something of a young Basil Fawlty in him that, whilst a little surprising initially, is ultimately endearing.

The accommodation was built in 2008 from local materials, and quarry where the bricks were cut is, well, a stone's throw away. Any



Leaf fish (above); Royal Angelfish (inset)

but safety was far from overlooked here; each BCD came with a surface marker bouy in the pocket and a briefing on how and when to deploy it.

Local sites included Kichafi and Haji reefs and their extensive lattice coral formations, peacock mantis shrimp, paperfish and bearded scorpionfish, Nankivell with its giant plate corals in fascinating formations, rays, napoleon wrasse, groupers, and the stunning Hunga Reef with its interconnected bommies and a huge variety of hard and soft corals, reminis-



## Zanzibar

als twenty metres down were clearly visible. Backwards roll, hot tub, OK, going down. Equalize, all together? look around. W-O-W. With a capital W. On one side was a wall, like the top of a submerged mountain, covered in hard and soft corals of all descriptions, positively teeming with fish. On the other, the bluest blue, near perfect viz, dropping down, and down, and down. Lucky there's no point talking underwater, because I was speechless. There was not one moment when there was not something to watch.

The surface interval snack of still-



imported goods come by dhow whose carbon footprint is limited to the fire that the crew use to warm their food at night when at sea. It is the best priced on the island with dorm beds and doubles, and good value packages. Food is wholesome and filling, and is locally-sourced and cooked with love by Chef Mzee Ali on charcoal (chocolate biscuit cake a speciality), unlike the other two resorts that ship most supplies in, and is the most affordable Pemba diving option.

Raf pioneered much of the diving from Pemba, and has discovered many of the sites himself, hence the odd names. You'll find no Aquarium here. Deep Freeze, Slobodan's Bunker (after the ex-Serbian warmonger), Le Reef Caché (hidden reef in French) and Emilio's Back Passage to name a few. With a wealth of knowledge of the reefs and conditions, years of experience, and a passion for underwater photography and videography, and you can pick up a host of tips from Raf, provided you can keep up.

The RIB zipped across the top of the flat sea, taking us to Deep Freeze. The ride had been soothing, re-enforcing the remoteness of this small island 50 kilometres off the coast of one of the poorest countries in the world. We passed local in sailing dhows or dugouts, fishing teams of up to ten men swam nets into a circle, slapping the water as they went to scare fish into the net. A lone spearfisherman here and there in Jacques Cousteau mask and an elbow-grease powered spear hunted for dinner. Now it was time to see if Pemba lived up to its growing reputation. Had I saved the best for last?

Looking down as we kitted up, the table cor-



LEFT TO RIGHT: Chake Chake mosque; Lush coral bommie at Egger's Ascent; Walls are everywhere; Linda's flatworm; Mauritius scorpionfish

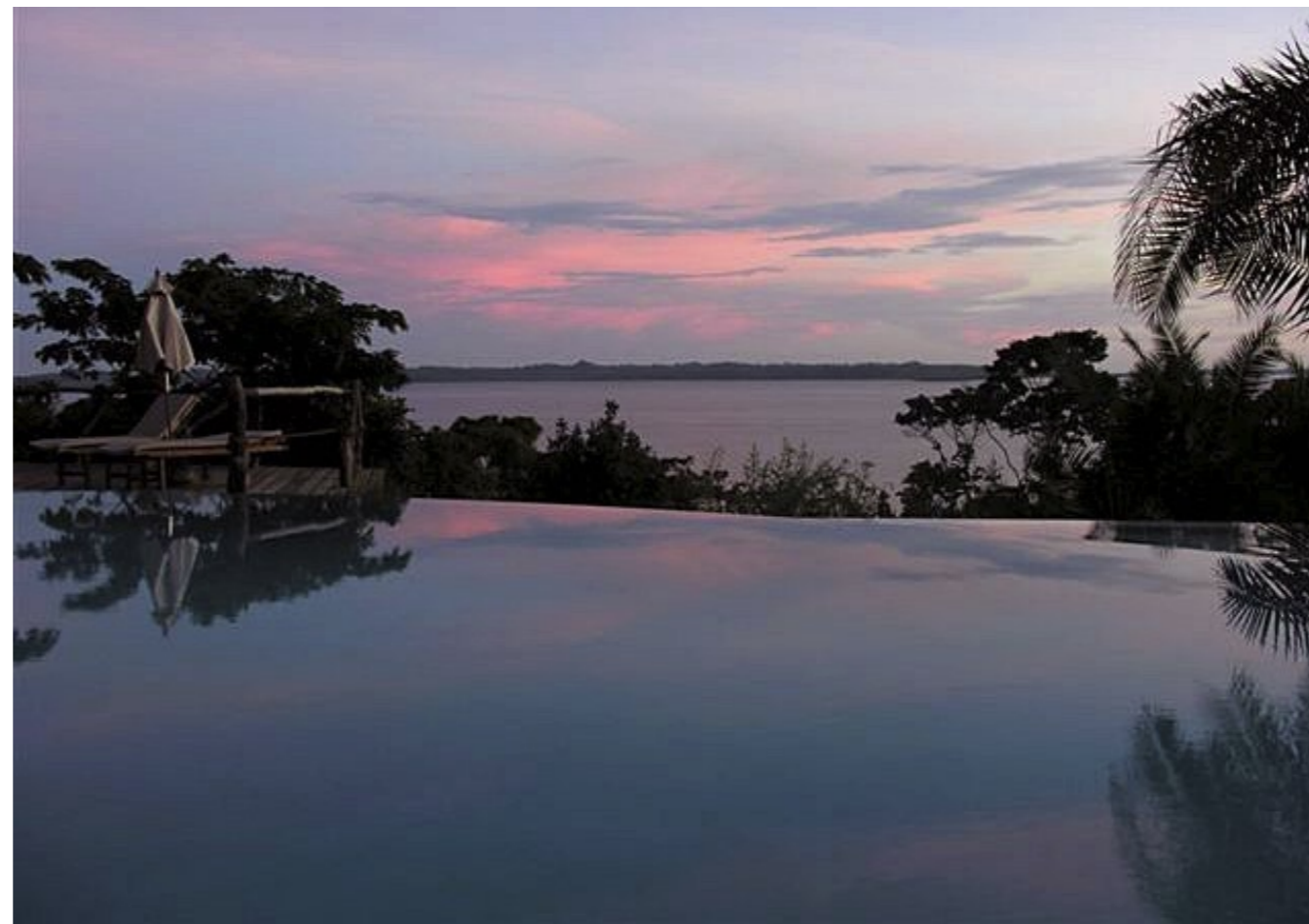
warm crepes was taken on a deserted island of fossilized coral and white sand before heading off to Slobodan's Bunker, best described by looking down on your hand with digits splayed, each gap a ravine in the reef full of marine life.

The following day, at Le Trek, we watched four Napoleon Wrasse pass below us and a school of Barracuda cruise by as we kept the wall left shoulder. Then one of the five other clients started babbling and bubbling loudly, pointing back to the right. And along came a six-metre wingspan Manta, accompanied by the largest and ugliest old cobia I have ever laid my eyes upon. She glided by on the outside to the edge of visibility, then turned, slowly soaring back, under me and up over the group.



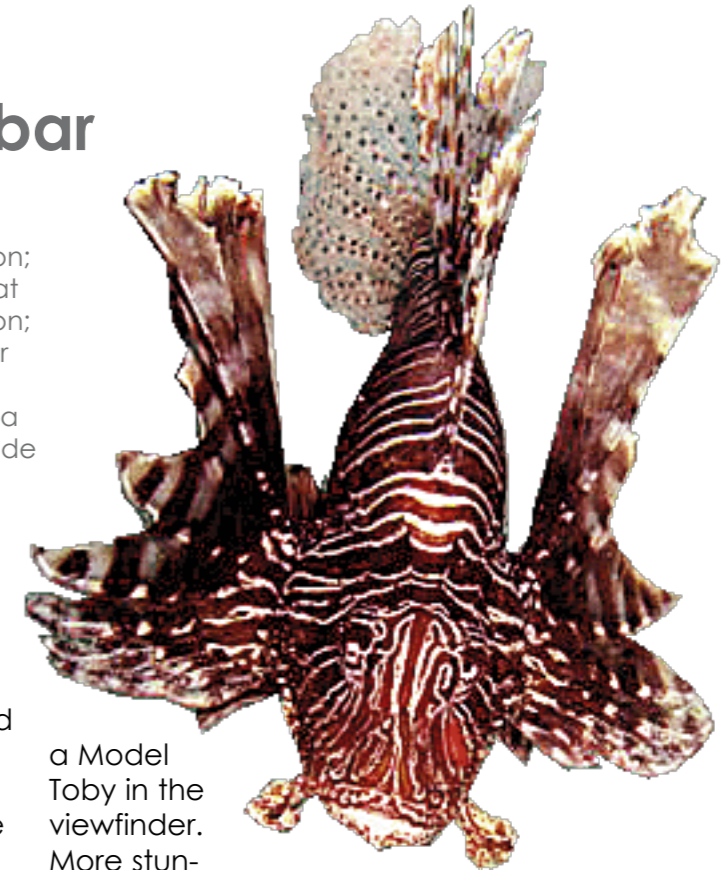
Maybe it's a mix of the remoteness of the island, the remoteness of Raf's sites, and a touch of melancholy from sitting at a keyboard, but the diving here felt like real adventure, as if all I needed was a red woolly hat and I was the re-incarnation of Commandant Cousteau.





## Zanzibar

CLOCKWISE: Sunset over Fundu Lagoon; Infinity pool at Fundu Lagoon; Lionfish; Diver with Giant Manta; Cobia catching a ride on manta



The next morning a cocktail of all four gels and shampoos revived me enough to make it down to the dive centre. The water was like a mirror, as we sped across

a Model Toby in the viewfinder. More stunning coral.

Unguja had been great, but Pemba was awesome. It's not a place for "big" encounters everydive, but the variety and volume of small to medium-sized species is outstanding, with coral crabs, magnificent partner shrimps, nudibranchs, anthias, morays galore. I wondered how I would re-adjust to diving back home? ■

the barracudas and assorted morays at Njao Gap; the multitude of marine life at Swiss Reef; and the ghost pipefish of Victoria's Secret almost to myself by

day. And when they turned their torches off momentarily on Shimba Wall at night and just followed my beam, the reef really was mine.

Dives were broken up by gourmet picnics on tidal sand islands in cyan waters under cloudless skies. It was blissful; more dream diving. Then it was time to move on for the last stop of the trip at luxurious Fundu Lagoon down south.

### Fundu Lagoon luxury

I couldn't hope to top the past week's diving, but the place itself looked impressive on the web, and the room rates certainly were at 600 USD a night per standard double, all inclusive (excluding champagne). After a 70-dollar taxi ride back to the airport, I met the Fundu transfer minibus and three well-heeled

guests. Forty-five minutes later, the driver dropped us at Pemba's main port of Mkoani where a speedboat was waiting to whisk us to the lodge, a ten-minute ride away.

The long wooden jetty was impressive, as was the discreet but warm welcome. The rooms are large safari tents inside a wooden cabin, with a magnificent ensuite shower room, complete with Fundu Lagoon's own range of four shower gels and shampoos (one of each for the morning and the evening, obviously), and a secluded bit of beach for each of the 16 rooms, the more expensive suites having their own pool, too.

The sunset views over the infinity pool and across the bay were breathtaking, and the sun setting directly behind the jetty bar and into the ocean surreal. It being a Saturday, dinner was being served on the beach, an eat-till-you-burst gourmet braai of slipper lobster, tiger prawns, and calamari washed down with excellent French wines and a few forgotten cocktails for desert.

to Misali Island and its surrounding reefs for my two last dives on Funga Pacha and Coral Mountain. Six of us baled over the side and dropped down to 18 metres (the four other guests were only Open Water certified). More clear blue water, more prolific fish life, and on the last dive, the magnificent marbled cleaner shrimp, and a last sighting of a crocodile flathead with a lionfish and



### Middle-class lodging

The next port of call was Manta Reef Lodge on the northeast tip of the island. Built on a hill just up from the beach, Manta Reef Lodge's well-appointed wooden chalets have superb views of the lagoon, and are good value for money, if you can afford 130 USD per person full board (excluding dives), given the weekly shipping in of supplies from Kenya, the excellent food, and the quality of the environment.

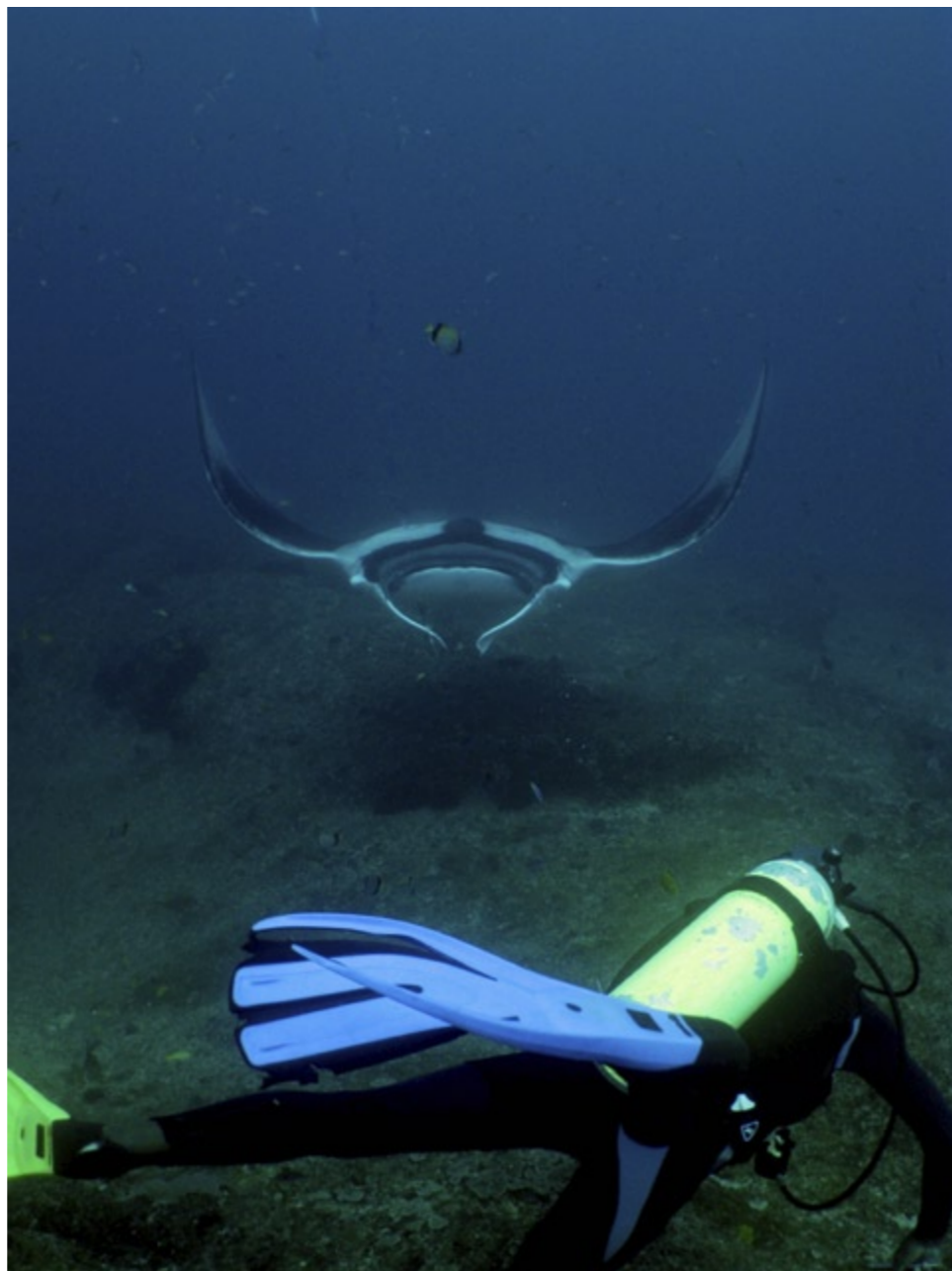
Over the next two days, accompanied by Van and dive master, Ali, I had the depths and the huge schools of big-eye trevally and skunk anemonefish of Fundo Gap South Wall; the unidentified but beautiful cleaner shrimps and metallic looking bubble algae of Manta Point (but no luck with the legendary mantas);





# Tantalizing Tofo

*Diving with Mantas Rays & Whalesharks in Mozambique*



Four hundred and fifty kilometres north of Maputo, Mozambique's capital, and half an hour from the historic Portuguese trading town of Inhambane and its airport, Tofo is a laid-back village popular for its endless pristine beaches and, of course, scuba diving. The warm waters of the Indian Ocean provide sustenance for an abundance of marine life here, but the mantas and the whale sharks are the stars of the show.

Text and photos  
by Christopher Bartlett

PREVIOUS PAGE:  
Sunrise at Tofo

THIS PAGE: Encounters with giant mantas at Tofo, Mozambique

*"Three, two, one go!"*

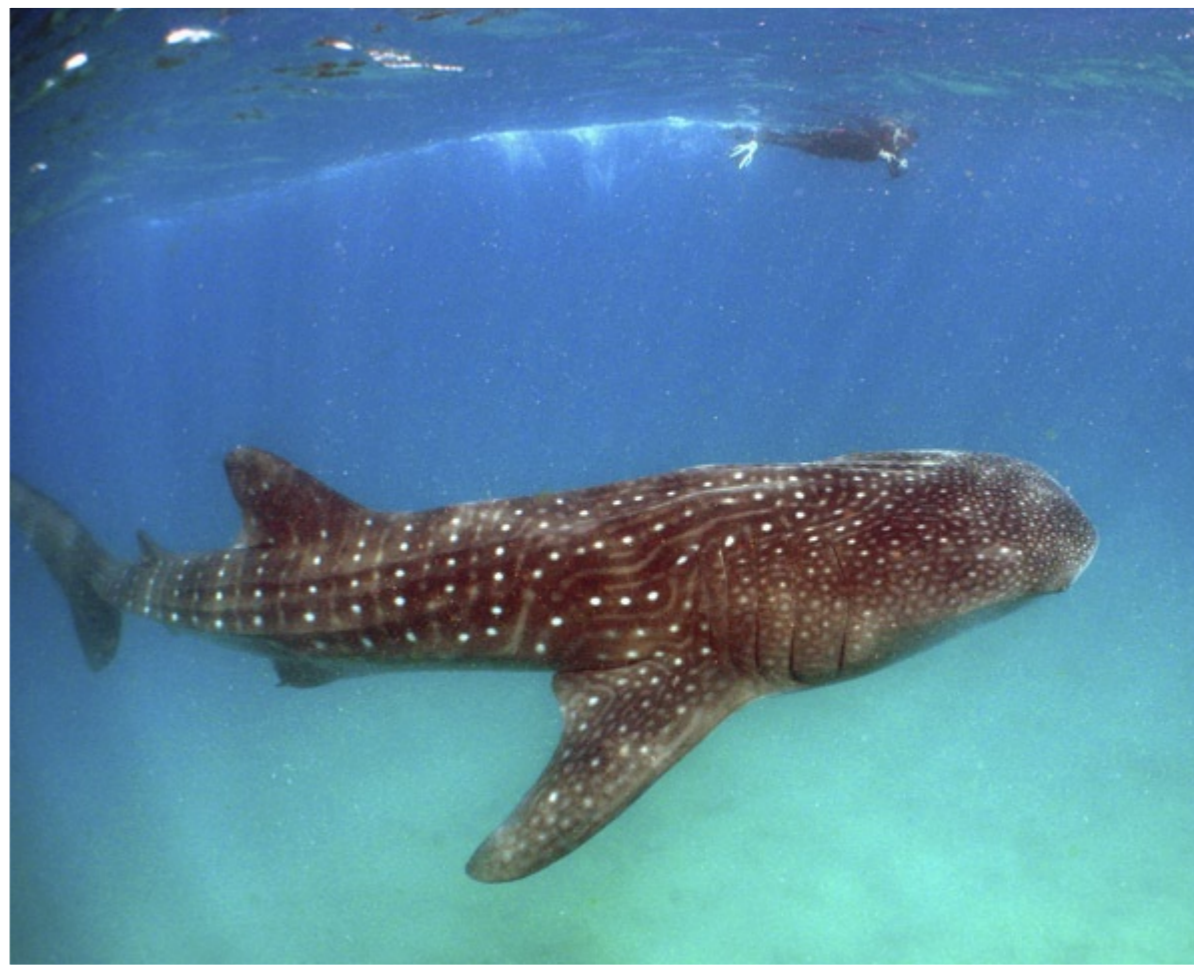
Rolling backwards off the pontoon of the RIB, I delighted in the slow-motion freefall from a negative entry, going straight down with Carlos, our Dive Master. "At last," I thought, "this is the life." Yet, I had little time to contemplate the hue of the blue and the visibility, as the instant I looked down I saw a giant manta moving slowly over the cleaning station 20 metres below. It slid graciously and effortlessly through the water, butterflyfish, goldies, and wrasses nibbling it clean of the parasites it had picked up on its oceanic wanderings. We unobtrusively dropped behind a wall next to the cleaning station and watched as a second and then a third manta glided in, whilst a large green turtle settled into a hollow. What a start!

As we drifted gently along the dive site, the oddly-named Hogwarts, 100 kilos of potato grouper gave us the eye, kingfish cruised past, and a school of barracuda zipped along. My grin was so wide I nearly lost my regulator when a

unique small-eyed stingray, the largest of all stingrays and only ever seen alive here, 5000 kilometres from the edge of its previously considered range, flapped its two-metre wide wings and slid past nonchalantly. It was undoubtedly the best first dive of a trip ever, and there were some big smiles on the surface, dive leader Carlos beaming even more than normal.

On the boat after the first dive, the crew changed our cylinders and we moved close to the coast and started cruising slowly, looking for the biggest fish in the ocean, the beautiful and docile whale shark. Within an hour skipper Ernesto's eagle eye picked out the outline of one of these giant planktivores. Donning fins and masks we slid over the side and snorkelled alongside a six-metre specimen, the sun's rays highlighting the white spotted patterns that cover its body from the tip of its tail to its super-wide terminal mouth.

Attracted by the plankton blooms



Fish catch a free ride in the mouth of a giant whale shark; Respect the whale shark's space and lengthen your experience; Six-metre whale shark; Schooling Bannerfish on Giant's Castle



scientist and Whale Shark specialist Dr Simon Pierce, Tofo has the world's largest population of the species, present year round, making it an ideal place for a sighting or two. Non-divers can also enjoy an amazing encounter with this behemoth on a two-hour ocean safari run by Tofo Scuba. I swam with them on four occasions in two weeks.

**Diving**

There are three dive centres in Tofo, with similar prices, but Tofo Scuba ([www.tofoscuba.co.za](http://www.tofoscuba.co.za)) has an attractive, purpose-built dive centre on the beach, a training pool, an on-site restaurant, and very professional and friendly staff. They are an eclectic mix of nationalities who make you feel at home straight away, and with smiles everywhere it is impossible to not have a good time. The rates are the best in town, too: On a ten-dive package with your own equipment, a dive comes to a very reasonable 22 pounds. Some of the further reefs are subject to a small surcharge, but are well worth it.

To the north, Amazon with its strong currents has



that occur in the vicinity, Junior opened wide to filter out the nutrients with the spongy tissue near its gill arches. As we did our best to keep up, he progressed effortlessly seemingly not moving his tail at all, staying just below the surface for ten minutes, before he disappeared from view.

And Junior is not alone; according to research





Anemone crab; Potato Bass; Snappers and diver on Manta Reef; Honeycomb moray eel; Frogfish and its aura; Eye-stripe surgeonfish

a good mix of macrolife, lionfish, honeycomb morays, and groupers, and never has it such a pleasure to be informed that it is time to go to The Office. David Brent was happily absent but his chair is often filled by a leopard shark, some whitetips, and the wierdly beautiful bowmouth guitarfish. Colosseum has only ever been dived a handful of times but should be renamed The Hospital for its schools of eye-stripe surgeonfish.

Straight out of the bay lies Giant's Castle. Dropping next to a Manta cleaning station, we drifted along the battlements as spectre-like silhouettes appeared from the blue, before dropping down to find the crawling sea moth or short dragonfish, morays, and ribbon

eels. Often the second dive of the day, it has a relatively short bottom time despite a 90-minute surface interval, but it's an action packed half-an-hour. As the bottom slopes downwards peppered with green coral trees, a big school of pelagic big-eye kingfish cruised into view circling us for a minute, and as we rose to our safety stop a school of devil rays ambled past. Giants also seems to be a favourite haunt of the small-eye stingray, and I was fortunate enough to see it there on two occasions.

To the south though, next to the impressive Hogwarts, lies the jewel in Tofo's crown. The aptly-named Manta Reef is as vibrant a piece of underwater eye candy that I would



Whip coral goby



Leopard blenny at Amazon (top); Ribbon eel (bottom)



happily dive over and over. From the surface, swathes of yellow and striped snapper, red soldierfish, and blue red-fang triggerfish covering the pinnacles can be seen.

Dropping into an amphitheatre that starts at 18 metres and bottoms out at 28, it is impossible to know where to look. Whilst taking

in the stunning colours of the schooling fish, my eye is caught by a coral whip goby, and then I spy African and Potato Grouper under different overhangs.

Back over the edge of the wide bowl, countless mantas (the resident and world-leading manta researcher Dr Andrea Marshall, identified 22 different individuals there the previous day), both giant and "normal", glided gracefully over the numerous cleaning stations, as a myriad of

goldies, damsels, and butterflyfish picked them clean. They danced over us, around us, and even between us, as if courting each other. I was certainly smitten.

And that was before meeting the monster.

I have seen many a fair-sized giant moray, as thick as a large

man's head, but, standing proudly on one-third of its three metres at the back of a cave like a dragon in its lair, was a beast with a head the size of a horse. Unsurprisingly, I could not convince my buddy to go in with a torch to help me focus my camera and give a sense of scale, but the image of this goliath of morays will stay with me until I return, as return I will. Manta Reef is definitely up there with the best.

### Accommodation & transportation

Tofo has a range of accommodation options from camping to lodges, but right next to the dive centre, the independently owned and run Aquaticos Beachside Casitas provide conveniently located, good value for the money self-catering, with friendly staff who take care of dishwashing and free laundry to boot.

A short walk along the beach or sand roads to the market and several restaurants and bars, and an even shorter walk to Tofo Online



CLOCKWISE FROM TOP CENTER: View of Tofo Scuba dive centre; Starfish posing; Market scene; Sea cucumber feeding at The Office



Tofo

CLOCKWISE FROM BOTTOM LEFT: Manta gets close; Stunning spiky starfish; Soldierfish on Manta Reef; Another stunning starfish; Shortfin dragonfish rests on the seabed



for email junkies, or to Dino's Bar for pizza or prawns—everything is close by. Meals at Tofo Scuba, Dino's or Fatima's go for around four pounds; a pizza will set you back a fiver.

The market has fresh fruit and veggies, cashews, fish and basic groceries—and, hidden in the centre behind the colourful batiks, some local lunch eateries serve rice with fish, chicken, or beef cooked on coals for a pound. If your Portuguese or Bitongo isn't up to much, pointing at a pot and saying "que es, por favor?" Will get you a look inside. In the evening, ask for Mr Bamboo's for grilled chicken or fish with a mountain of rice and fresh tomato salsa. Wash it down with a 500ml Manica, a Dois M, or Mozambique's stout, Laurentina Preta, and you'll get change from three pounds.

It's perfectly safe to walk around day or night, and the curiously squeaky sand is a delight to stroll along. Just remember to pack the sunscreen, as even in early May, the air temperature is in the low 30s, and the sea at 25-27°C, although it can drop to the low 20s in July.

LAM-Mozambique Airlines flies

between Inhambane and Johannesburg on Mondays, Wednesdays, Fridays and Sundays, or it's an eight-hour ride on a shuttle bus from departing from outside Fatima's in Maputo at 5 a.m everyday. The cost is 11 euros, and there is more information at [www.mozambiquebackpackers.com](http://www.mozambiquebackpackers.com). The LAM ticket office is difficult to deal with, and it's best to go through an agent like Tofo Scuba Safaris ([www.tofo-scubasafaris.com](http://www.tofo-scubasafaris.com)). Ask for Lucie, and she'll be delighted to interrupt her endless coffee consumption to answer your queries. A Joburg-Inhambane return is around 300 to 350 pounds. Both Lucy and Sharon at Acquaticos ([info@aquaticolodge.com](mailto:info@aquaticolodge.com)) can organise airport transfers.

As I write this in the bus heading south,



Maputo then London-bound, taking in the palm trees, acacias, and the villages with cassava crops and roadside vendors, I wonder when I'll be back. Tofo and its megafauna have enchanted me. ■

# fact file

## Mozambique



SOURCES: US CIA WORLD FACT BOOK, SCUBADOC.COM

**History** In 1975, Mozambique established its independence after nearly 500 years as a Portuguese colony. However, the country's development was hindered by large-scale emigration, economic dependence on South Africa, a severe drought, and a prolonged civil war until the mid 1990's. In 1989, the ruling Front for the Liberation of Mozambique (FRELIMO) party formally abandoned Marxism. The following year, a new constitution authorized a free market economy and multiparty elections. In 1992, fighting ended between FRELIMO and rebel Mozambique National Resistance

(RENAMO) with a UN-negotiated peace agreement. After 18 years in office, Joaquim Chissano stepped down in December 2004, leading Mozambique into a delicate transition. The elected successor, Armando Emilio Guebuza, pledged to continue the sound economic policies that have nurtured foreign investment. Largely due to post-conflict reconstruction, Mozambique has seen very strong economic growth since the end of the civil war. Government: republic. Capital: Maputo. Legal system: based on Portuguese civil law system and customary law.

**Geography** Mozambique is located in Southeastern Africa. It borders the Mozambique Channel, between South Africa and Tanzania. Terrain is mostly coastal lowlands, uplands in central Mozambique, high plateaus in the northwest and mountains in the west. Coastline: 2,470 km. Lowest point: Indian Ocean 0m. Highest point: Monte Binga 2,436m. Note: the Zambezi River flows through the most fertile north-central part of the country.

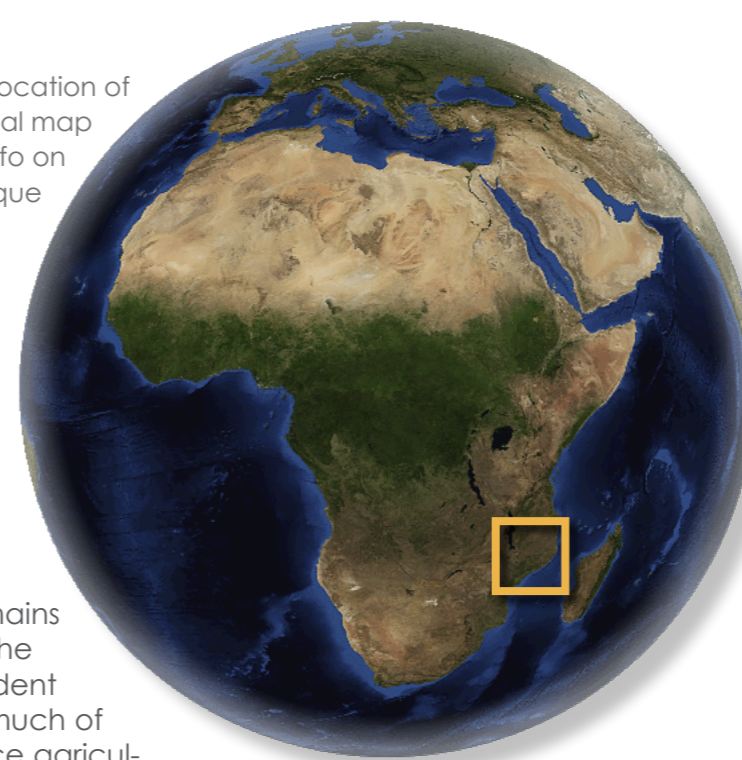
**Economy** Mozambique was one of the world's poorest countries at its independence in 1975. Exacerbating the situation were socialist mismanagement and a brutal civil war from 1977-92. In 1987, the government initiated a series of macroeconomic reforms made to stabilize the economy. These led to vast improvements in the country's growth rate. Despite these gains, the majority of

the country's population remains below the poverty line and the government remains dependent upon foreign assistance for much of its annual budget. Subsistence agriculture employs the majority of the work force. However, through forgiveness and rescheduling under the IMF's Heavily Indebted Poor Countries (HIPC) and Enhanced HIPC initiatives, Mozambique's once substantial foreign debt has been lowered, and is now at a manageable level. July 2007 saw the Millennium Challenge Corporation (MCC) sign a five-year Compact with Mozambique, which went into force in September 2008 and focuses on improving infrastructure, sanitation, agriculture, and the business regulation environment in the northern provinces. Natural resources: coal, titanium, natural gas, hydropower, tantalum, graphite. Agriculture: cotton, cashew nuts, sugarcane, tea, cassava (tapioca), corn, coconuts, sisal, citrus and tropical fruits, potatoes, sunflowers; beef, poultry. Industry: food, beverages, chemicals (fertilizer, soap, paints), aluminum, petroleum products, textiles, cement, glass, asbestos, tobacco

**Climate** tropical to subtropical. Natural hazards: severe droughts; devastating cyclones and floods in the central and southern provinces

**Environmental issues** adverse environmental consequences have resulted from increased migration of the country's population to urban and coastal areas spurred by civil war and recurrent

RIGHT: Location of Mozambique on global map  
FAR RIGHT: Location of Tofo on map of Mozambique



drought in the backcountry. Other issues include desertification; pollution of surface and coastal waters; elephant poaching for ivory. Mozambique is party to: Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Desertification, Endangered Species, Hazardous Wastes, Law of the Sea, Ozone Layer Protection, Ship Pollution, Wetlands

**Currency** Meticals (MZM)  
Exchange rates: 1EUR=37.41MZM;  
1USD=25.55MZM; 1GBP=43.70MZM;  
1AUD=21.78MZM; 1SGD=18.27MZM

**Population** 21,669,278. In poverty: 70% (2001 est.). Living with AIDS: 1.5 million (2007 est.) Ethnic groups: African 99.66% (Makhuwa, Tsonga, Lomwe, Sena, and others), Europeans 0.06%, Euro-Africans 0.2%, Indians 0.08%. Religion: Catholic 23.8%, Muslim 17.8%, Zionist Christian 17.5%, other religions 17.8%, no religion 23.1% (1997 census). Internet users: 200,000 (2007)

**Time** CAT (UTC+2)

**Language** Emakhuwa 26.1%, Xichangana 11.3%, Portuguese 8.8% (official language spoken by 27% of population as a second language),

Elomwe 7.6%, Cisena 6.8%, Echuwabo 5.8%, other Mozambican languages 32%, other foreign languages 0.3%, unspecified 1.3% (1997 census)

**Health** There is a very high degree of risk for food or waterborne diseases such as bacterial and protozoal diarrhea, hepatitis A, and typhoid fever; the vectorborne diseases malaria and plague; the water contact disease schistosomiasis; and the animal contact disease rabies (2009)

**Recompression Chamber**  
St. Augustine's Hospital  
Durban, South Africa  
[www.sahmc.co.za](http://www.sahmc.co.za)

**Links**  
Mozambique Tourism  
[www.mozambique tourism.co.za](http://www.mozambique tourism.co.za) ■



Diver with large lionfish



silver



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





Water lilies display  
their blooms on the  
Okavango River

Text and photos by Toni White

**Carrying all we would need for the next five days, our expedition team travelled some 65 kilometres through shallow, meandering channels in small power boats. We eventually reached Jugu Juga, the small island which was to be our home for the next two days. As we unloaded our equipment and started to pitch camp, a bull elephant with tell tale 'tears' staining his face repeatedly charged us, only veering off when our guide beat two metal plates together. The strong smelling discharge, rich in testosterone, running down his cheeks announced that he was in 'musth'. This was my introduction to the "Really Wild"—the Okavango Delta in Botswana.**

The Okavango Delta in Northern Botswana is described as the "Jewel of the Kalahari Desert". Covering some 15,000 square kilometers, it is a labyrinth of lagoons, lakes and hidden channels. It is the biggest inland fresh water delta in the world. It acts like a magnet to the wildlife of Botswana and beyond, with its crystalline waters attracting huge herds of elephant, hippo and Nile crocodiles. With 400 different species of bird, it has by far the greatest concentration and diversity of wildlife in the whole of Africa.

Spurred by huge subtropical storms in central Angola, some 12 billion cubic metres of water travel down



# Diving the Delta

*Botswana's Okavango River*





The expedition team in action; Hippo yawns; Stealthy croc in the reeds; Team member Pete works his underwater rig

the Cubango River, through Namibia as the Kuvango River, and finally enter Botswana as the Okavango River. The water diverts through a maze of lagoons, channels and islands before draining away in the southern wastes of the Kalahari Desert.

I had been talking for some years about going on an expedition to the Okavango Delta to photograph the wild-

life and assess the possibilities of diving it. However, I really didn't know what we were letting ourselves in for.

I had done many big animal expeditions before with world renowned expert Mark Addison of Blue Wilderness Diving ([www.bluwilderness.co.za](http://www.bluwilderness.co.za)), mainly in South Africa. And so it was that in the dry season of October 2007, Mark and I gathered with six intrepid underwater

photographers, in Maun, the gateway to the Moremi Game Reserve, Botswana.

**The expedition**

As we loaded up our two flat-bottomed boats with everything from tents to compressors, we all wondered what the next five days would bring. We were soon speeding along the Boro River, leaving the low rise buildings of Maun. The river

banks were alive with birds of every description, and we soon found ourselves gazing at the rafts of reeds that are the life blood of the delta. The further we travelled, the narrower and shallower the delta channels became.

After 30 to 40 kilometres, we started to see our first signs of big game. Elephants and crocodiles became more frequent sightings, and in the distance, we saw herds of impala and buffalo. After a couple of heart-stopping moments

when the boats became tangled up in the reeds in the shallow waters, we arrived at our first camp on Jugu Juga Island.

It was late afternoon by the time we started preparing the camp while our cook started to dig holes to prepare our evening meal. This was the point when we all decided that the Okavango was very definitely a different kind of wild

from the average game reserve.

We were just carrying our sleeping bags up from the boats when the bull elephant repeatedly charged us. It was more than a little disconcerting, especially when we wondered whether we were pitching camp in his territory. Mark managed to discourage him, and he pulled back to a safer distance, but continued to show his annoyance with us by stamping and trumpeting for the rest of the night.

We investigated our chosen patch further and found a small lagoon at the rear of the camp with a resident hippo in it. The next morning we found that five rather large crocodiles had spent the night on the sand of the river, no more than 20 feet from our tents. It was definitely getting wilder! To add to all of this, during that first night we had one of the most dramatic storms that I have ever seen. The cracks of thunder would have shattered glass if there been any around and the night sky was illuminated by huge displays of lightning.



**The Okavango River**

The next morning, we were quickly on the river with our dive gear and cameras in tow. Travelling deeper into the delta, we came across a huge disturbance in the river. It soon became obvious that we had come across a hitherto unknown migration of barbell. The banks were covered in every bird imaginable; fish eagles, storks, pelicans and the beautiful malachite Kingfisher. Crocodiles were lined up in the sand. Every size from half a metre to a couple of four metre monsters were waiting for their turn to feed on the barbell.

Andy donned his wetsuit, fins and mask and immediately jumped over the side, camera in hand, to try and get a half and half picture of a small croc sitting on the bank. The croc was up and gone before you could say snap! So instead he turned his attention to the more static lilies that were growing profusely from the river beds.

Following Andy's lead we all jumped into the water, ignoring the fact that bigger crocs were within a few metres of us. The

barbell (some as long as a metre) were swimming past us in such numbers that they were crashing into our submerged legs. Before long we were all jumping up and down in the water, and the air was blue with expletives! It didn't take long for us to decide that this was just a bit too hairy, and we exited the water rather faster than we had entered.

We thought that that was quite enough excitement for one day but on the way back to camp, we were confronted by a herd of elephants crossing the channel in front of us. Two huge females were guarding the progress of the young elephants. They decided that they would walk up the channel towards us, sparring as they came. Luckily for us they must have seen the agitation on our boats as they got nearer and decided that we had taken their severe warning.

Apart from the troop of baboons that walked through the camp at 1am, the pride of lions calling to each other all night and our friend the elephant throwing

things around in disgust because we hadn't moved on, the night passed relatively quietly.

**Hippo haven**

The dawn brought a new challenge; we knew that there was a lagoon nearby with a resident herd of hippos. On arrival, we saw five heads in the water all staring at our boat. Apparently, boats take first place on the hippo hate list, closely followed by humans!

We had already decided that going into the water with the single biggest killer of humans on this continent was not an option. We had built a couple of small ROV's with Mark that we planned to attach our cameras to and drive them into the herd to try to capture the images we wanted. Let's just say we got close.

We had a bit of a hiatus while deciding which of us would volunteer their camera first (due to the significant risk that it might not come back!!!) Once decided, the ROV's set off but instead of the attack we expected, the male hippo moved behind the females, and the whole herd started to back off into shallower water, completely intimidated by the small black box travelling towards them. After three frustrating hours trying to get nearer, we decided that we had enough information to plan a different approach for our next trip in July 2008.



We spent the rest of the afternoon gently travelling the river banks enjoying the profusion of wildlife. We were on our way back to base camp when we saw a group of hippos on the bank. It was the group that we had been trying to photograph that morning. In an instant, we could see a look in their eyes that said, "So, it was you harassing us in the lagoon this morning". At that point, they all charged down the bank towards us. Our driver slammed the engines forward and sped past them as they all jumped into the channel obviously intent on upsetting our evening.

The next day we broke camp to travel back nearer to Maun with the intention

camp on Nxaraga Island and were looking out of our tent at the lagoon with its eight resident hippos. We spent the afternoon fruitlessly trying to photograph this herd and learned valuable lessons for our next visit.

The evening and night brought nothing more exciting than a large spider running around the inside of my tent. Little did I realize that all the trouble was being stored up for our last night.

### Diving the river

Bright and early we were back on the water heading for deeper channels with the clear water that we had identified

of getting nearer to a bigger herd of hippo. We wanted some deeper water, so we could attempt a scuba dive to assess the possibilities of future dives with crocs.

By lunch-time we had established

for our dive. Kitting up, we soon became aware that the waters here are never still, and this would be a drift dive.

Entering the water, we dropped two metres to the bottom. The visibility was restricted to about four metres because of the high concentrations of peat in the ground but this was good enough for photography. The sand on the bottom was white—we were definitely in the Kalahari Desert.

We knew from this first dive that photography would be possible, but we got another reminder that this was truly a wild, wild place and one to be respected. As the dive ended, we stood up in shallow water and within seconds, Pete had let out an ear splitting scream as something large swam between his legs knocking him off his feet. Whether it was a croc or a



Large croc waits in the grass; Stork in flight; Trees dot the Delta landscape

## Botswana

large monitor lizard has been debated many times since. Whatever it was, it was certainly a warning.

And as for our last night... what a night it was! Just after midnight Mark and Gail woke up to find that they had an elephant's trunk in their tent with them. They had pitched their tent under a Marula tree—the fruit is an elephant's favourite food.

I opened my tent flap during the night to find three hippos happily munching away at the grass just outside. Nobody left their tents that night, and in the morn-

ing, there was a huge rush for the one portable toilet!

Joking apart, we all agreed that this had been an exceptional expedition for all of us. Experiencing these magnificent animals up close and wild, had been the experience of a lifetime for all of us. From a practical point of view, it has also given us confidence to return armed with what we learned. We are sure that given time, we will capture the underwater images that we now know are possible. We plan to return to the Delta twice a year over the next three years, once during the dry and once during the wet season. We know that we will capture the stunning images that we have been privileged to see. ■

*Tony White is a professional underwater photographer. Now based in South Africa, he runs underwater photographic tours to some of the most exciting underwater events and places on our planet. More information can be obtained from his website [www.seaofdreams.co.uk](http://www.seaofdreams.co.uk)*



# fact file



## Botswana



SOURCES: US CIA WORLD FACT BOOK

**History** Botswana, formerly the British protectorate of Bechuanaland, adopted its new name when it attained independence in 1966. Forty years of uninterrupted civilian leadership, progressive social policies, and significant capital investment have boosted the country's economy making it one of the most dynamic in Africa. Although tourism is a growing sector due to the country's conservation practices and extensive nature preserves, mineral extraction, mainly diamond mining, leads economic activity. The country has one of the world's highest known rates of HIV/AIDS infection, however, it also has one of Africa's most progressive and comprehensive programs for dealing with the disease. Government: parliamentary republic. Capital: Gaborone

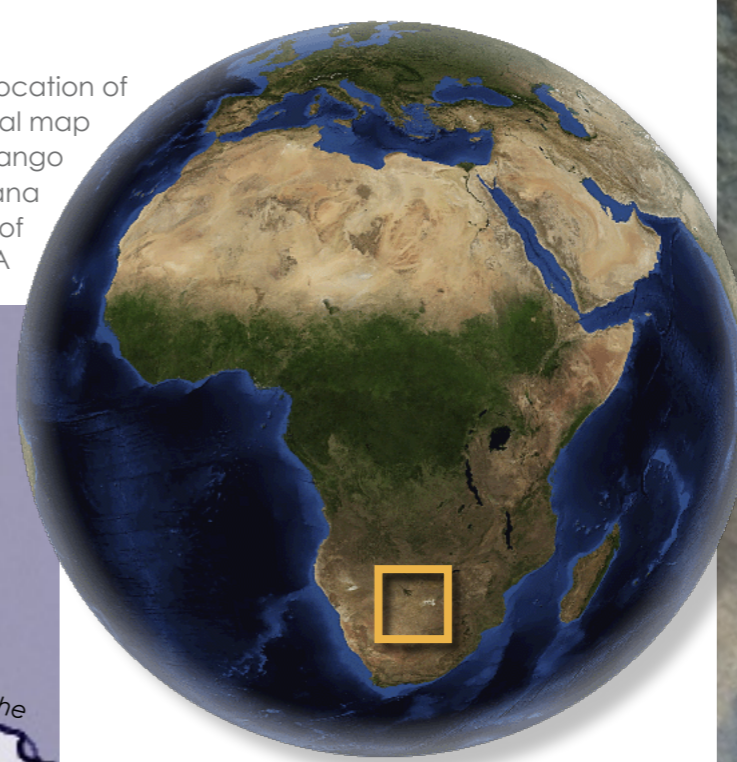
**Geography** Botswana is located in Southern Africa, north of South Africa. Note: No coastline, landlocked; population is concentrated in the east. Terrain is predominantly flat to gently rolling plateaus with the Kalahari Desert in the southwest. Lowest point: junction of the Limpopo and Shashe Rivers 513 m. Highest point: Tsodilo Hills 1,489 m.

**Economy** Since independence in 1966, Botswana has had one of the world's highest economic growth rates, though, in 2007-08, growth fell below 5%. Botswana has transformed itself, through fiscal discipline and sound management, from one of the poorest countries on Earth to a middle-income country with a per capita GDP in 2008 of US\$13,300. Indeed, Botswana is ranked as the best credit risk in Africa by two major investment services. Much of the expansion is fueled by diamond mining, which currently makes up more than one-third of GDP and 70-80% of export earnings. Other key sectors include tourism, financial services, subsistence farming, and cattle raising. However, the government faces challenges such as high rates of

unemployment and poverty. Botswana's considerable economic gains are also threatened by high HIV/AIDS infection rates, the second highest in the world. Long-term prospects are dimmed by an expected leveling off in diamond mining production. Natural resources: diamonds, copper, nickel, salt, soda ash, potash, coal, iron ore, silver. Agriculture: livestock, sorghum, maize, millet, beans, sunflowers, groundnuts. Industry: diamonds, copper, nickel, salt, soda ash, potash; livestock processing; textiles

**Climate** Botswana's climate is semi-arid with warm winters and hot summers. Natural hazards: periodic droughts; visibility can be obscured with seasonal August winds that blow from the west, carrying sand and dust cross-country.

RIGHT: Location of Botswana on global map  
BELOW: Location of Okavango Delta on map of Botswana  
FAR RIGHT: View from space of Okavango Delta. NASA



**Environmental issues** overgrazing; desertification; limited fresh water resources. Botswana is party to: Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Desertification, Endangered Species, Hazardous Wastes, Law of the Sea, Ozone Layer Protection, Wetlands.

**Currency** Botswana Pulas (BWP)  
Exchange rates: 1EUR= 9.95BWP;  
1USD= 7.00BWP; 1GBP= 11.58BWP;  
1AUD= 5.82BWP; 1SGD= 4.84BWP

**Population** 1,990,876. In poverty: 30.3% (2003) Living with AIDS: 300,000 (2007 est.) Ethnic groups: Tswana (or Setswana) 79%, Kalanga 11%, Basarwa 3%, other, including Kgalagadi and white groups 7%. Religion: Christian 71.6%, Badimo 6%, other religion 1.4%, no religion 20.6% (2001 census). Internet users: 80,000 (2007)

**Time** CAT (UTC+2)

**Language** Setswana 78.2%, Kalanga 7.9%, Sekgalagadi 2.8%, English 2.1% (official), other language 8.6%, (2001 census)

**Health** There is a very high degree of risk for the food and waterborne diseases

bacterial diarrhea, hepatitis A, and typhoid fever; and the vectorborne disease malaria (2009)

**Recompression Chamber**  
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24hr phone: +27(0)12 334-2567

DURBAN, South Africa  
St. Augustine's Hospital  
Hyperbaric Medicine Centre  
[www.sahmc.co.za](http://www.sahmc.co.za)

**Links**  
Botswana Tourism  
[www.botswanatourism.co.bw](http://www.botswanatourism.co.bw)

Split view of lilly pad on Okavango River in Botswana



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POINT & CLICK  
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# Warp 10 Equipment

Edited by  
Arnold Weisz



## Cressi Ellipse MC9

This regulator is a pairing of the balanced and adjustable second stage, Ellipse Balanced, with the hyper-balanced first stage, MC9. The Ellipse Balanced has a slightly larger casing, which is made from a sound absorbing material, and a new diaphragm to further improve the inhalation effort. Some of the features are: the user can adjust both the inhalation effort and the Venturi effect (dive/pre-dive) at any time during the dive; pneumatic balancing system of the piston allows for constant performance at any depth and with any air pressure in the tanks; and the standard release baffle can be directly replaced by the user for a larger model, which pushes the bubbles further away from the diver's face.



## Seemann Vapor

The BCD from this German company allows for up to 9kg of weight in their SR weight pocket system and has rear trim pouches for 2.5kg per pocket, which is good news for those diving thick drysuits with a lot of undergarments in cold waters. Other features: hybrid aircell combines the advantages of a Wing and an ADV BCD; new material construction reduces wear and colour fading; complete padded harness with carry handle; tank loop and spinal support; large capacity zippered pockets; and pre-fitted rivets for BC knife attachment without damaging BCD. [www.seemannsub.de](http://www.seemannsub.de)



## Force Fin Wing

The Force Wings from Force Fin, are now offered in a new material. This new material feels as hard as steel and is 95 percent transparent, with new colors including: Diamond Clear, Amber Yellow, Sapphire Blue, Smoke Black, Emerald Green, Ruby Red and Amethyst Purple. Another new feature is the Individual Blade Control (IBC). IBC allows you to manage the water flow behind your fin blade and gives you varied control of power and speed, while increasing tracking, stability and maneuverability. Also available is a Launch Pad Kit that allows you to retro fit and turbo charge a wide variety of fins not made by or procured from Force Fin. [www.forcefin.com](http://www.forcefin.com)

## DUI Ultra Drysuit Hood

Their new drysuit hood is made with 7mm superior stretch neoprene that makes it easy on/easy off and comfortable to wear. Also important, the hood is vented to allow air to escape yet keep the water out. Other features are: larger face seal allowing for more face coverage for warmth; strategically placed seams for longer wear —no seam under the chin; tapered behind the head for a closer fit to reduce water flow; and 4mm neck skirt for easier tucking into neck collar. Available in warm neck and standard styles. [www.dui-online.com](http://www.dui-online.com)



# equipment



## Lomo Watersport

The Stinger fin features strong rubber side rails that give split fins their flexing strength, but the blade in the Lomo fin system is not split in the same way. Instead, it features a flexible rubber section that flows during the finning motion giving similar benefits. The Stinger is made from a multipart mould that uses different materials for different parts of the fin. The main body is made from a flexing plastic, whilst the foot pocket is made from a softer material that conforms better to the shape of your boot. The fin also features the 'drooped nose' shape, which, according to the producer, further improves efficiency and helps reduce cramping in the legs. Stinger fins are only available direct from Lomo through their website. [www.lomowatersport.com](http://www.lomowatersport.com)

## Portable hyperbaric chamber

The new portable hyperbaric chamber from SOS Hyperlite is designed for advanced and technical diving, for emergency response units and especially for use in remote locations. The 2009 model is one-third lighter, more durable and packs into one case rather than two. It is fully operational within ten minutes, and the patient can be treated on-site, or be transferred under pressure during treatment to a nearby medical centre, depending upon circumstances. [www.hyperlite.co.uk](http://www.hyperlite.co.uk)



## Quick Fit Weight Pocket

The Quick Fit Weight Pocket is easy to fit to add weight for all requirements by attaching to Wings/BCD Systems and trimming equipment without fuss. The pocket has a maximum capacity weight of 2kgs block lead or shot. The system comprises of two pockets flaps, which are secured with strong Velcro and fastened together with a 25mm side release buckle. The weight may be quickly released by unfastening the side buckle and pulling down the lower flap of the pocket. [www.customdivers.com](http://www.customdivers.com)



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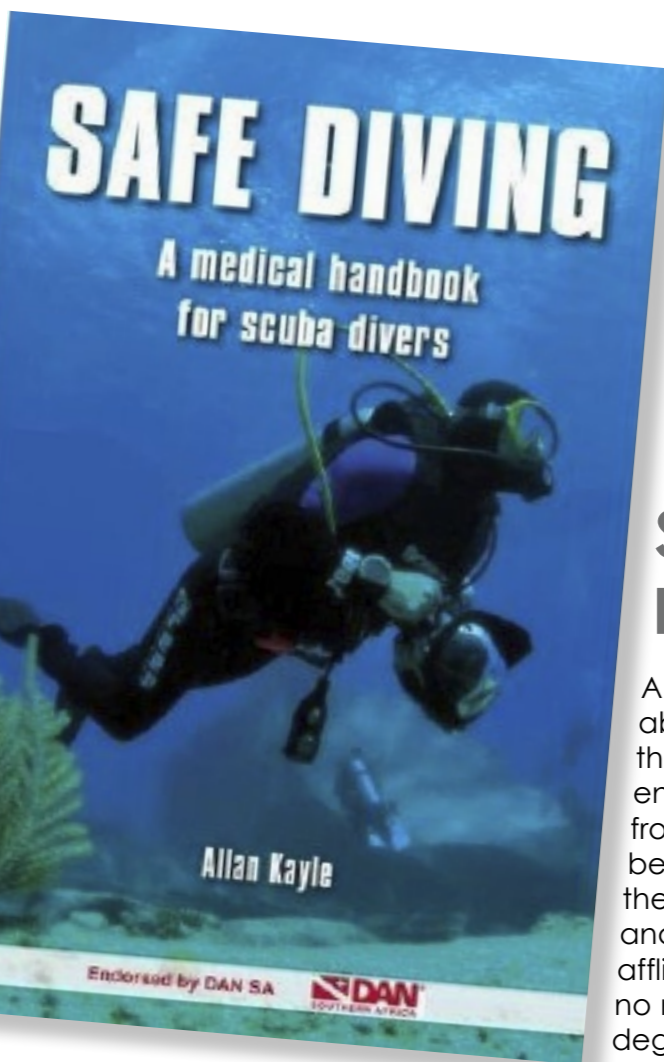
[www.diveindustrybc.com](http://www.diveindustrybc.com)



## Books & DVDs

Edited by Catherine GS Lim

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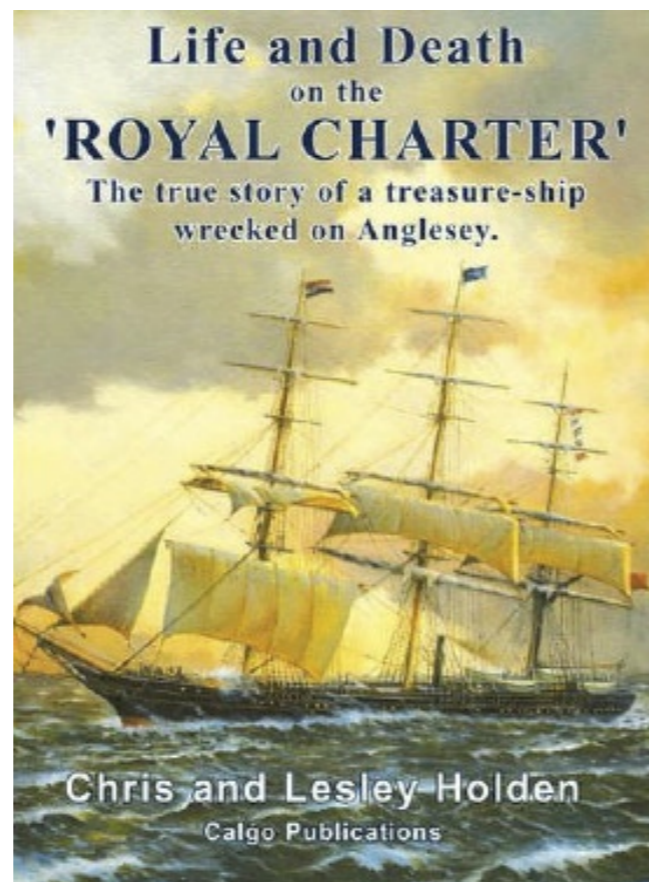


### Safe Diving

A diver must be reasonably fit before entering the water. But it's not enough to get an okay from your doctor. It's best to be aware of all the medical conditions and ailments that may afflict divers. While there's no need to get a medical degree, having this book in your hands is a good first start.

Written by diving medical officer and DAN Southern Africa board member Allan Kayle, this book highlights the many ailments that threaten divers above and below the water surface. These include nasty things like heatstroke, inhaled gas contamination, animal bites, etc. Even unique situations like diving during pregnancy, deep diver rescue and emergency ascents are also covered. Endorsed by DAN Southern Africa.

Written by Allan Kayle. 368 pp, July 2009, ISBN 13: 9781770077539.



### Life and Death on the Royal Charter

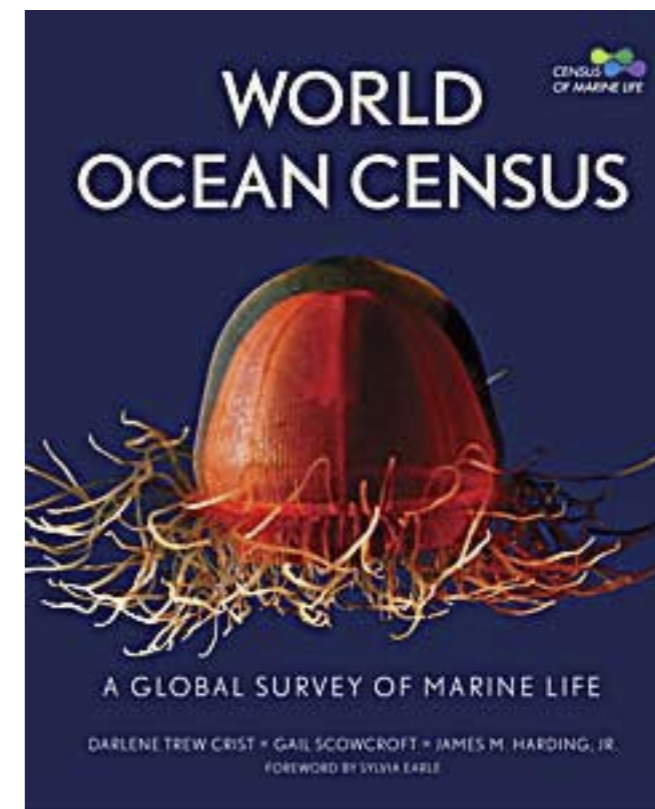
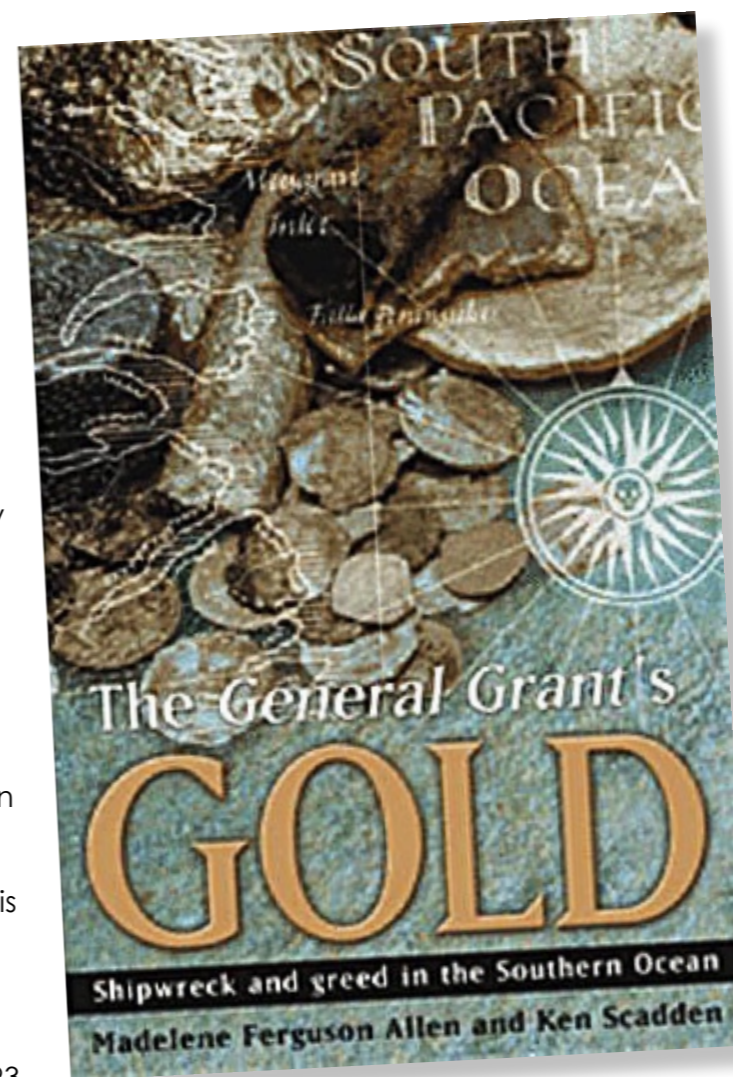
The *Royal Charter* was launched in August 1855, and met its demise on 26 October 1859. Much has been written about that fateful storm and the tragedy that followed, in which more than 400 people perished. Instead of focusing just on this one incident, this book relates the story of the *Royal Charter*, from her launch and maiden voyage, to her travels to and from Australia. It also takes a wide-angled look at the development of steamships and the gold rush in Australia during those times, all the way to the aftermath: the inquest, recovery of the bodies and the gold, and the new legislations that resulted from the sinking.

Written by Chris and Lesley Holden. Published by Calgo Publications. 288pp, August 2009, ISBN: 9780954506629

### The General Grant's Gold

The gold rush in the South Pacific has yielded tales of hard-working miners, dashed hopes, shipwrecks and sunken treasures. This book revolves around the bounty from one particular shipwreck, one in which the survivors were marooned on a deserted island for more than two years before they were rescued. Reminds one of Robinson Crusoe? Perhaps, but our childhood protagonist didn't have the misfortune of seeing their gold, fresh from the mines of Australia, go down with the ship. Since then, bounty hunters have tried without success to locate the sunken treasure from the ship, rumoured to be more than \$US10 million. If you're a history buff, this book is a gem for its in-depth research and comprehensive fact-finding into this famous nautical mystery.

Written by Madelene Ferguson Allen and Ken Scadden. Published by Exisle Publishing. 192 pp, ISBN: 9781921497193



The Census of Marine Life was launched in 2000 with the goal of producing the first-ever ocean census by 2010. Two thousand scientists from 82 nations agreed to the mandate to answer three important questions:

- What once lived in the global ocean?
- What is living there now?
- What will live there in the future?

This book deals with the adventures and experiences of the Census of Marine Life and the process of gathering the data, revealing the stories behind the science. The authors detail the most fascinating findings and exciting discoveries—the thrills encountered and the difficulties overcome—all illustrated with fabulous images captured during the project's explorations.

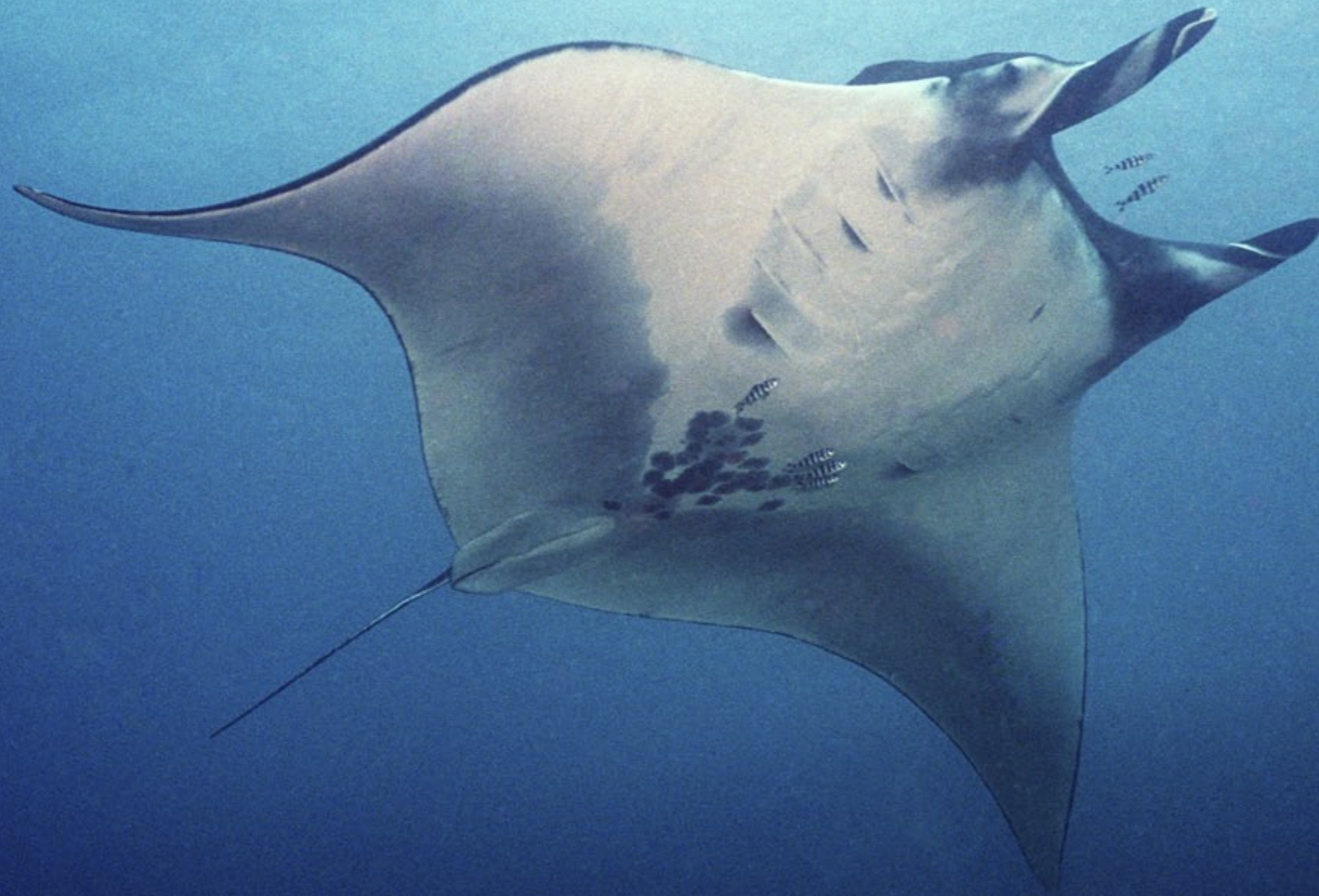
The text readily engages the reader, and the photographs are as beautiful as they are accurate. The information is comprehensive, compelling and current, and it represents an enormous group effort by some of the world's leading scientists.

256 pages, 9" x 11"  
EAN: 9781554074341  
ISBN: 1554074347  
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news

Edited by  
Arnold Weisz



Protecting our oceans

*“Ocean: A body of water occupying two-thirds of a world made for man —who has no gills.” — Ambrose Bierce*

BENGT FRIZELL

The Koster islands off the Swedish west coast are separated by the mainland by a deep fiord, which creates good conditions for a varied marine life

Text by Arnold Weisz

Whilst the largest marine park, The Phoenix Islands Protected Area is backed by institutions such as New England Aquarium and Conservation International, to protect some of the last pristine coral reefs on the planet, the tiny Brazilian state marine park Laje de Santos, relies mostly on volunteer work done by a small group of divers who run the NGO Instituto Viva Laje. Because of its close vicinity to Santos, one of the busiest ports in South America, this NGO is doing a vital job to educate the world on how to care of this little piece of ocean. Norway and Sweden are no strangers to creating protected areas, but this is the first time they venture out into the ocean. The new transnational marine parks are placed on popular tourist areas and near busy shipping lanes, with a rich fauna making them as important to protect as pristine coral reefs in the Pacific. Africa has mostly been known for its safari parks, as a way of protecting the environment. Now the continent may see the benefits of extending their conservation efforts beyond their beaches, in order to save both the marine fauna and the people depending on it. Namibia has launched its first marine park and entered the group of nations who take pride in protecting their marine heritage.

**At the moment there are approximately 5000 marine protected areas (MPAs), located around the world. Still only 0.7 % of the world's oceans are protected this way. They all share a common goal, to protect the sea and land within and everyone who lives within their boundaries. How they actually function, the scope of protection they enjoy, or how research is done, however, differs greatly.**

# The Goliath Amongst the MPA's

Text by Arnold Weisz

**The small Pacific Island nation of Kiribati has become a global conservation leader by establishing the world's largest marine protected area—an area the size of the state of California in the United States—within its boundaries.**

The Phoenix Islands Protected Area (PIPA) conserves one of the Earth's last intact oceanic coral archipelago ecosystems, consisting of eight coral atolls and two submerged reef systems in a nearly uninhabited region of abundant marine and bird life. The major concern for this vast ocean wilderness of pristine coral reefs and rich fish populations is the threat of over-fishing and climate change.

## Historic proportions

Located near the equator in the Central Pacific between Hawaii and Fiji, the nearly uninhabited Phoenix Islands form an archipelago several hundred miles long. They are part of the Republic of Kiribati, which comprises three distinct island groups (Gilbert Islands, Phoenix Islands and Line Islands) with a total of 33 islands to make it the largest atoll nation in the world. On other hand, the total surface of land is only 726 km<sup>2</sup> (280 square miles) and the 410,500 km<sup>2</sup> (158,453 square miles) covers about 12 percent of the nation's exclusive economic zone. Countries like Kiribati have a self interest in slowing down climate change or global warming, as these low-lying islands would be some of the first to vanish into the ocean as water levels rise.

"The creation of this amazing marine protected area by a small

island nation in the Pacific represents a commitment of historic proportions; and all of this by a country that is under serious threat from sea-level rise attributed to global warming," said CI President Russell Mittermeier, as the MPA was formally established in January 2008.

## Joint efforts

Kiribati and the New England Aquarium (NEAq) developed PIPA over several years of joint scientific research, with funding and technical assistance from Conservation International's (CI) Global Conservation Fund and Pacific Islands Program. The CI support for PIPA is part of the Coral Reef Initiative in the South Pacific (CRISP).

"The new boundary includes extensive seamount and deep sea habitat, tuna spawning grounds, and as yet unsurveyed submerged reef systems,"

said Greg Stone, the NEAq vice-president of global marine programs.

As the MAP is a non-fishing area this could also aid in saving a shrinking tuna fish populations. Long-line fishing for yellowfin and bigeye tuna were amongst those who paid US\$26 million per year to use the country's Exclusive Economic Zone (EEZ). This takes a huge toll on a poor nations income, but with aid from other countries, Kiribati will survive both economically and environmentally. ■

## SOURCES:

The Phoenix Islands Protected Area (PIPA) [www.phoenixislands.org](http://www.phoenixislands.org)  
 The New England Aquarium [www.neaq.org](http://www.neaq.org)  
 Conservation International [www.conservation.org](http://www.conservation.org)



DAVID OBURA

CLOCKWISE FROM TOP LEFT: Schooling Baracuda; Table corals; Mating sea turtles

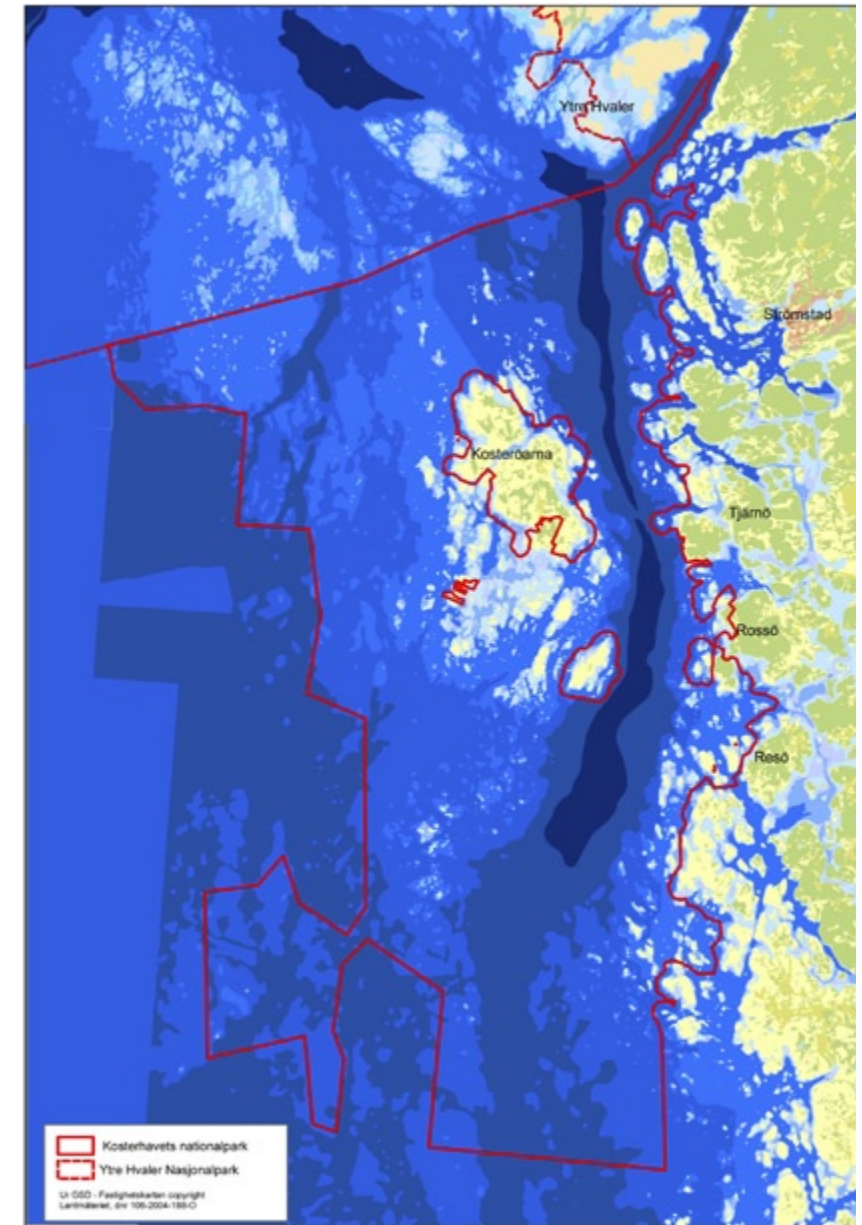




MATTIAS SKOLD



The 247-meter deep fissure fault between the Koster Islands and the mainland is the only true oceanic environment in Sweden, with the highest number of marine species in Sweden



The map shows the extent of the almost 400 km<sup>2</sup> marine park. North of the border with Norway, the Ytre Hvaler Marine Park extends another 354 km<sup>2</sup>. The two parks combined makes this one of the largest protected areas in Scandinavia

# New cross-border MPA's in Scandinavia

**Norway recently inaugurated its first national marine park, and the Swedes will follow in September. The Swedish Kosterhavet national park will connect with the adjacent similar protected area around the Hvaler Islands in Norway.**

Although both these Scandinavian countries have numerous national parks, this is the first time they set aside large areas off their coasts for protection. Both Sweden and Norway have long coastlines, but until now, most of the environmental efforts have been focused on the inland nature. The new marine parks are set up in populated areas, which also are major tourist destinations, but also lie close to very busy shipping lanes. The area

is situated at the north-eastern edge of the Norwegian trench, which connects the Skagerrak with the Atlantic. The major part of the marine area is around 200 meters deep and features a high range of marine biotopes such as soft and hard substrates, kelp beds and shell gravel. The species diversity is considered very high, with more than 6,000 species discovered as yet. The Ytre Hvaler and Kostefiorden area is threatened by large scale impacts such

as eutrophication. Small scale threats for the areas include shipping, infrastructural development and fishing.

## Ytre Hvaler National Park

The Norwegian marine park covers an area of about 354 km<sup>2</sup> on the west side of the Hvaler archipelago close to the Swedish border, at the entrance of the Oslofiord. The marine park includes mostly ocean but also strips of coast on the islands.



MATTIAS SKOLD

The 247 meter deep fissure fault between the Koster Islands and the mainland is the only true oceanic environment in Sweden, with the highest number of marine species in Sweden

The Swedish west-coast boasts a large common seal population, which often are seen sunbathing. They are a bit shy though, and not often seen under water

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Hvaler is the sunniest geographical area in Norway, and combined with Østfold's long coastline, the population consists of mostly summertime vacationers. About 4,700 summer houses, an increasing fleet of leisure boats, and daily visitors contributes to giving Hvaler status as one of the biggest and most popular tourist destinations in the country.

### Kosterhavet National Park

The Koster islands, about 10km to the west of Strömstad, are noted for their beautiful scenery and the center for the new 400km<sup>2</sup> MPA. The islands of North and South Koster are Sweden's most populated westerly islands. About 1,000 people live in or immediately adjacent to the national park. Tourism is a major source of income for the 24,000 people living in the area.

They are surrounded by the Koster Archipelago—a large number of skerries and rocky isles. Kosterhavet (the Koster Sea) is in northern Bohuslän, on the west coast of Sweden bordering Norway. It is a valuable recreational resource and one of Sweden's most popular tourist destinations. Kosterhavet is also home to an important inshore fishery. The marine environment in Kosterhavet is influenced by the Atlantic Ocean and includes habitats and species unique to the area. This has made the archipelago a very popular destination not only for Swedish divers, but also for divers from Denmark, Norway and Germany. Of the 6,000 marine species that have been identified in Kosterhavet, about 200 are found nowhere else in Sweden. ■



BENGT FRIZELL



news

Edited by  
Arnold Weisz



# Brazilians Tagging Manta Rays

Text by Arnold Weisz

**The Brazilian NGO Laje Viva is part of a world-wide manta ray tagging project by the Foundation for the Protection of Marine Megafauna. Together they are trying to get a better look into the hidden life of these gentle giants.**

We met with Dr Andrea Marshall from the Foundation for the Protection of Marine Megafauna, the Manta Ray & Whale Shark Research Centre, Mozambique, and the Instituto Laje Viva in São Paulo,



RICARDO FERES

No mantas rays sighted on this trip, but everyone's still hopeful. From the right: Guilherme Kodja Tebecherani and Ana Paula Balboni Pinto both from Laje Viva, then Dr Andrea Marshall and Richard van Huyssteen from the Manta Ray & Whale Shark Research Centre

Brazil during her three-week visit as a part of a world wide manta ray tagging project. In addition to diving at the state marine park, Laje de Santos, much time was spent exchanging information with the local NGO and doing presentations about manta rays both in Santos and São Paulo city.

**Cross continent cooperation**

The Viva Laje Institute is run by a small group of divers who eventually have also become lay marine biologists, and are doing important work in the marine park on their free time. The Instituto Laje Viva did not hesitate when they got the opportunity to work with Marshall.

"We were looking for spots on four continents to tag mantas. Searching for suitable places, I came across a research paper made by a group of people at the Laje Viva. The site itself, but also the NGO, looked as if it could have a potential to study mantas," said Marshall.

The Brazilians had been studying their manta ray (*Manta birostris*) population for several years already and also produced a scientific paper, *Seasonal occurrences of Manta birostris* (Chondrichthyes: Mobulidae) in southeastern Brazil, by Osmar J. Luiz Jr., Ana Paula Balboni, Guilherme Kodja, Mauricio Andrade and Heloisa Marun.



DR ANDREA MARSHALL

Manta rays are the largest winged creatures on the planet, but we know very little about their movements. The tags used in this project were developed by Dr Marshall and the Manta Ray & Whale Shark Research Centre

Manta with satellite tag (left)

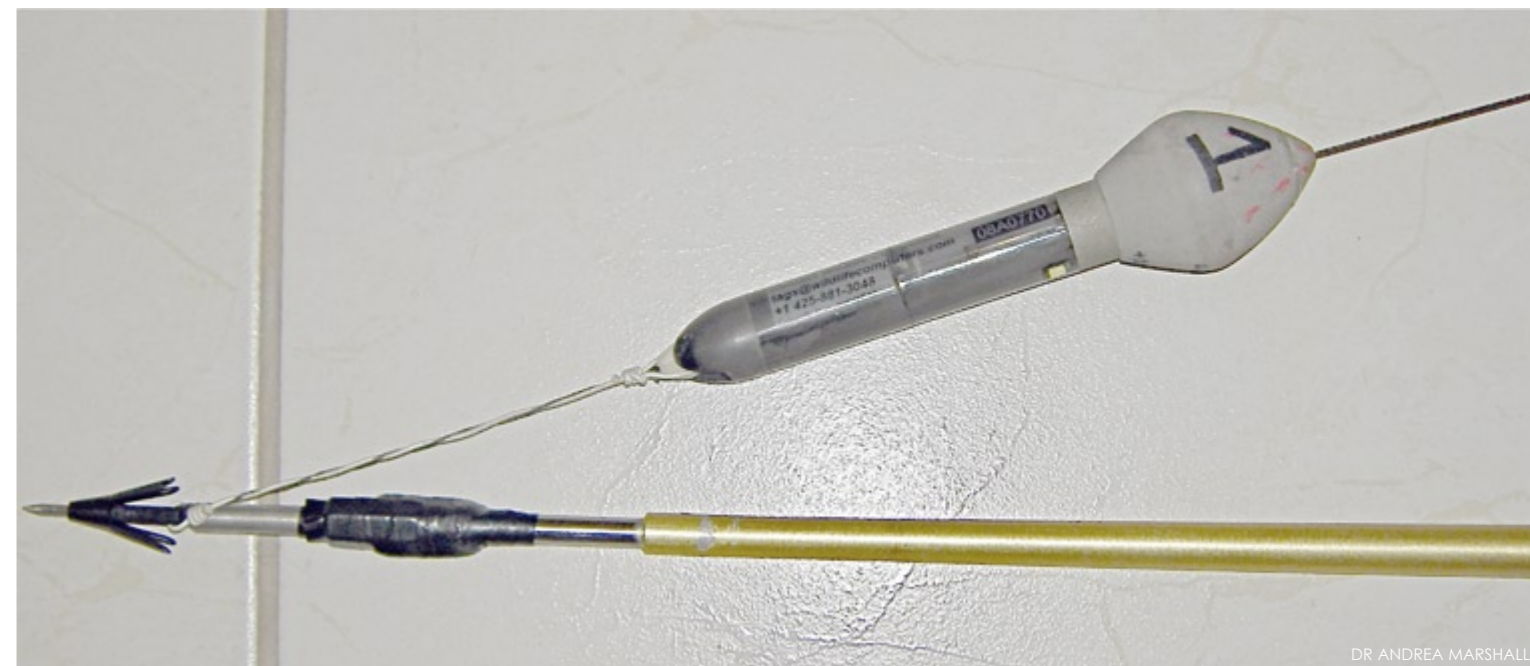
The first manta rays were tagged off Mozambique, and Brazil was the second location. Another two locations are also in planning.

"We are continuing our efforts to genetically sample and compare populations around the globe to better understand their movement patterns and relatedness," said Marshall.

**Tags waiting for mantas**

Even though Marshall didn't encounter any manta rays during her stay in Brazil, the project will continue with the help of Instituto Laje Viva.

"I've received training and will try to attach the two tags allocated to us during this manta season," said Guilherme Kodja Tebecherani.



DR ANDREA MARSHALL

The satellite tags are completely harmless to the manta rays, and release themselves after 3-4 months

There is an agreement in place for exchange of information on the manta rays between Mozambique and Brazil. The two tags are important in hope they can reveal some important information about the mantas that visit the small Brazilian marine park. Not only about the

local population in general, but also if these mantas are part of a wider population structure, and interacting with other manta populations.

"This is the first step. If it works well, we'll do more. The tags are programmed to record information from 100 to 110 days. And as soon as they detach from the mantas and return to the surface, they will upload info to us," said Marshall.

Tagging is not the only way to study and track manta ray populations. Non-intrusive underwater photography is being used for the majority of the study.

Each animal sighted on the local reefs is identified by a 'fingerprint' of markings on their ventral surface as well as by distinctive scars. Once an individual has been identified, their details are logged in a computer database, and their re-sightings tracked over time.

"We have taken a lot of photos over the years for our photo identification project," says Guilherme.

### Manta rays in Brazil

Manta rays are usually seen and photographed by recreational scuba divers

in south-eastern Brazil, especially in the Laje de Santos Marine State Park (Parque Estadual Marinho da Laje de Santos), a popular dive site from where most of the reports from Brazil about these rays originate. According to an analysis by Instituto Laje Viva of 79 underwater photographs, *Manta birostris* gathered over a period of nine years in a marine protected area in south-eastern Brazil suggesting a high predictability of manta ray occurrences in the region during the austral winter (June–September). The reasons for this are probably related to the seasonal

oceanographic conditions, as characterized by the presence of a coastal front at the study site in winter and consequent plankton enrichment, which provides a feeding opportunity for manta rays. In addition, a melanistic individual in the Atlantic Ocean that is similar in color to the Pacific Ocean's "black manta" was reported for the first time.

### On the web:

Manta Ray & Whale Shark Research Centre, Mozambique  
Instituto Laje Viva

Manta rays usually show up during the southern hemisphere's winter in June–September at the Laje de Santos state marine park, off Sao Paulo, Brazil





news

Edited by  
Arnold Weisz



UTE VON LUDWIGER/NAMIBIA TOURISM WWW.FOTOSEEKER.COM

# Namibia's first Marine Protected Area launched

Text by Arnold Weisz

The MPA's are going to be a part of the more extensive Namib-Skeleton Coast National Park (NSCNP). In total the NSCNP borders onto over 14,000 square kilometers of land and sea, which is managed primarily for wildlife biodiversity, conservation and tourism.





DAV HUMPHREYS/NAMIBIA TOURISM - WWW.FOTOSEEKER.COM

The Namibian coastline is dominated by weather worn sandy beaches. Gale force winds and heavy surf are normal

PREVIOUS PAGE: The Namibian coastline, known as the Skeleton Coast, holds many stories of human drama and shipwrecks. Remnants of these stories are still visible in the sands and sea

The Namib-Skeleton Coast National Park (NSCNP) has an extension of about 1,570 km, from the Orange River in the south to the Kunene River in the north. The new Coastal and Marine Protected Area (MPA) off the Sperrgebiet and Namib-Naukluft areas, runs 400km up the coast and is about 30km wide. The MPA will cover an area of 12,000 km<sup>2</sup>, containing all of Namibia's ten islands. These are Hollamsbird, Mercury, Ichaboe, Seal, Penguin, Halifax, Possession, Pomona, Plumpudding and Sinclair. Also included in the MPA are Neglectus islets, Marshall, Boat Bay, Albatross, Staple, Dumfudgeon, and Ladies north and south rocks, as well as Long Island north and south. This enigmatic and poignant coast—the Coast of Skeletons—contains many shipwrecks, the bones of early mariners as well as those of whales and seals.

### Greatest conservation effort

The protection and regeneration of marine resources are priority issues for coastal states,

in particular, Namibia, whose marine resources contribute considerably to the socio-economic welfare of the country. Moreover, the global fish stock collapses and possible negative ecosystem effects from mining and fishing activities has resulted in steps taken to establish Marine Protected Areas in Namibia.

Besides keeping ecosystems like fish stocks intact, there is also the need to protect species that are not part of the commercial marine resources. Breeding in the waters of the Namibian Islands' Marine Protected Area are the Southern right whale and Heaviside's dolphin (Benguela dolphin), with the Humpback whale also migrating to the area. Also, dusky dolphin, mink whale and killer whale, or orca, can be seen here regularly.

The proclamation of this protected area represents one of Namibia's greatest conservation achievements since gaining independence in 1990, and one of the most exciting developments in the history of conservation in this country. ■

There are several large sea lion colonies along Namibia's Skeleton Coast. The Namibia colonies, being on land, they allow visitors a close-up look



DAV HUMPHREYS/NAMIBIA TOURISM - WWW.FOTOSEEKER.COM



NAMIBIA TOURISM - WWW.FOTOSEEKER.COM





# whale tales

Edited by Peter Symes

## Whale-watching is 'worth billions'

*Worldwide, the whale watching industry now generates about \$2.1bn per year*

**Whale watching generates far more money than whale hunting, according to a report commissioned by the International Fund for Animal Welfare (Ifaw)**

The report follows on the heels of an analysis commissioned by another organisation opposed to whaling, WWF, which suggested that the Japanese and Norwegian hunts were a net cost to their governments.

"Whale watching is clearly more environmentally sustainable and economically beneficial than hunting, and whales are worth far more alive than dead," Patrick Ramage, director of Ifaw's whale programme, told BBC News.

Worldwide, the industry now generates about US\$2.1bn per year, it says in the report compiled by the Australian organisation, Economists at Large for Ifaw. In 2008, it concluded that 13 million people went to sea to watch cetaceans in 119 countries. ■

# Southern Right whales return to breed in Tasmanian waters

**Scientists have confirmed that for the first time in 200 years Southern Right whales are again migrating to Australia to give birth in waters in Tasmania.**

In mid August, a mother and newborn calf were spotted in Great Oyster Bay near Swansea on Tasmania's east coast. Scientists examined the photographs, and confirmed the calf was no more than two days old, which meant it had been born in local waters.

Marine biologist David Pemberton said the confirmation that the recently sighted calf was born in Tasmanian waters was critical to the ongoing recovery of the species, which became scarce after excessive whaling in the early 1800s. There are approximately 1,500 of these whales that migrate to Australia each year out of the estimated 60,000 in the world.

"There have been mother-calf pairs reported for quite a few years, but we needed scientific proof they were breeding in this area. We finally got that today, so it is very exciting," Pemberton told The Times.

Tasmanian waters were once a key breeding ground for Southern Rights during the early days of European settlement. However approximately 1,000 Southern Rights were killed in the island's bays every year during the early 1800s, and by 1842, they had become commercially extinct.

Pemberton said going by historical records, right whales preferred to congregate in large groups. He predicts that as numbers re-

cover, large gatherings in Tasmania's bays could become a major Tasmanian tourism asset.

"Now the calving pairs have been appearing here over several seasons we are happy to say, it's a regular occurrence," Pemberton added.

It is important for people not to get too near to right whale mothers who were shy at the best of times and tended to be nervous about their babies. ■

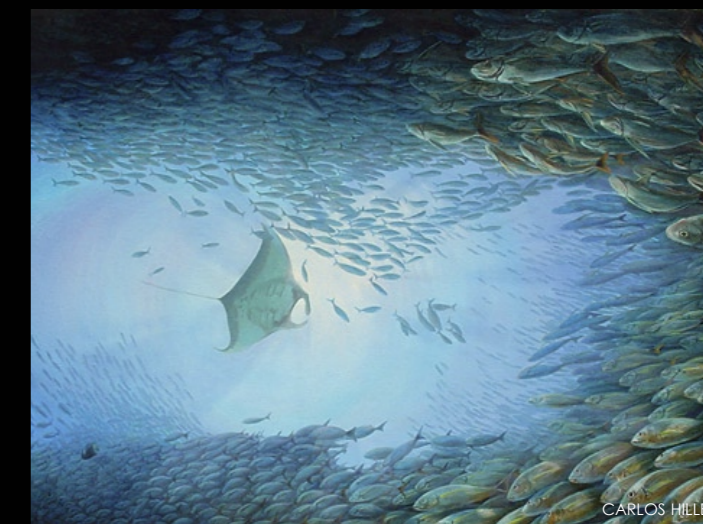
A mother and baby southern right whale off Swansea. Sightings of whales with calves have raised hopes that whales are returning to Tasmanian waters to calve



DEPARTMENT OF PRIMARY INDUSTRIES, PARKS, WATER AND ENVIRONMENT / DAVID PEMBERTON

## A Percent for the Ocean

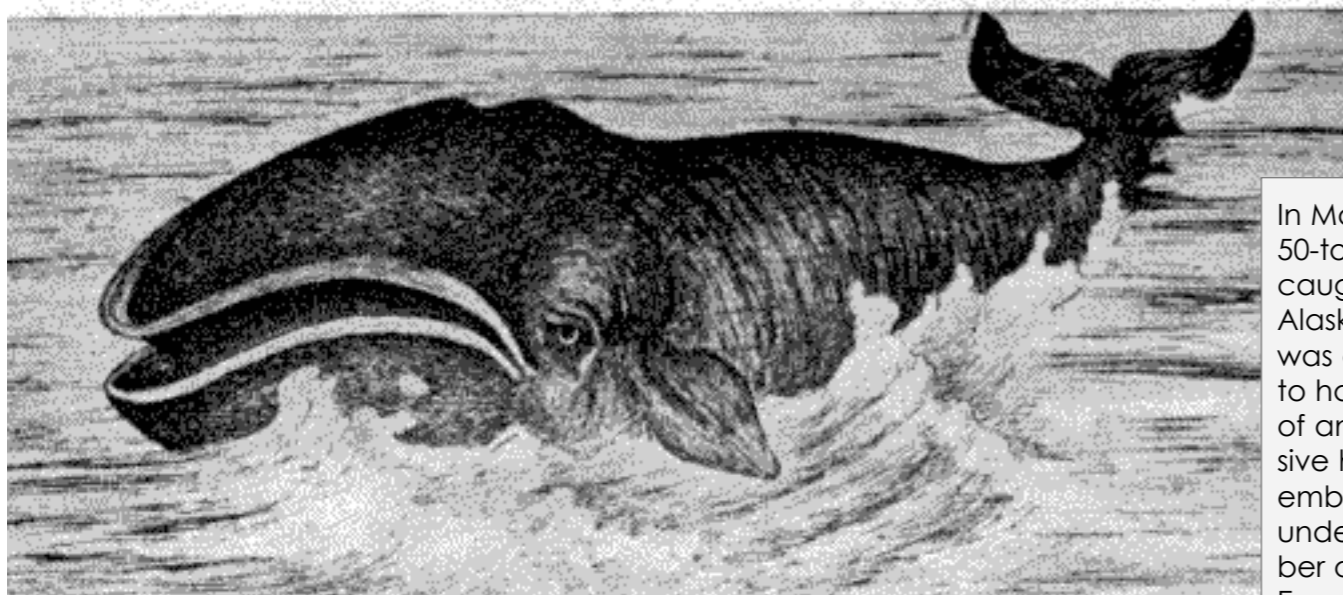
Carlos Hiller is a painter of ocean light and life



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In May 2007, a 50-ton specimen caught off the Alaskan coast was discovered to have the head of an explosive harpoon embedded deep under the blubber of its neck. Examination determined the 3 1/2 inch arrow-shaped projectile was manufactured in New Bedford, Massachusetts, a major whaling center, around 1890. This proof that it survived a similar hunt more than a century ago indicated to researchers that the whale's age was between 115 and 130 years old. ■

## Atlantic and Pacific Bowhead Whales meet and mix

The Atlantic population of Bowhead whales has pulled back from brink of extinction after establishing contact with their cousins in the Northern Pacific thanks to the opening of the Northwest passage, which for the first time in 125,000 years, is now ice free for part of the year.

Researchers from the University of Copenhagen doing field studies in the Bay of Disco on Greenland noticed that bowhead whale songs, which are

already more complex than that of other whales, had become 'bilingual' with elements of songs stemming from both the Pacific and Atlantic populations. Different songs or sounds get mixed together, which is a phenomenon not observed with other baleen whale. The bowhead whales change the songs from year to year and never repeat songs from earlier years, explains graduate student, Outi Maria Tervo, who is supervising the study. ■

## Killer whales also visit 'social clubs'

**Killer whales create and visit social clubs just like people do, scientists have discovered. Orcas, which normally live in smaller groups, also form huge superpods in which the killer whales form and maintain social ties.**

Fish-eating killer whales (*Orcinus orca*) in the Avacha Gulf, off the coast of Russia live in stable

groups called pods that contain an average of ten individuals. But researchers have seen up to eight of these pods coming together to form large groups of up to 100 animals. These large aggregations of pods have also been observed in British Columbia, Alaska, Iceland and Antarctica.

It is unlikely that the whales gather for protection, as they have no natural predators, and researchers found that the whales rarely forage and feed when they gather into a much larger super-

pod.

However, the killer whales did interact much more during these large gatherings, which lasted from a few hours to almost half a day. When meeting killer whales from other family pods, they made contact with each other, swam in synchrony and rubbed flippers much more often, the researchers found. Sexual activity also increased, suggesting that these big aggregations provide a chance to assess potential breeding partners. ■

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tech talk

*The fine art of conducting*  
**Extreme Exploration Dives**



Text and photos  
courtesy of Pascal Bernabé  
Translation by Mathias Carvalho  
Edited by Peter Symes

## How to master the complexities of extensive explorations of underwater caves and other overhead environments

Our case story will be a recent actual exploration where the dive profile posed a few challenges:

- Distance of 700 meters from the entrance to the end point
- The depth of 164 meters at the beginning of the actual exploration and 186 meters at the end
- Duration of the dive, which including deco stops, required a run time 9 hours and 46 minutes submersed.

However, even if this specific dive profile presented us with some exceptional challenges, it wasn't fundamentally different from other technical dives in terms of safety and logistic considerations. We do our preparations and make plans in which we try to reduce the number of unknown factors as much as possible.

In technical diving "what if..." and "plan your dive and dive your plan" are all basic mantras. It is only the magnitude of the undertaking that changes as well as the levels of complexity. Even for a practiced tech diver, who routinely dives his twin 12-liters tanks and uses ready made tables, dives like this are much more complicated.

### Preparations

#### 1. Defining objectives and means.

In this case, the objective was to explore an underwater cave that would take divers beyond the depth of 164 meters before they made it to the end. In this case, we planned as if we were diving to

a depth of 200 meters and ranging more than 700 meters from the entrance. On the actual dive date, we may then find that these preset definitions of depth and time do not match up with the actual diving profile, mental and physical fitness, and the equipment at hand. This leads to postponements and delays, which may run into a year, or at least several months of waiting, which is often the case. It is thus necessary to stay fit and keep practicing all the relevant technical skills. In this case, I kept up a regular schedule doing many speleological/cave dives where I could rehearse practice stage and travel procedures as often as possible, as well as practicing deep and rebreather dive profiles.

In the beginning of May, we found ourselves in Egypt. After one week of diving between 50 and 100 meters deep with stage and trimix, I had also made five dives to depths between 65 and 180 meters on rebreather in order to build some routine with real deep dive profiles and to test the 150 meter barrier.

Physical fitness training was not an issue, as I practice every year around 4-5 times a week by running, swimming and bicycling, so I simply took a nice break the week before the actual dive.

### Knowing the location

This cave is quite the labyrinth and has several levels. So, it is a good thing I knew it rather well. A year ago, I first dived it to a depth of 60 to 90 meters before going down to 150 meters. And the week before the dive, I had returned with a rebreather,





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going to the 70-meter mark, just to memorize the route, using a scooter, to avoid wasting time when we were going to do our exploration. Needless to say, I had also gone over the available topographic information and reports from previous dives in order to get a clearer picture of equipment load during the dive, restricted passages, currents (what if it rains the preceding days?), visibility and necessary permits. In nature, it is not any different from when you check the weather forecast, prevailing currents and swell before you go on a dive in the ocean.

### 2. Choice of equipment

The choice of gear must reflect the depths and environmental hazards. For example, when I did my 330-meter dive, it was obvious to go with an open circuit system, since I had never been beyond 150m on a rebreather. And no one has ever gone deeper

than 270 meters on a closed circuit rebreather. On the other hand, the closed circuit system (or semi-closed circuit) is the latest trend amid serious underground exploration dives for a number of good reasons:

- greater autonomy
- greater gas economy
- breathing a much less colder gas
- less tanks to manage
- Possibility for using helium—in the form of heliox—for the entire dive, significantly improving the decompression profiles.

My Voyager dive computer has a battery life of at least seven hours, making it possible to complete the entire dive, starting from the entrance until the bell-area. My other technical option was to stick with the usual open circuit system with complete redundancy.

We had to bring a few 20-liter tanks inside the cave, between the depth of 110 meters, which was 600 meters

inside the cave, and the dive bell at 12 meters. It was a bit heavy, but in case of a complete failure of the closed circuit, it would have allowed me to make it back to the bell area from the deep end. This also permitted the team to familiarize themselves with the cave.

The scooter or, as it is appropriately termed, the Diver Propulsion Vehicle, was also a requirement because of the distance to be traveled. Several trips starting from the deep end, which was 500 meters from the entrance, helped me to select a model that can really tow, rather than a lighter one. The former, although a little less speedy, seemed to me to be more maneuverable inside that particular cave.

### The deco stations

The possibility of mounting a deco station was extensively used. The choice was between a mobile deco station—suspended between 11





and nine meters deep and then again at six meters—or a fixed deco station at six meters, which is much simpler. The mobile option was then chosen, as it was capable of staying dry and hot twice as long, which in this case, meant almost four hours instead of the two hours offered by the fixed option.

### Decompression strategy

The dive profiles were simplified as much as possible, so we opted for a short one and a long one, for a depth of 180/200 meters at the bottom, which was already very complex with its several levels and a great end depth. As an additional option, we could use a set of a set of more conventional tables and two multi-gas computers, one connected to the rebreather to deal with all the intermediary situations.

Simplicity is preferred even if it

demands hours of calculations for different profiles and using different software. With the calculations for depth and time completed, we opted to go with the “full helium” option which only had 6% nitrogen without a second thought. Even the bailout plan an open circuit system had a maximum level of 30% nitrogen.

We had full sets of tanks with standard deco mixes O<sub>2</sub>/He 20/50, 40/30 and 60% O<sub>2</sub> which were thoroughly analyzed, marked twice and pressure verified. Also clips sets, and speleological cable keepers for the ropes were checked.

For the sake of safety, we also had to consider the situation where we had to perform the dive on open circuit systems and not rebreather. Did we have enough of each mix? For each depth, we had to calculate what was needed with an acceptable level of security.

Thermal insulation was taken care of

by a drysuit with Thinsulate 300 undergarment. The diving bell was mounted at 11 meters, and since the ambient temperature was 18°C, it wasn't necessary to heat the habitat.

### Provisions

Dealing with dehydration is paramount to ensure proper decompression—we can never drink too much. Lots of water with a bit of fructose and an isotonic salt mixture is ideal. Fruit juices or energy drinks can also be used but with moderation, as the last thing you would want is nausea. Hot drinks such as light sweet teas or soups are also suitable. During long dives, it is also important to eat to keep up the energy. Energy bars are fine, also nut paste or cocoa, but go easy on the sweets. Put pastes and creams into tubes or syringes. And don't bring ham, or other meat products, into the dive bell.







**Team**

Stay with the same team if possible. It is important to know each other well and how you act under water. In our team, we are all multi-taskers, but each one of us is also a specialist on some area. For this specific dive, I had part of the team who assisted me at my record dive to 330 meters.

Each member dove both according to their qualification levels and their role in providing assistance during the dive such as:

- placement of safety and decompression tanks
- helping the deep divers get in the water
- assembly and handling of the diving bell

*Stay with the same team if possible. It is important to know each other well and how you act under water.*

- deep diver assistance during decompression until the end of the dive (comfort, information assessment, food, re-hydration, photography, etc.)

During planning, we delegate roles and responsibilities and some will be tasked with very special roles, which they will focus entirely on throughout



the dive.

The person in charge of surface management has a lot of particular responsibilities:

- Make decisions.
- Manage the chain of support divers while keeping tabs on the deep diver. Each support dive will be planned according to each particular deco planning.
- Manage safety and possible variables, in case a problem should occur such as longer dive time than planned, evacuation, decompression, drifting in open sea drifts as well as having prepared or evaluated the weather forecast, communications, medical assistance and an evacuation plan.
- Manage the boats if the dive occurs at sea (crew, available anchorage, dif-

ferent types of vessels, etc.)

For that purpose, we used a list of participants and material, as well as the deep diver's runtime as planned.

*On the big day, having everything properly planned and rehearsed will pay off, help ease the stress, and aid the visualization during which we review all stages to be followed during the exploration.*

Managing it all is no mean task.

**During the dive**

On the big day, having everything properly planned and rehearsed paid off, helped

ease the stress, and aided the visualization during which we reviewed all the stages to be followed during the exploration.

Once the process had begun, people were usually less stressed and always very focused on the different technical tasks ahead. All equipment was checked one last time, and after performing bubble checks at the surface, we commenced our descent.

We left the diving bell and its reassuring shape behind us, took up the safety tanks, and piloted the scooter. After 500 meters, we dropped the scooter and let ourselves glide along successive wells between 60 and 114 meters deep, taking the opportunity to descend a little deeper to the two remaining safety stations at 60 meters, 75 meters and 114 meters respectively.





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I appreciated Stéphane's re-equipment handwork while I appreciated my companions' work at storing the safety tanks. After some 40 meters, it was then a great pleasure—and one that made all the preceding months of tedious preparations worthwhile—to go beyond 164m and enter the "terra incognita" as we went into the uncharted gallery. We frequently checked the rebreather's oxygen partial pressure, dive time and depth. As we carefully reeled out our lines, we kept an eye out for the next opening. We passed 170 meters and went along a long ledge. We reached 180m and another flat surface that gradually

leads us up to a dead end at 168 meters. The next area would probably be at a much higher level. Next time perhaps... Facing more than eight hours of deco time, we turned around and went back at a slow pace, taking the opportunity to scrutinize the fault with the powerful 21 watts HID Green Force torch, which made everything as bright as daylight. Since we were still on the first stage of the return, we reduced our ascent rate even further to just three meters per minute when we reached 132 meters. Despite being 600 meters from the entrance, we felt as well as being at home. Our return was very slow, as it was sectioned into short deep stops and we

were busy going into all the nooks and crannies. At 54 meters, we recovered the scooter and the third relay, then faced recompression ahead. A while afterwards, Fred was the first to return followed by David, Patrick, François and his equipment. Another 12 meters and it was already time to re-enter the diving bell. It was Marc, Josep, Henri and Michel who manned the relay, along with François and Tono, as always. After four hours inside the diving bell, I surfaced an extremely happy man. The whole team was eagerly awaiting our accounts from the depths, my opinions and the prospects of going there themselves—because wathair dive as well.

*...it was then a great pleasure—and one that made all the preceding months of tedious preparations worthwhile—to go beyond 164m and enter the "terra incognita" as we went into the uncharted gallery.*

It is important to acknowledge and savor the accomplishment and never forget that it is the result of good teamwork. At this stage, we usually drift already into planning the next dive, even in the cases where we had a disastrous dive and had just been swearing to ourselves never to do it again. In any case, it is important to learn a lesson from each dive. In this case, for example, we felt afterwards that we could have done with a lighter load of equipment in the cave, in particular, the safety tanks.

**The downside**  
We didn't use the rebreather to its fullest potential. There were too many equipment pre-car-

After the dive

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ryover dives, over the entry area, which was very easy to reach. We should have left some safety/deco tanks between 30 and six meters, which were very easily installed while setting up the diving bell—then, why burden the team?

The use of a dorsal redundant rebreather (two totally independent closed circuits) and a third side rebreather left safely, for example, with the scooter at 54 meters would have prevented long, deep and tiresome carryover dives, while allowing for a triple safety measure. And even more safety at every point along the way as we approached the exit.

The re-equipment dives were left in place, which, when needed, would be eventually used as an added safety measure.

### The positive

- We used only 60 bars of trimix during almost six hours of dive time, outside the diving bell (wings included). The rebreather option allowed for cutting down to half the number of carryover trips and tank loads inside the cave.
- The decision of using a mix close to heliox (only 6% nitrogen to counter the onset of High Pressure Neurological Syndrome) avoided having to pay a small fortune, and eliminated the fear of helium freeze, since the

gas breathed in the rebreather would be warm. Also, at 186 m, we could enjoy having completely clear minds and the total absence of narcosis as well as exiting the water in a refreshed state after a dive lasting nine hours and 46 minutes.

Going with the “full helium” option must therefore be considered for validation.

The usage of the mobile diving bell enabled us to stay warm, talk during decompression and eat proper

*The usage of the mobile diving bell enabled us to stay warm, talk during decompression and eat proper food rather than sit with a second stage stuck in our mouths for four long hours.*

food rather than sit with a second stage stuck in our mouths for four long hours.

The equipment was chosen for its performance characteristics and reliability. It was a key point for

the success of this undertaking. The equipment included the high performance Apeks XTX 50, 100 and 200 regulators. An Aqualung Legend was on the rebreather (with oxygen, air and trimix diluent feed) and on the open circuit for the safety trimix. This setup is used by the majority of British cave divers and was used for my dive to 330 meters with no problems whatsoever.

The gear also included a very warm Arctic 330 Thinsulate undergarment. Credit also goes to the Green Force Tri star LED torch with its long lasting power, a 21-watt HID over the hand mount, and safety torches. The whole set was devel-

oped for a 500-meter beam and tested in a hyperbaric chamber at 350 meters. We used a D9 Suunto wristwatch, which matched our depth up to 200 meters and was ideal for a very precise runtime.

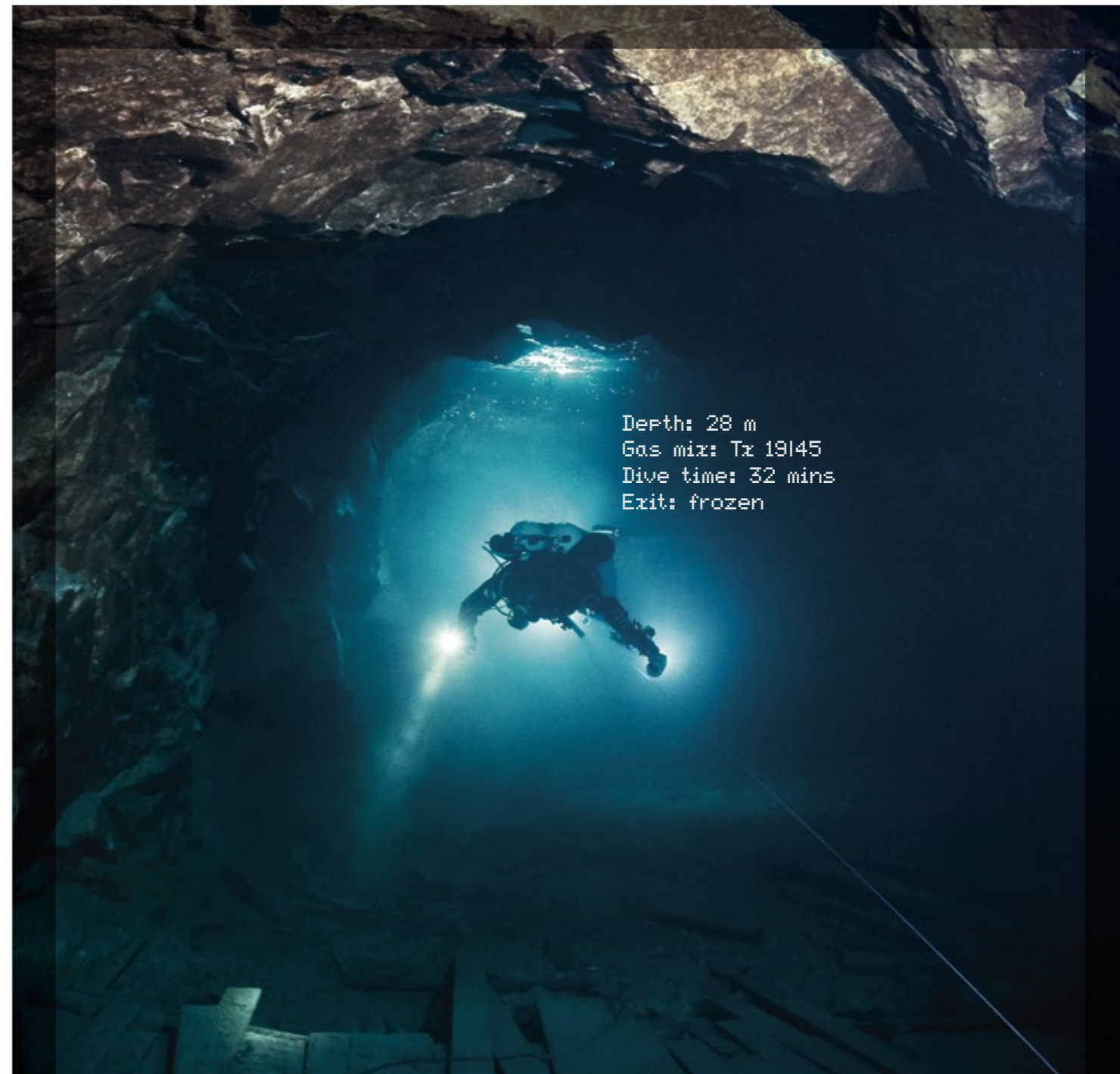
An unmodified Aquatek Voyager manual closed circuit rebreather was also an important piece of equipment. During the planning phase, I enquired with the manufacturer about the model’s limitations—not only theoretical ones, but those tested in hyperbaric chambers and/or during assembly. It tested to at least 240 meters for the O<sub>2</sub> feed and 300 meters for the triple PPO2 electronic control.

Setting the limit for this dive to 200 meters left me a large margin. I have tested the equipment at progressively greater depths, 111 meters (wreck), 177 meters (reef), 150 meters (cave), 180 meters (at sea at Dahab), 186 meters (cave).

Thus, the next step will be using dorsally mounted redundant equipment with totally independent circuits giving ten hours of autonomous operation. Another laterally carried set will be carried clipped on, so it can be left behind as a safety set for the return trip.

### Acknowledgements

A thousand thanks go to the great team members (well-known folks!) Fred Badier, Henri Benedittini, David Bianzani, Philippe Bompa, François Brun, Christan Deit (Northern Catalan), Stéphane Girardin (Swiss), Josep Guarro (Southern Catalan), Sophie Kerboeuf, Kristian Rouannet, Jean Luc Soulayres, Marc Thène, Patrick Tonolini, and Michel Ruiz. ■



Depth: 28 m  
Gas mix: Tx 19/45  
Dive time: 32 mins  
Exit: frozen



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Edited by  
Bonnie McKenna



## Marine turtles gain protections

**The Gulf of Mexico Fishery Management Council has taken its final step in an effort to protect marine turtles from the bottom longline sector of the Gulf of Mexico reef fish fishery.**

The council voted to close all bottom longline fishing shoreward of 35 fathoms (approximately 210 feet/64 meters) from June to August and to restrict longline fishing from all vessels that have a history of catching at least

40,000 lbs/18,181 kilos of reef fish each year. They also established a limit of 1,000 hooks on board during any fishing trip and a limit of 750 hooks rigged for fishing at any time on any vessel.

David Allison, senior campaign director of Oceana said, "Today's vote is a signal from the Council that it's possible to craft fisheries management plans to protect threatened and endangered sea turtles while maintaining viable commercial fisheries."

The decision has been sent to the National Marine Fisheries Service (NMFS) for an assessment of whether

the fishery operating under the new system would jeopardize the continued existence of loggerhead turtles.

NMFS issued a new status review of loggerhead sea turtles worldwide. Both the Northwest Atlantic and North Pacific loggerheads were identified as "currently at risk of extinction". Oceana is calling on the NMFS to uplist the populations to "endangered" under the U.S. Endangered Species Act. This news comes after preliminary data from the state of Florida showing 2009 to be one of the worst sea turtle nesting years on record. ■

## Leatherback turtle nests on North Carolina Beach

**For only the second recorded time in all of North Carolina, on Wednesday, July 8, a leatherback turtle nested on Carolina Beach.**

Carolina Beach Police Officer, Wray Lefler, was the first to notice the tracks in the sand.

"I knew it was something out of the ordinary," Lefler said.

Lefler reported the find to Nancy Busovne, Carolina Beach coordinator of the Pleasure Island Sea Turtle Project. "It looked like a small tractor had come up the beach," she said. Because of the decoy eggs left on top of the nest Busovne said it belonged to a leatherback.

The nest site has been blocked off

with orange caution tape. In about six weeks volunteers will standby around the clock waiting for the eggs to hatch and guide the hatchlings safely into the sea. ■



# Loggerhead turtle at risk of extinction

Populations of loggerheads on both the Pacific and Atlantic coasts are at risk of extinction, according to the U.S. National Marine Fisheries Service (NMFS). Pacific loggerheads, which nest in Japan and migrate to Hawaii and the West coast of the United States, are being decimated by coastal fisheries off Japan, Mexico and longline fisheries in the deep seas.

The fisheries service report followed nine loggerhead populations across the world. Experts with the Loggerhead Biological Review Team studied each population to access its status. Of the nine populations, only two—one in the Southwest Indian Ocean and the other in the South Atlantic Ocean—were not at risk of im-

mediate extinction. The populations in the North and South Pacific are at risk of immediate extinction.

In May 2009, the Center for Biological Diversity and the Sea Turtle Restoration Project filed a federal complaint claiming the U.S. Fish and Wildlife Service and the NMFS have violated the Endangered Species Act by not increasing protection for threatened and endangered marine turtles.

*Buying six species of fish has caused the death of hundreds of loggerhead sea turtles*

Flounder, scup, black sea bass, Atlantic mackerel, squid and Atlantic butterfish are caught by methods that kill hundreds of loggerhead turtles, according to the conservation group Oceana. Fishermen targeting these fish in the Atlantic are using trawl nets. Trawl fisheries operate by towing funnel-shaped nets through the water and along the seafloor. The trawls are unselective; they capture anything that is too large to escape through the nets. Turtle extruder devices (TEDs) are only required when fishing for summer flounder at certain times of the year and in certain locations. Nothing is required for the protection of sea turtles when fishing for the other five fish species. ■

## Loggerheads have returned to Andalusia, Spain

Thanks to a reinsertion program implemented by the Superior Council for Scientific Research of the Board of Andalusia (CSIC) a total of 240 *Caretta-Caretta* (loggerheads) that were born on the beaches of Cabo de Gata-Níjar National Park in Almeria last year have now been allowed to go to sea. The turtles were born from 400 eggs that came from the island of Boavista, in Cape Verde, and placed on the beaches of Cabo de Gata, last September, by the CSIC.

"The research aims at verifying the possibility of reintroducing this species to the Spanish coast, and the results show that there is a lot to hope for," said Adolfo Marco, director of the program.

After hatching last year, the hatchlings were kept in a protected environment to allow

their shells to ossify giving them a higher level of protection before going to the sea. It is hoped that in 14 to 15 years they will return to deposit their eggs on the beaches of Almeria where they were born.

This year 500 *Caretta-Caretta* eggs were transferred from Cape Verde, 350 will be deposited in five nests on the beaches of the park, the rest will be put into monitored incubation at the Biology Station of Donana Park in Andalusia and at the Munejar Aquarium, which reproduces a Mediterranean habitat. The objective of the project is to widen the nesting area significantly, compared to its current size, given that the *Carretta-Caretta* turtles deposit eggs exclusively on a 50 km area of the Boavista coastline.

The primary threats for the young turtles are hunting and egg predation.

All of the turtles that have been released are equipped with a microchip and an ultrasound device that allows the hatchlings movements in the sea to be followed.

### *Anguilla establishes a sea turtle conservation project*

The Anguilla National Trust (ANT), through its newly established Anguilla Sea Turtle Conservation Group will be holding a public meeting with individuals interested in sea turtle conservation. Interested individuals should contact Janeczka Richardson at the ANT office.

Anguilla is one of the Leeward Islands in the Lesser Antilles. ■

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# Seasonal Migration *of the Leatherback*



It takes a year for the turtle to travel the 7,000 miles from the nesting beaches in Indonesia to the nutrient-rich waters of Monterey Bay. This is the longest migration documented for any in-water vertebrate.

The leatherback migration pattern has only been discovered and documented within the past decade. DNA analysis of the turtles showed that local leatherbacks are part of the same genetic stock as those nesting in Indonesia, Papua New Guinea and the Solomon Islands. This led to the theory that the western Pacific turtles must be traveling the distance to forage in local productive waters.

Scott Benson, marine ecologist for NOAA at the Southwest Fisheries Science Center, began capturing leatherbacks in Monterey Bay and along the west Pacific nesting beaches and releasing them with transmitters.

"They start arriving in June," said Benson. The turtles will remain there until mid-to-late October when the jellyfish density decreases. They then move off toward Hawaii, then return to California the next season.

"They may do this two or three times before they bulk up enough to make the voyage back to nesting beaches," Benson added.

## Not all jellyfish are equal

In the eyes of the leatherback, not all jellyfish are equal. The objects of their feast are the brown sea nettles. With

the help of Jim Harvey, advisor for the Vertebrate Ecology Lab at Moss Landing Marine

Laboratories, a time-depth video recorder was developed that could be suction-cupped to the turtles back. With the lens positioned close to the turtles head, researchers could view the turtle's prey field.

"The time-depth recorder changed our energetic model for these turtles," said Harvey. "We assumed they ate the whole jellyfish. But we found that as they come up, they use their heads to shove the tentacles and arms out of the way to get underneath the bell to the gonads and stomachs...that is what they are eating.

"In the bell there is a lot of water. And the arms, tentacles, gonads and stomachs are one-and-a-half to two times calorically more rich than the bell," Harvey added.

The question is: Does this high-energy feast provide enough nutritional pay-back to make the 7,000 mile migration worth it? It is theorized that the energetic expense must have some sort of evolutionary pay-off, and that reward must be with higher reproductive success in the end.

"They get very round and large after feeding here," said Benson. "They actually wobble on the deck of the

boat. The animals in Papua, Indonesia, are quite skinny. You can see that the migration has had an impact, plus egg-laying is very expensive."

To make the story more complicated, not all the turtles make the journey. In fact, only 40 to 50 percent of the population on Papua nesting beaches use California or Oregon foraging grounds. The rest use beaches off South China.

## To migrate, or not to migrate...

There are two theories as to why not all turtles make the migration.

One, is the use of multiple foraging sites protects the species from detrimental environmental changes ensuring survival of the species.

Two, since only really large turtles make the trans-Pacific migration it could be that younger, smaller turtles utilize foraging grounds closer to the breeding sites.

Benson and Harvey are continuing to unravel the mystery of why leatherbacks cross the ocean.

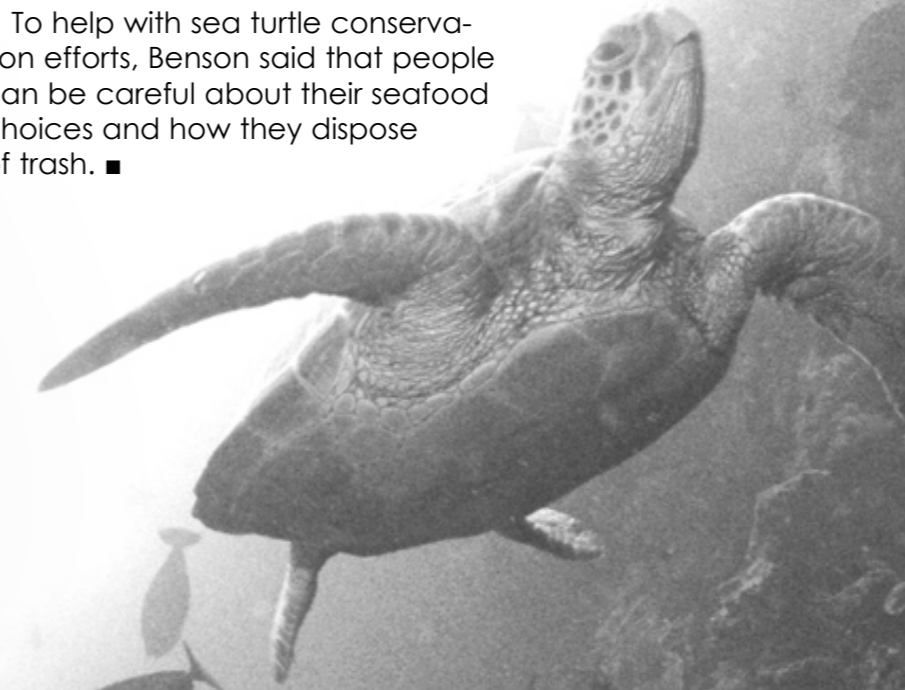
"Leatherbacks are interacting with fisheries, particularly swordfish fisheries," said Benson. "Long-

*It takes a year for the turtle to travel the 7,000 miles from the nesting beaches in Indonesia to the nutrient-rich waters of Monterey Bay.*

lining and drift gill netting both have negative impacts on turtles."

Leatherbacks eat plastic bags because they look like jellyfish. "We've found lots of plastic debris in the gastro-intestinal tracks of turtles"

To help with sea turtle conservation efforts, Benson said that people can be careful about their seafood choices and how they dispose of trash. ■





Text and photos by Lawson Wood

# Scapa Flow

*The Wrecks of Scotland's Orkney Islands*

Situated 25 km (15 miles) north of the Scottish mainland, the Orkney Islands are located on the same latitude as southern Greenland, Alaska and Leningrad, however Orkney is bathed in the warm waters of the North Atlantic Drift that first started out as the Gulf Stream in the Caribbean. Hence, a profusion of marine life, water that rarely gets too cold and mild winters, whilst the islands are inevitable windy, the almost landlocked bay of Scapa Flow is sheltered for diving all year round. The Orkney Islands are created by submergence and give the impression of tipping westwards into the sea. There are great sea stacks, arches, caves and caverns all around the coast, some of which are world famous such as the Old Man of Hoy, and they have a total land mass of around 971.25km<sup>2</sup> (375 square miles).

Stromness Harbour in the Orkney Islands. **BOTTOM LEFT:** Lawson Wood with the Standing Stone of Sten Ness  
**PREVIOUS PAGE:** Aerial view of Scapa Flow Bay in the Orkney Islands

When you travel around Orkney you cannot help but notice the standing stones and ancient stone rings which predate the Norsemen as far back as Stone Age, Bronze and Iron Ages and the Pictish civilisation.

Although very little is known of these early times, other than

the monuments themselves, detailed history of the Norse Occupation was not committed to paper until the 13th century in Iceland. The Orkneyinga Saga tells the tale of the Earl's of Orkney and the occupation of the islands.

More recently, the sheltered bay of Scapa Flow was the base of the British Naval Fleet over several generations and indeed has served the nation well during the Napoleonic War and the American War of Independence. Orkney had the almost perfect naval base with calm sheltered waters surrounded by protective islands, creating a deep natural harbour first named by the Vikings. Graeme Spence, Maritime Surveyor to the Admiralty said in 1812, "...the art of Man, aided by all the Dykes, Sea Walls or Break-Waters that could possibly be built could not have contained a better Roadstead



Dive boats in Stromness Harbour

than the peculiar situation and extent of the South Isles of Orkney have made Scapa Flow ... from whatever

point the Wind blows a Vessel in Scapa Flow may make a fair wind of it out to free sea ... a property

which no other Roadstead I know of possesses, and without waiting for Tide on which account it may be called the Key to both Oceans."

### To the Orkneys

There is always a sense of mounting excitement as you approach the Orkney Islands by ferry, either from Aberdeen direct to Kirkwall or from Scrabster with landfall at Stromness. The initial huge land mass that looms up out of the early morning mist is the Island of Hoy, and as one approaches the first of several entrances to Scapa Flow, visitors can appreciate why this natural harbour was used by the British Admiralty. In Stromness, we disembark next to the harbour where the majority of Scapa Flow's fleet of diving boats are based; most are converted fishing

trawlers, their skippers and crew eagerly awaiting our arrival.

So what is it that brings the droves of divers from all over the world? Why visit an area, which is not exactly known for its sun-kissed beaches, crystal clear water and palm trees. In fact, I seem to remember the famed Scot's comedian Billy Connolly complaining that when visiting Orkney, he could not take his dog out to relieve itself because he couldn't find any trees! The interest is undoubtedly around the fleet of warships sunk deliberately or otherwise during the last two world wars and principally to dive on the German High Seas Battle Fleet, scuttled ninety years ago, in 1919.

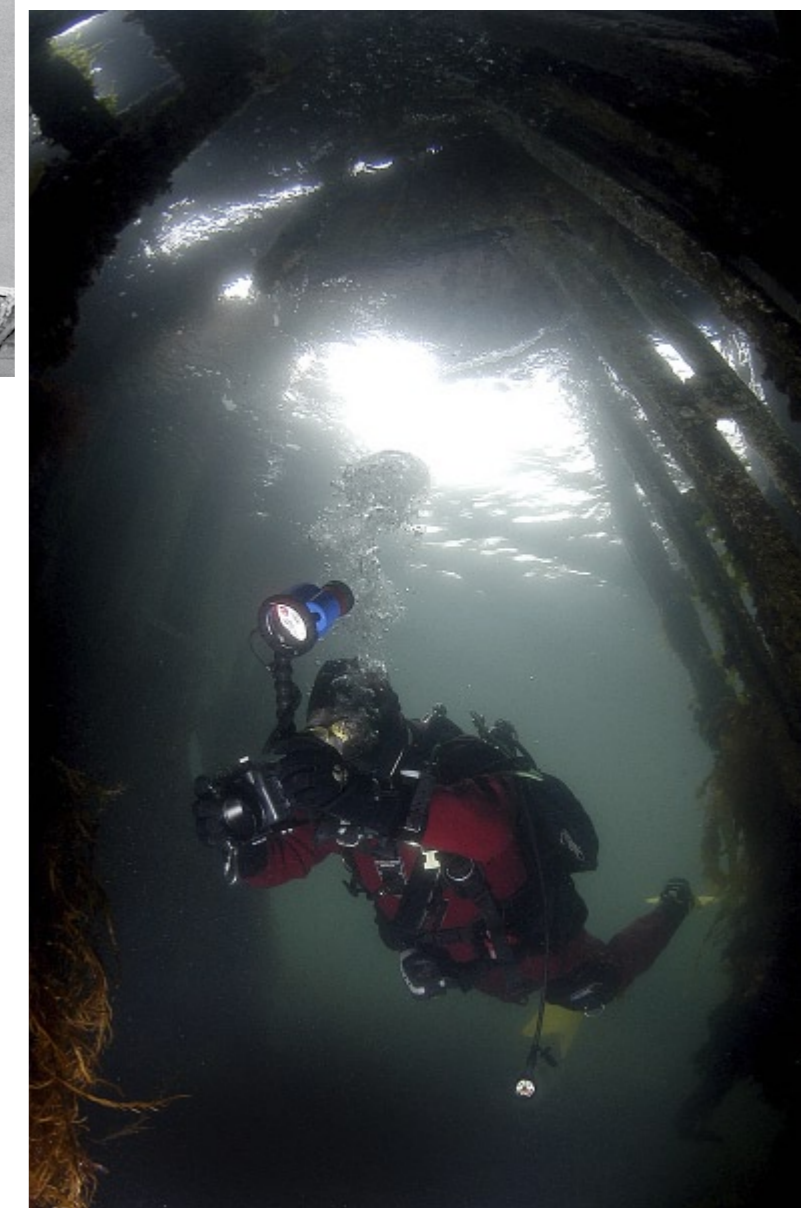
The Orkney Islands and specifically the bay of Scapa Flow are home to the largest amount of diveable







Scapa Flow



Interior of the wreck of the blockship Doyle; Archive photos of the blockships and their placement in Scapa Flow Bay during WWI

shipwrecks and wreckage to be found on the planet, directly as a result of the deliberate scuttling of the German High Seas Battle Fleet in June 1919. Seventy-four ships sank within just a few hours of each other. Couple that statistic with a further 43 ships deliberately sunk to block the entrances into this bay during both World Wars; 11 airplanes, one submarine and a further 16 British shipwrecks including two British battleships, then we have some major wreck diving interest.

Considered by many to be impregnable to attack, the bay of Scapa Flow covers some 311sq.km (120 square miles) and is now almost totally landlocked with Mainland to the north, the islands of Hoy and Flotta to the south and west, and to the south and east, the Churchill Barriers link the islands of Lamb Holm, Glimps Holm, Burray and South Ronaldsay. This makes for some relatively calm waters

for most of the year. The wrecks are actually dotted all over Scapa Flow, with blockships found in the extreme east and west of the Flow and the German light cruisers and battleships found roughly in the centre of Scapa Flow, arranged in a horseshoe shape near the island of Cava and a rocky pinnacle called the Barrel of Butter.

But first, let's look at the reasons why the ships are here and what makes them so interesting.

When Germany capitulated at the end of the First World War, her High Seas Battle Fleet—comprised of battlecruisers, battleships, light cruisers, destroyers and motor torpedo boats—were interred until it was decided what was to be done with them. In November 1918, the entire German High Seas Battle Fleet, escorted by 200 British Naval ships sailed into the bay of Scapa Flow, much to the surprise and consternation of the local population.

There they languished for over seven months, with most of the ships' crews being returned to Germany. Admiral Ludwig von Reuter, convinced that war conditions were to be reinstated and that the interred fleet was to be used by the Allied force against Germany, took it upon himself to scuttle the entire fleet on 21 June 1919 whilst the British fleet had left for manoeuvres. At 11 a.m. the skeleton crews on board opened condensers, valves and pipes. Within four hours, most of the ships had sunk from view, others were beached and many flipped upside down on their way to the sea bed.

Whilst there are still so many wrecks to dive, the largest majority of the German fleet were actually raised and scrapped, and interestingly, much of the scrap metal was resold back to Germany for them to rebuild their navy! Cox & Danks were the first major

Anemones on guns; Underwater photographer under the pontoons at the wreck site of the blockships

Diver on the wreck of the Markgraf



CLOCKWISE FROM BOTTOM LEFT: Shrimp on coral; Conger eel; Anglerfish; Queen Scallop; Red Gurnard fish; Seal at the Barrel of Butter



Scapa Flow

Scapa Flow is undoubtedly the best wreck diving in Europe and certainly ranks in the top five of the world, having three times more wrecks than found in Chuuk (Truck Lagoon). Although many of the ships were salvaged, at present there are still three German battleships; four light cruisers; five torpedo



divers on over 70 percent of the same shipwrecks.

### The Top Ten Diveable Wrecks of Scapa Flow

The following list is purely arbitrary, as virtually all of the German Naval Fleet wrecks are in deep water, making each dive, potentially either a mixed gas dive or a decompression dive of some sort. Photographically

and time wise, the blockships—*Tabarka*, *Gobernador Boreis* and the *Doyle*—are superb and definitely the best accessible

seabed is less than 30m (100ft) deep. All of the motor torpedo boats and blockships are in less than 18m (60ft), the blockships at Barrier II are in under 6m (20ft) and are quite possibly some of the best shallow shipwrecks in Europe. Therefore, all the blockships and German light cruisers are achievable for novice divers (under supervision). A diving holiday in Scapa Flow is realistic for novice divers, as the diving on offer goes beyond mere opinion and expectation, novice diver are able to dive alongside those super-qualified, mixed gas



next eight years, Cox & Danks raised two battleships, four battlecruisers, one light cruiser and 25 destroyers. His first ship took ten days to lift from the seabed but before long, as one observer recorded, "he fished up ships almost as easily as an angler winds in salmon".

The next salvor was Metal Industries and they continued the same practice set up by Cox & Danks and raised all

salvors of the German fleet and were extremely innovative in sealing up all of the holes and pumping the sealed hulls full of compressed air, thereby floating them to the surface. From their early beginning in March 1924 and over the

of the remaining battlecruisers and many more ships accidentally lost during the occupation of Scapa Flow by both major navies, including the *Derfflinger*, which was the largest ship ever raised from the deepest water at 45m (150ft).

boats (small destroyers); a WWII destroyer (F2); one submarine; 27 large sections of remains, debris sites and salvor's equipment; 32 blockships and two British battleships (the *Vanguard* and the *Royal Oak*); a further, 16 known British wrecks and many other bits of wreckage as yet unidentified including a number or aircraft.

### Diving Scapa Flow

Many divers still assume that one can only explore the German Naval Fleet wrecks using nitrox, trimix or rebreathers, and that all of the dives should be treated as decompression dives, only to be dived by super-qualified divers. In fact, diving in Scapa Flow can be as simple or as complicated as you want to make it.

Novice divers can have a great diving holiday in Scapa Flow and indeed many visitors gain their first diving qualification through the excellent diving schools on the island. The shallowest part of the *Karlsruhe II* is in only 15m (50ft) and the



Panoramic view showing positions of German battleships in Scapa Flow Bay during WWI, c. 1919

wrecks in Scapa Flow. The four German Light cruisers come next as they sit far enough off the seabed, lying on their sides, and this allows for a little extra time for exploration. I have only included one battleship, as all of the others are well broken up and are considered quite dangerous now, and divers should not be tempted to enter the ships at any time. The last two are somewhat of a prize, as the *F2* was sunk in 1945, and the barge attached by rope to her was sunk in 1968. Both are great for photography in shallower water.

Everyone who visits Scapa Flow to dive the wrecks has his or her favourite dives. As a photographer, my interest is different to perhaps someone on trimix, who will explore the seabed piece by piece, and in many cases, do long penetration dives within the deeper battleships. However, I am quite content to stay on the shallow ships. Even better, I could spend all of my time on the blockships, as not only are they shallow enough for plenty of bottom time, they are also in much clearer water, and therefore, much more photographic. So, I have tried to compile a comprehensive list of the top dives to suit all tastes.

1. *Doyle* (blockship) sunk 1914
2. *Gobernador Boreis* (blockship) sunk 1914
3. *Tabarka* (blockship) sunk 1941 & 1944!
4. *Cöln II* (German light cruiser) sunk 1919
5. *Brummer* (German light cruiser) sunk 1919
6. *Dresden II* (German light cruiser) sunk 1919
7. *Karlsruhe II* (German light cruiser) sunk 1919
8. *Markgraf* (German battleship) sunk 1919
9. *James Barrie* (fishing boat) sunk 1969
10. *F2* (German torpedo boat) sunk 1945 and *YC21* (barge used to salvage *F2*) sunk 1968

Although the German fleet now makes up the bulk of the wrecks more accessible to divers, the blockships sunk at the entrance to Burra

Sound continue to be picked as the best dives by visiting underwater photographers.

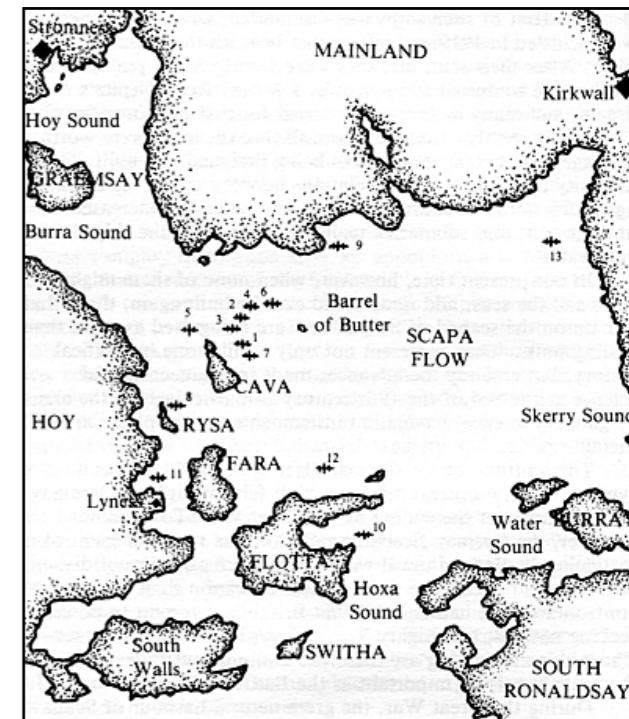
#### The top five photographic wrecks:

1. *Doyle* (blockship) Burra Sound
2. *Gobernador Boreis* (blockship) Burra Sound
3. *Kronprinz Wilhelm* (battleship) Central Scapa Flow
4. *Brummer* (German light cruiser) Central Scapa Flow
5. *Cöln II* (German light cruiser) Central Scapa Flow

For those deco freaks who insist on wearing their computers in the bar—post diving—just to scroll off, or show off their excesses of the day.

#### The top six deco deepo's:

1. *Strathgarry* (fishing boat), 57m

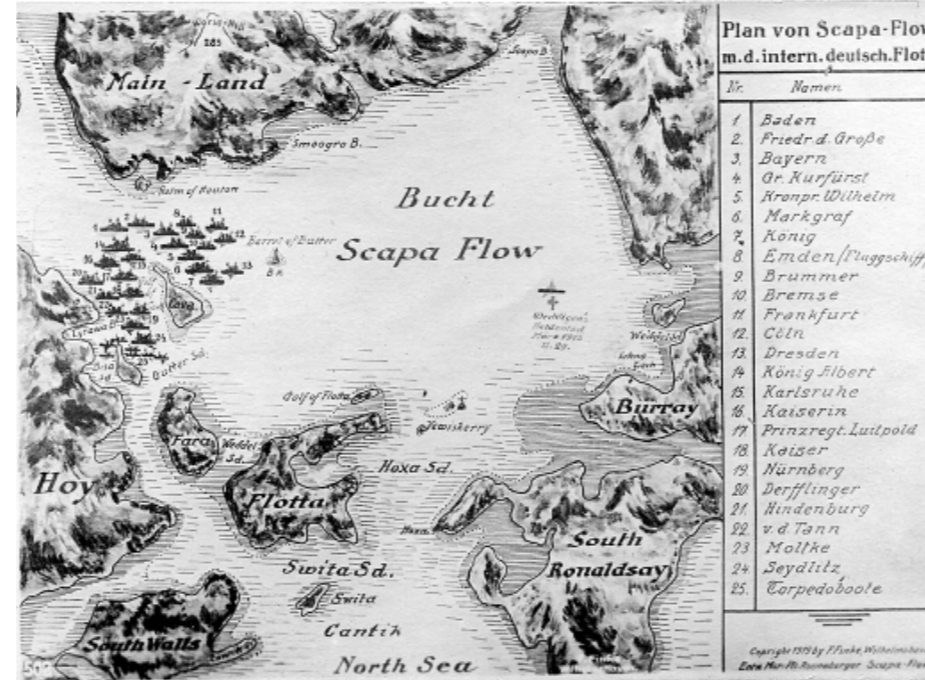
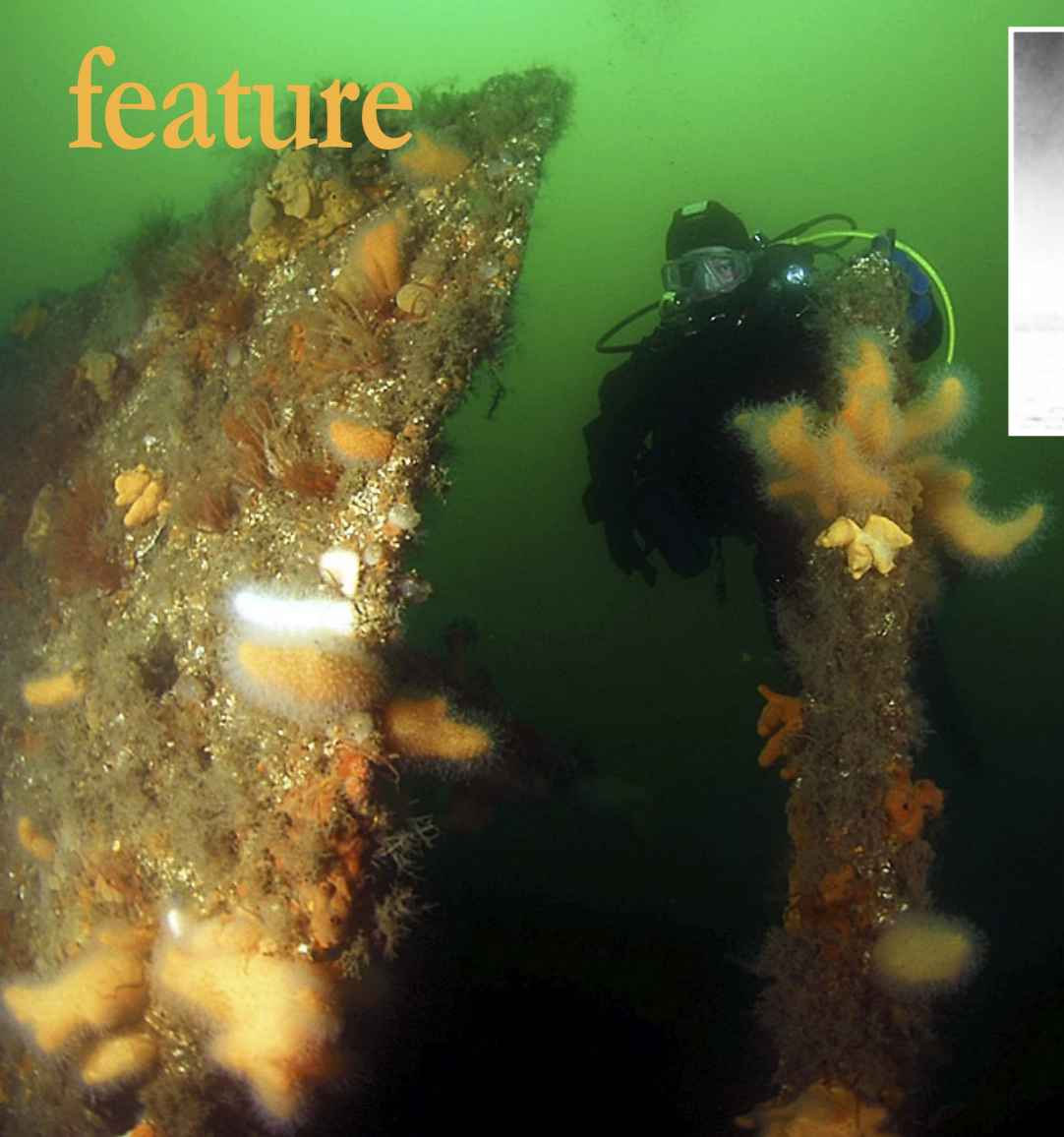


Wrecks located on map of Scapa Flow



ABOVE: Stern of the *Gobernador Boreis* wreck

RIGHT: Inside the *Gobernador Boreis* wreck lurks a Ballan Wrasse



- 2. *Markgraf* (battleship), 42m
- 3. *James Barrie* (fishing boat), 42m
- 4. *König* (battleship) 42m
- 5. *Bayern* debris site (battleship remains), 38m
- 6. *Kronprinz Wilhelm* (battleship), 34m

**Just a few little dives in Scapa Flow**

Sitting in the early morning calm, the cold air of daybreak was leaving a foggy residue around the dive boat, we could see no land, or in fact any other living thing, except a tiny orange marker buoy with a frayed bit of line attached. A couple of seagulls flew overhead just to check us out, then a seal popped its head up—I guess we weren't alone after all. Our skipper, Andy Cuthbertson on board the *MV Jean Elaine* had brought us to the site of one of the German light cruisers scuttled in June 1919—90 years ago!

We were about to dive on one of those ancient warhorses, in both eerie and spectacular fashion, dropping through 30 metres of water (100ft) to arrive near the bows of the *Cöln II* in a bay set amidst some of the most dramatic scenery in Europe, considerably heightening the diving experience and raising our adrenalin in anticipation of what was to come.

**The Cöln II**

The *Cöln II* is just one of the four remaining German light cruisers and three battleships, which were scuttled under the orders of Admiral Ludwig von Reuter in 1919. Virtually all of the others sunk at the same time were thoroughly salvaged, but the huge debris sites are still superb dives on their own, subsequently there are tons of wreckage still scattered over the seabed, much of which is still unexplored.

Through the descending gloom, the

graceful arch of the sharp bows approach us, and we drop to the stony seabed to gaze upwards in awe at this massive ship lying on her starboard side. The hull is completely festooned in plumose anemones (*Metridium senile*) and feather starfish (*Antedon bifida*). From here we swam along the now vertical decking, past the forward 5.9 inch gun and approached the superstructure, which is mostly collapsed. The central section of the ship is now completely destroyed, blasted apart by salvage divers, however the stern is mainly intact and the other 5.9 inch gun can be found. Maximum depth is 36 metres (120ft) and all too soon, it is time to make our way up the mooring buoy line.

Conditions vary tremendously during the season, and it can be poor visibility and dark on the seabed in the centre of Scapa Flow. Lights should always be used, and work up dives should be undertaken



LEFT TO RIGHT: Diver at the wreck of the *Cöln II*; Archive photo of the *Cöln II*; Historic map of the German Fleet in Scapa Flow Bay, c.1919; Diver inside the wreck of the *Tabarka*

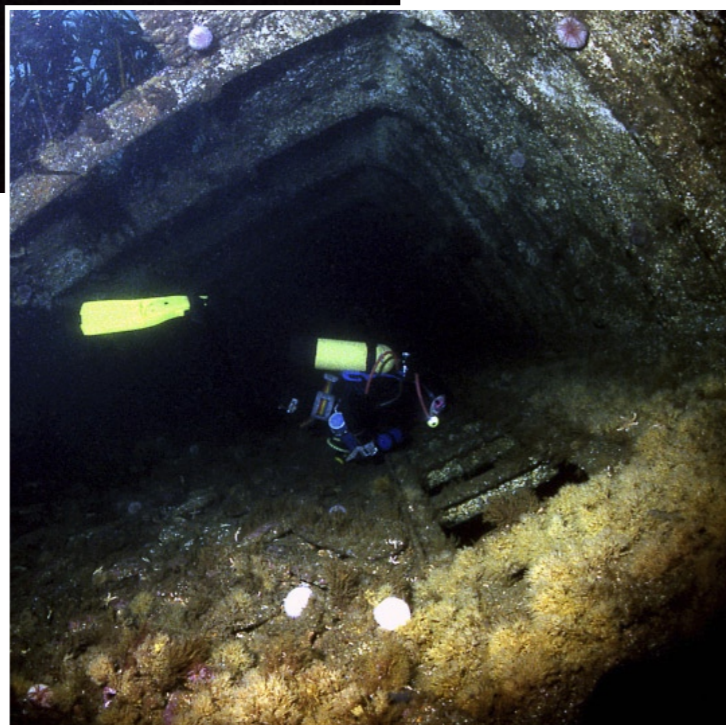


### The *Tabarka*

Many divers prefer the *Tabarka* as their number one blockship, as it rests upside down in 18m (60ft) of water. You enter the water at slack tide and quickly explore the outside of the ship before penetrating its cavernous interior. Here, you can spend your maximum bottom time until your computer makes sufficient noise at you to return to the surface. By the time the dive is over, the tidal race will be in full flow, and you just launch yourself into the current. The dive boat skippers know exactly where you will surface and will pick you up safely and easily. In the immediate vicinity is my personal favourite dive on the blockship *Doyle*.

### The *Doyle*

The *Doyle* was a single screw coastal steamer built in Troon, Ayrshire, and weighed 1,761 tons. At 79.3m (260ft) long, she was requisitioned by the Admiralty and sunk on 7 October 1914. The smallest of the blockships in Burra Sound, she is instantly recognizable by her intact



Diver investigates the interior of the *Doyle* wreck

## Scapa Flow

curved bows and stern. Lying on her port side, the more exposed starboard hull is covered in dwarf plumose anemones (*Metridium senile*), seaweeds and sponges. Her wooden decking has all rotted away, but virtually all of her ribs, posts and lower sections of masts are still in place allowing divers many safe access points into the interior of the ship at various levels.

The ship is still robust enough to allow for full safe and easy access, and the interior allows you to extend your dive into the time when the current starts to run once more. Hull plates have come away over the years, and the light now streams in through a huge number of square holes making for a rather superb cathedral-like quality.

Ballan wrasse, cuckoo wrasse and conger eels are found in the interior and huge schools of juvenile Saithe and Pollack swirl around the superstructure. The stern is also largely intact, topped with kelp, and the huge blades of her single propeller are covered in anemones and small pincushion sea urchins.

Once slack water passes, divers are recommended to just drift away from the wreck, as they will only pull down the dive boat's shotline. Divers should deploy a delayed surface marker buoy, and the dive boat will follow your easy progress into Burra Sound and be there to collect you.

### F2 German torpedo boat

In between dives, the dive boats often anchor on the jetty at Lyness, the former Naval Base on the Island of Hoy. Incidentally, nearby is a former dive boat called the *Mara* and the wreck of the *F2*, a German Torpedo boat, as well as her salvage barge, sunk in 1968. The salvage company had just removed a set of guns from the *F2* and had tied tight onto the stricken vessel (at low tide). The crew



went off to celebrate their good fortune at being able to raise the guns and left their booty to a rising tide, which low and behold, sunk

LEFT TO RIGHT: Diver at the wreck of the *Doyle*; Cuckoo Wrasse; Massive propellor of the *Doyle* wreck

before one dives the deeper battleships. Which is why so many of us photographers prefer the Blockships at the entrance to Burra Sound, where the average depth is half that of the German warships, subsequently with much more light, more interesting marine growth and in much clearer water as the tidal race at Burra Sound sweeps all sedimentation particles away. But this also means that one has only limited time on these wrecks and then only at slack tide.



their barge (and their booty) now making two very nice diveable ships (and both with guns). The wrecks are attached by rope.

There is a museum nearby on Hoy with an excellent display of artefacts relating to the two World Wars.



### The Royal Oak

Twenty years after the German Fleet was scuttled, on the night of October 14th, 1939, the 188-metre (600ft) battleship *Royal Oak* was at anchor in the northern region of Scapa Flow. Her duties were to protect Kirkwall and the British fleet from aerial attack. Scapa Flow was considered impenetrable because of the narrow passages between the reefs and islands. Likely attack would be expected only from the skies.

However, nobody told this to the commander of the *U47*, Günther Prien, who stealthily approached Scapa Flow—in what is considered by many to be one of the bravest feats in naval history—and at the dead of night, sunk the *Royal Oak*, taking with her the lives of 833 men and boys. The *Royal Oak* is now a designated war grave and is



protected by Navy Law. Diving on her is strictly forbidden without express permission from the Ministry



ANDY CUTHERSON

CLOCKWISE FROM TOP CENTER IMAGE: Archive photo of *Royal Oak*; Archive photo of the salvaging of a battleship in the German Fleet; Anti-aircraft guns on the *Royal Oak*; Commander Günther Prien of the *U47*

of Defense.

As a direct result of the loss of the *Royal Oak*, Winston Churchill visited Orkney and ordered the complete closure of all of the eastern approaches into Scapa Flow, which had clearly been unable to stop the ingress of an enemy U-Boat, which passed through the blockships unhindered.

TOP TO BOTTOM: The *Royal Oak* wreck at Admiral's Pinnacle; Stern of the V83





## Scapa Flow

### SCAPA FLOW CONTACTS

Orkney Dive Boat Operators Association - Halton Charters  
www.mvhalton.co.uk

Orkney Islands Charters  
www.orkneyislandscharters.co.uk

Roving Eye Enterprises  
www.rovingeye.co.uk

Scapa Scuba  
www.scapascuba.co.uk

Scapa Flow Charters  
www.janelaine.co.uk

Scapa Flow Diving Centre  
www.scapaflowdivingcentre.com

Scapa Flow Technical  
www.scapaflow.com

Stormdrift  
www.mv-stormdrift.co.uk

Stromness Diving Centre  
www.orknet.co.uk/scapa/triton.htm

Sunrise Charters  
www.sunrisecharters.co.uk

The Diving Cellar  
www.divescapaflow.co.uk

### ORKNEY USEFUL CONTACTS

British Airways  
(operated by Loganair)  
www.ba.com

Nautical Archaeological Society  
nas@portsmouth.msn.com

Orkney Archives  
www.orkneylibrary.org.uk

Orkney Dive Boat Operators Association  
www.odboa.co.uk

Orkney Heritage  
www.orkneyheritage.com

Orkney Islands Council Harbours Department  
harbours@orkney.gov.uk

Orkney Tourist Board, Stromness  
www.visitorkney.com

Northlink Ferries Ltd  
www.northlinkferries.co.uk



### Tourism

Although the contract for the work was awarded to a civilian company, over 1350 Italian Prisoners of War were transported to Orkney and billeted on the eastern islands to work alongside the locals.

Rather cheerless and lacking in home comforts, the Italians, whilst

working alongside civilians on the construction of the barriers, set about improving their huts by laying concrete paths, planting flowers and of course redecorating.

Italian artist Domenico Chiocchetti set about painting the interior of one of the camp huts and transformed it into a Chapel. Completely restored by the original artist, the Italian Chapel on Lamb Holm is well worth a visit when staying in Orkney.

Undoubtedly a visit to the Orkney Islands is not just about visiting the sunken fleet, Orkney is so much more. Sports diving is seriously big business in Orkney and has been for many years. Scapa Flow is one of the most popular dive sites in Europe.

Recreational diving alone contributes well over GB£1,000,000 a year to Orkney's economy, with up to 3,000 divers making almost 30,000 dives a year—about 60 percent of them on what's left of the German High Seas Fleet.



CLOCKWISE FROM TOP LEFT:  
Diver inspects an anchor at the *Seydlitz* wreck; Diver at the bow of *Brummer* wreck; Exterior of Italian chapel; Interior of Italian chapel



TOP LEFT TO RIGHT: Anemones decorate the wreck of *Kronprinz Wilhelm*; Diver investigates the *Kaiser* site; Diver inspects bridge railings of the *Brummer* wreck

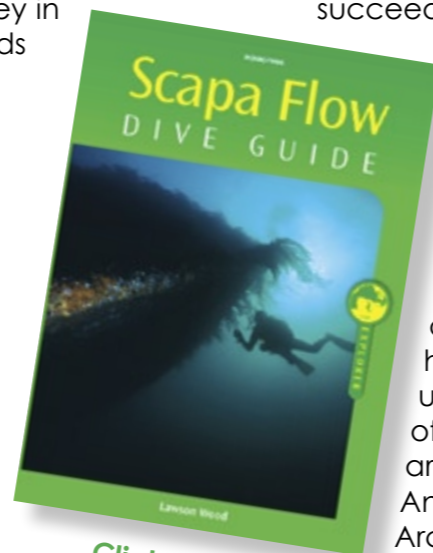
And that's a conservative estimate. It translates into thousands of divers needing accommodation, transport, shops and equipment; spending time and money in the islands; and thousands being carried by Orkney dive boat operators and others, whose livelihoods depend on the diving industry.

In the story of the German High Seas Fleet at Scapa Flow, we have a microcosm of the changing approach to historic wrecks and the way we as a society value them: First, they were seen as weapons of mass destruction (1918-21); then as a salvage resource (1923-39); then an unrestricted diving amenity (1960s onwards); and finally, as national historic and archaeological assets, worthy of protection by law.

As for the remaining seven wrecks,

scheduling should help to ensure that they survive as intact as possible, for as long as possible, for the enjoyment and opportunities they offer to succeeding generations of

Orcadians, dive boat operators, and the vast majority of responsible divers. Scapa Flow is there to be enjoyed by everyone, but please dive responsibly and please recognise that all of the shipwrecks have protected status under the Protection of Wrecks Act 1974 and are scheduled under the Ancient Monuments and Archaeological Areas. 1979.



Click to Buy!

Want to learn more about wrecks and diving in Scapa Flow? See Lawson Wood's book, *Scapa Flow Dive Guide*, published by Aquapress or visit his website at: [www.lawsonwood.com](http://www.lawsonwood.com)



ABOVE: Aft gun on the *Kronprinz Wilhelm* wreck. BOTTOM LEFT: Stern gun breaches landscape at the *Karlsruhe* wreck. INSET: *Scapa Flow Dive Guide* by Lawson Wood





Edited by Peter Symes

The Basking Shark is the second largest shark, and second largest fish in the world. It grows to ten metres but is harmless, feeding entirely on plankton. In recent years, it has become an increasing focus of marine wildlife tourism in the Isle of Man, the West of Scotland and Cornwall.

Text by the The Save Our Seas Foundation



# Basking Sharks Travel the World

Experts agree to tackle the mystery of missing migrations using photo-identification and satellite tags.

The exciting discovery that a basking shark tagged in the Isle of Man had crossed the Atlantic Ocean to reach Newfoundland, has been followed by the revelation that other basking sharks tagged off the coast of the North-eastern USA have travelled to the Bahamas and the Caribbean. One or two have even been tracked crossing the equator all the way to the northern and central coasts of Brazil. These studies were made using electronic tags, cutting edge technology in marine research. Once attached, the tags track the sharks' movements and locations, and the data are transmitted to the scientists via satellite on a pre-programmed date.

## One Atlantic population

Until now scientists had thought that the numbers of basking sharks found on each side of the North Atlantic, South Atlantic, North Pacific and South Pacific were essentially separate populations. "These latest results are really quite amazing," said Dr Gore, who led the Save Our

Seas Foundation (SOSF) supported team that tagged the Isle of Man shark. "This raises the possibility that a shark we see in Britain could cross to North American one year, and turn up in Brazil the next!"

These discoveries, however, highlight the fact that little or nothing is known about any corresponding migrations

of southern hemisphere or Pacific Ocean sharks. Knowledge of such migrations is proving increasingly vital in order to better protect the species. Populations of basking sharks in other parts of the world have been drastically depleted, and as Canadian scientist Scott Wallace described, in the northern Pacific they may have been exterminated. Gore explained, "The basking sharks seen in the Isle of Man might travel to other parts of the world to repopulate them, but if there is inadequate protection in those countries, they may never return."

*"... a shark we see in Britain could cross to North American one year, and turn up in Brazil the next!"*

The scientists will collaborate in a scheme to both assess the numbers of the animals and to track their movements, using both satellite technology and photographs. Scientists from a dozen countries, including New Zealand, Canada, the USA, and the Seychelles, as well as the UK, Ireland, and France

attended the meeting. The new scheme will use close up photographs of the sharks' fins, which show above water when the sharks are feeding near the surface, to identify as many individuals as possible.

Photo-identification projects such as this have been used on a wide range of animals including elephants, penguins, whales and dolphins. Detailed photographs, which enable researchers to recognise individual animals after they have travelled hundreds or thousands of miles, are crucial for piecing together migratory routes and social behaviour. Especially important in the case of the

basking shark, an endangered species, is estimating the size of the population. One estimate from a few years ago, based on genetic analysis, suggested that the global population might be fewer than 20,000.

## Numbers up in Europe

In the Pacific, basking sharks are relatively rare, but in northwest Europe, where the animal is now protected the population is recovering. Good numbers have already been seen this year in Cornwall and the Isle of Man. "We are not sure what is happening," explained Dr Rupert Ormond, chief scientist of the Save Our Seas Foundation, one of the co-sponsors of the conference. "We need the main research groups, and interested members of the public, to collaborate in determining what proportion of the sharks we have already photo-ID'd, and since we know the total number of sharks in our catalogue, we can estimate roughly how many sharks there are altogether."

The new scheme will develop

a European Basking Shark Photo-Identification Catalogue, to which researchers in Cornwall, the Isle of Man, Ireland, Scotland and France have already agreed to contribute.

Al Reeve of the Plymouth-based Shark Trust, who is taking the lead in developing the necessary database and web-site, commented: "Photo-identification really is a very powerful technique; and while photographs taken with powerful telescopic images may be needed to identify many of the sharks, even snap-shots taken by tourists can enable us to recognise some individuals, who because of encounters with boats and fishing gear, can have highly distinctive scars and tears on their fins." ■

THE SAVE OUR SEAS FOUNDATION IS A NON-PROFIT ORGANIZATION THAT ESTABLISHES AND SUPPORTS SCIENTIFIC RESEARCH AND EDUCATIONAL PROJECTS FOCUSED ON THE NEED TO PROTECT OUR WORLD'S OCEANS. ITS INITIATIVES PROVIDE KEY INFORMATION ABOUT THE IMPORTANCE OF MAINTAINING THE DELICATE ECOLOGICAL BALANCE IN MARINE ECOSYSTEMS. IN PARTICULAR, SOSF AIMS TO LEARN MORE ABOUT THE ROLE SHARKS AND RAYS PLAY AS TOP PREDATORS AND THE DEVASTATING CONSEQUENCES OF REMOVING THEM FROM OUR SEAS.

USING KNOWLEDGE BASED ON SOUND SCIENCE, SOSF AIMS TO INSPIRE PEOPLE TO APPRECIATE THE INTRICATE NATURE OF HOW WE ARE ALL BOUND TO THE HEALTH OF THE SEA. TEACHING THE CHILDREN OF TODAY TO BE CUSTODIANS OF OUR MARINE WORLD TOMORROW, IT IMPLORERS EVERY GENERATION TO ACT NOW AND MAKE A DIFFERENCE.



# “Teenage” sharks prefer to hang around home

**Young lemon sharks tend to stay near their coastal birthplace for many years. Tropical island nations that sacrifice their nursery habitats to coastal development are therefore likely to lose not only babies but also much older sharks from their local areas, with potentially dire effects on the surrounding ecosystem.**

*We were very surprised to see that many lemon sharks lingered for years around the island where they were born—often more than half of their development to adulthood.”*

While shark research and conservation typically focuses on baby sharks confined to shallow habitats, or ocean-roaming adults, less is known about these intermediate-aged animals, which are the breeders of tomorrow and are roughly similar in development to human teenagers.

## Studied for 14 years

During a 14-year study of lemon shark conducted by the Institute for Ocean Conservation Science at Stony Brook University, University of Miami, Field Museum of Chicago, and others at the Bimini Biological Field Station, over 1,700 immature lemon sharks were

caught, tagged and released. The implant-

ed tags, plus subsequent recaptures and DNA analysis, showed that more than half of the 3- to 7-year-old sharks caught off Bimini were born locally and had lingered near their birthplace for years.

“It takes some sharks more than a decade to reach reproductive age, so we set out to better understand the phase of their development from when they are a couple of years old until they are on the verge of sexual maturity,” said lead author Dr Demian Chapman. “We were very surprised to see that many lemon sharks lingered for years around the island where they were born—often more than half of their development to adulthood.”

## Afraid of the deep

Fear of deep water—and the bigger predators that live there—combined with abundant prey in the mangroves around Bimini probably keeps these island-born sharks in safer waters near home for several years after their birth. “This means that using marine reserves and other local conservation measures may help protect sharks born around tropical islands for much longer than we thought,” Chapman explained.

He suspects that future research could show that these stay-at-home behavior patterns are common among many shark species that live and breed around tropical islands. “If

island communities develop all of their shark nursery habitats, like mangroves, or overfish baby sharks in local waters, then they will subsequently lose a big chunk of the older sharks as well,” he said.

Detailed information on how sharks disperse from their birthplace could be very useful for conservation efforts throughout the tropics, given that many tropical shark species are threatened by overexploitation to supply the trade for shark fin soup, for which demand is especially high in Asia. Between 22 and 73 million sharks are killed each year to supply the fin trade.

“Our study suggests that many tropical island nations may not have to wait for complex international shark regulations to be established in order to act,” said Chapman. “Their local management efforts could give immature sharks a chance to grow up in relative safety until they are big and ‘bad’ enough to roam deeper habitats far from home, where broader scale protection becomes more important.”

The study entitled, *Long-term natal site-fidelity by immature lemon sharks (Negaprion brevirostris) at a subtropical island*, is the cover feature of the August issue of *Molecular Ecology*. ■

SOURCE: SCHOOL OF MARINE AND ATMOSPHERIC SCIENCES  
STONY BROOK UNIVERSITY

*If island communities develop all of their shark nursery habitats, like mangroves, or overfish baby sharks in local waters, then they will subsequently lose a big chunk of the older sharks as well.*



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Edited by Peter Symes  
and Scott Bennett

# Cave & Cavern Photography

—*Techniques for Photographing in Overhead Environments*

Text by Kurt Amsler  
Translation Arnold Weisz

**Caverns and caves is one of the most demanding challenges in underwater photography. To produce great images in the dark requires both special equipment and training, and mastery of daylight photography.**



Penetrating into caves should only be undertaken with proper training and correct equipment

Mysterious, pitch dark and dangerous. This is how most divers imagine underwater caves. On the other hand there are few underwater photography's that come out more spectacular than images captured in caves. Obviously you have to discern between full cave and cavern diving. The latter are being defined as the area where daylight still can be seen and can be dived by normal sports divers without requirements for additional equipment other than a good light source. Penetrating into caves on the other hand is a completely different ball game and should only be undertaken with proper training and correct equipment.

### The equipment

Photography in dark overhead environments is very seldom about animals, but all about the special impressions of bizarre shapes and the play-of-light. The best lenses to use in this environment are therefore super wide angle. Small cameras like the Nikonos and Motormarine are often easier to use than larger housed mirror reflex cameras, as you may have to work your way through narrow passage ways. These simpler kinds of cameras will

do the job as good as SLR cameras, since you are only working with wide angle photography. To capture the fascination of cave diving you have to work with the light effects. To create some good light effects you should also use (besides the main strobe) slave flashes, like f.ex. the YS-30 from Sea & Sea. But even a 50 W dive light can create some nice effects in a cave. To keep your slave flashes negative buoyant, strap some lead on to them. I've used counterweights, normally used to balance car tires, with great success for this purpose.

### Caverns

The most spectacular images can often be made at the caverns and cave entrances. Stay inside the cave/cavern and let the divers enter, swimming towards you with their dive lamps turned on. Light entering a cavern/cave from holes or crevices in the ceilings also make for great light effects. To capture these kinds of light effects you need to use longer shutter times, like for example 1/30 or 1/15 second. If you can place a diver within the natural light beam, the image will be even better.

The most spectacular images can often be made at the caverns and cave entrances

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## Cave & Cavern

Slave strobes can illuminate everything although they cannot be pointed towards the camera, as this would distort the image

flash and no models, and progress the next step, once you've mastered the previous. Before setting up more complicated shots, do dry-runs with your team, and start up with doing easier shots by setting the image in caverns or cave entrances with some ambient light, before you do images in full caves. Training in a low risk environment first, relieves some of the stress once you are diving 1 000 meters into narrow caves. When you are using multiple slave flashes, try to arrange them in calm and quiet before you bring in the models. After a while, both you as the photographer and the people that see your images will learn to appreciate caves. Well illuminated caves appear much less intimidating and secretive than our vivid imagination too often tricks us to believe. Because caves can actually be dreamlike beautiful.



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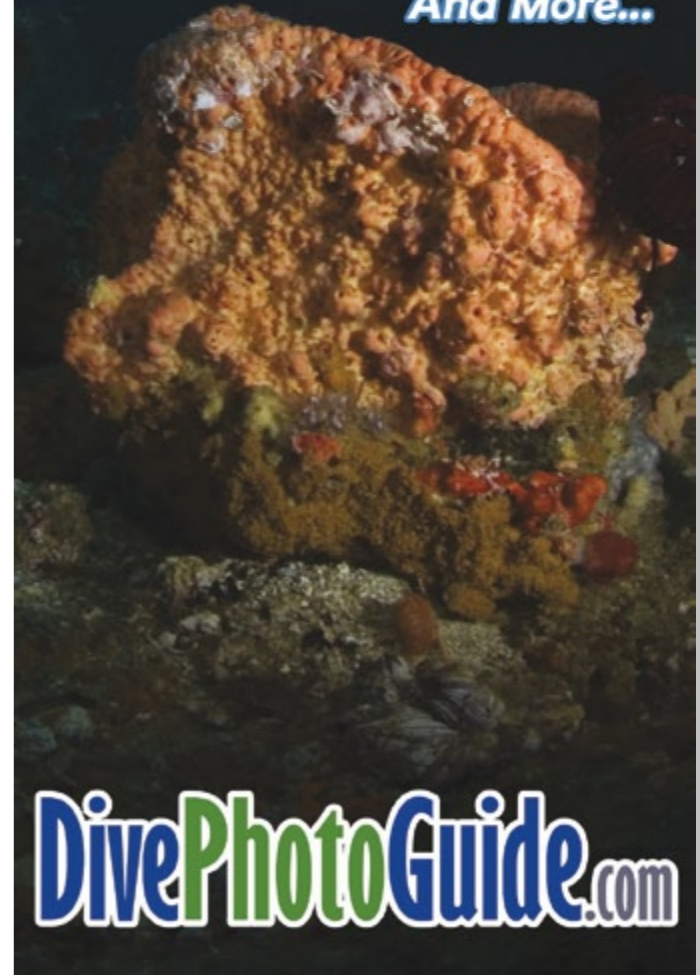
### Caves

In caves slave flashes really come in useful. Most ideal would be if every diver in the group could carry one. The main aim for those who carry a slave flash is to illuminate the surrounding cave and/or each other for the photographer. These can illuminate everything although they cannot be pointed towards the camera, as this would distort the image. You can also achieve some great effects, if you place several slave flashes around the cave and place a diver in the midst. If there is any current in the cave, you can fasten the slaves to the rocks. Just be certain that the sensor of the slave is directed towards the main strobe. To do this kind of imagery with multiple light sources and diver's within a cave

can be complicated. It is therefore important that you brief your team so that every member knows exactly what to do.

### Direction

When ever you have divers involved you have to pay attention to directing them, otherwise capturing great underwater images is impossible. This is especially true in the difficult conditions as you often encounter in caves. Everyone participating in the photo shoot needs to have a clear idea of their role. Therefore the importance of a thorough briefing is essential for obtaining a successful image. For the photographer it is important to master the necessary skills involved. Learn them step by step. Start with one slave





CLOCKWISE FROM ABOVE:

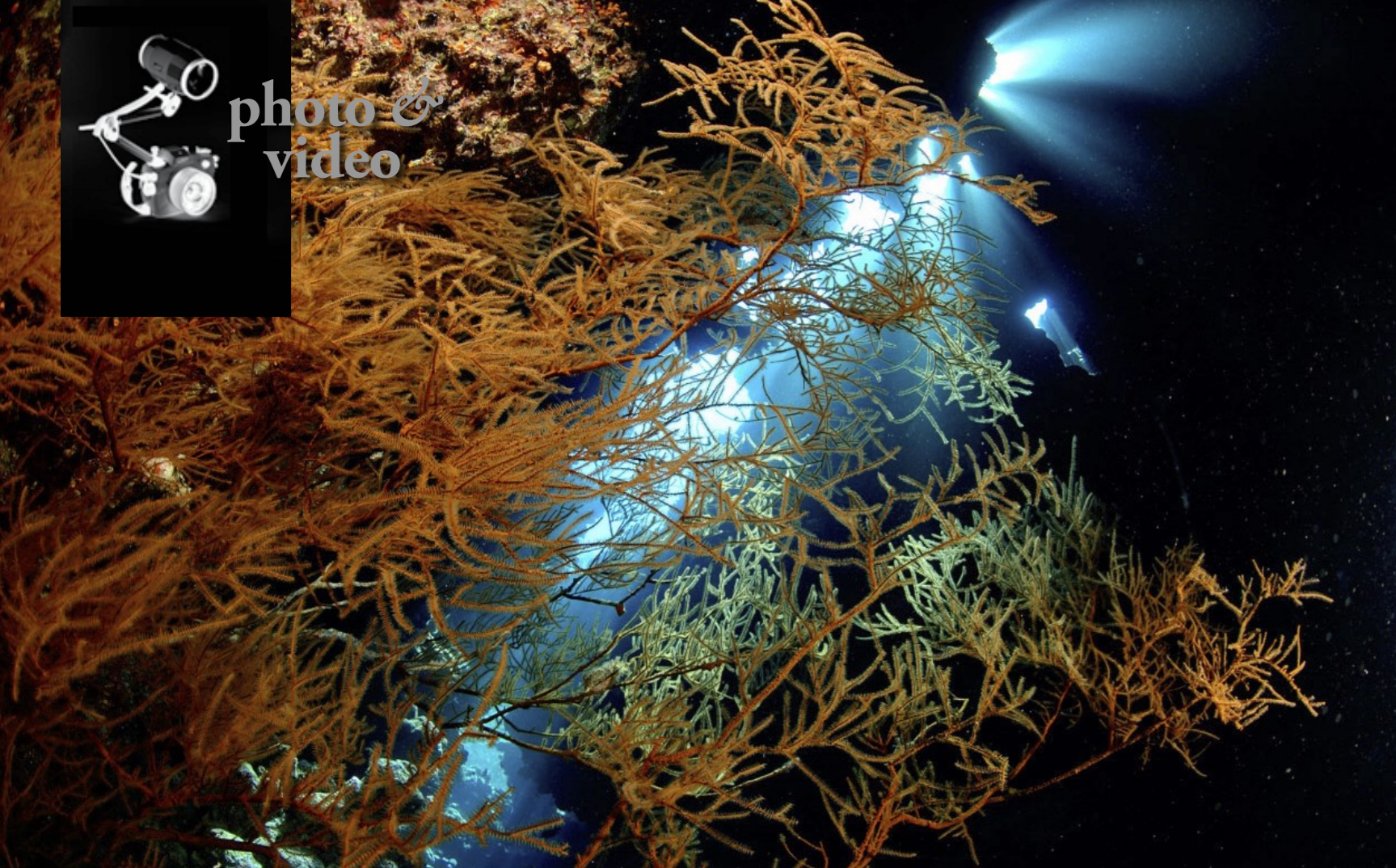
Training in a low risk environment first, relieves some of the stress once you are diving 1000 meters into narrow caves

You can also achieve some great effects, if you place several slave flashes around the cave and place a diver in the midst

Whenever you have divers involved, you have to pay attention to directing them

**Practical tips:**

- To capture the atmosphere, is Alfa omega for underwater cave/cavern photography. Use all the different light sources available such as natural light at entrances or holes or create your own by using dive lamps, strobes and slave flashes.
- Penetrate caves only if you are trained for diving in such an environment.
- Overhead and dark environment diving creates more obstacles than in free water. Know your techniques to work well in dark, and bring camera equipment suitable for working in small spaces.
- Photographical accessories such as lamps and slave flashes should be secured to your body by carbine hooks and d-rings. This allows you to have your hands free for movement and squeezing through narrow passages.
- Your models can point their slave flashes where ever they want, except in the direction of the camera to avoid distortion.
- To get the most out of your light sources, like dive lamps and ambient light, use a slower shutter speed like 1/15 second.
- Especially for full cave dives a detailed briefing of all the team members is a must.
- It is important to protect your camera well when diving in the darkness of caves and narrow passages. Cover your domes and lenses with neoprene covers, and keep the equipment tucked well together during swims.
- If your camera doesn't have any viewer display light carry an small dive lamp on your wrist to help you using the knobs and the wheels on the camera, for settings such as shutter speed and blender.
- Caverns and caves offer some fantastic photo opportunities, but never forget to put you and your dive team's safety first. ■



Underwater cave photography using natural light

## How to prevent your housing from fogging

If you open your housing in a warm humid environment and bring it down into the relatively cooler temperature water, you are likely to get condensation in your housing. One of the most popular counter measures would

seem to be dry silica or desiccant packs inside the housing to absorb any moisture in the air. But eventually these will get saturated, and then what? You can try to bake moisture out of the desiccant inside an oven for three minutes, but

that might not be an option either. Then, you can use teabags or better still, uncooked rice stuffed into an emptied teabag. Even a live-board way out on the ocean will usually have one or both.

The best solution is to keep the moisture out of the housing altogether by putting your equipment together in the driest and—since cold air cannot hold as much moisture as warm air—coldest environment you have. This could be an air conditioned hotel room. Then, keep it out of the sun, covered if possible. ■



# 36<sup>e</sup> FESTIVAL MONDIAL

# DE L'IMAGE SOUS-MARINE



Renata LUKMANOVA, 13 ans, Russie



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### SensorScope

SensorScope enables you to check your sensor to see if it needs cleaning. The SensorScope looks like a camera lens, but it allows you to look back into your camera to inspect your sensor. The SensorScope is easily portable and provides a 5x magnification lens and 4 ultra bright LED lights, which are focused to completely illuminate the field of inspection. Although specifically designed for Canon and Nikon DSLRs, the SensorScope may be used on any manufacturer's DSLR. [www.backscatter.com](http://www.backscatter.com)

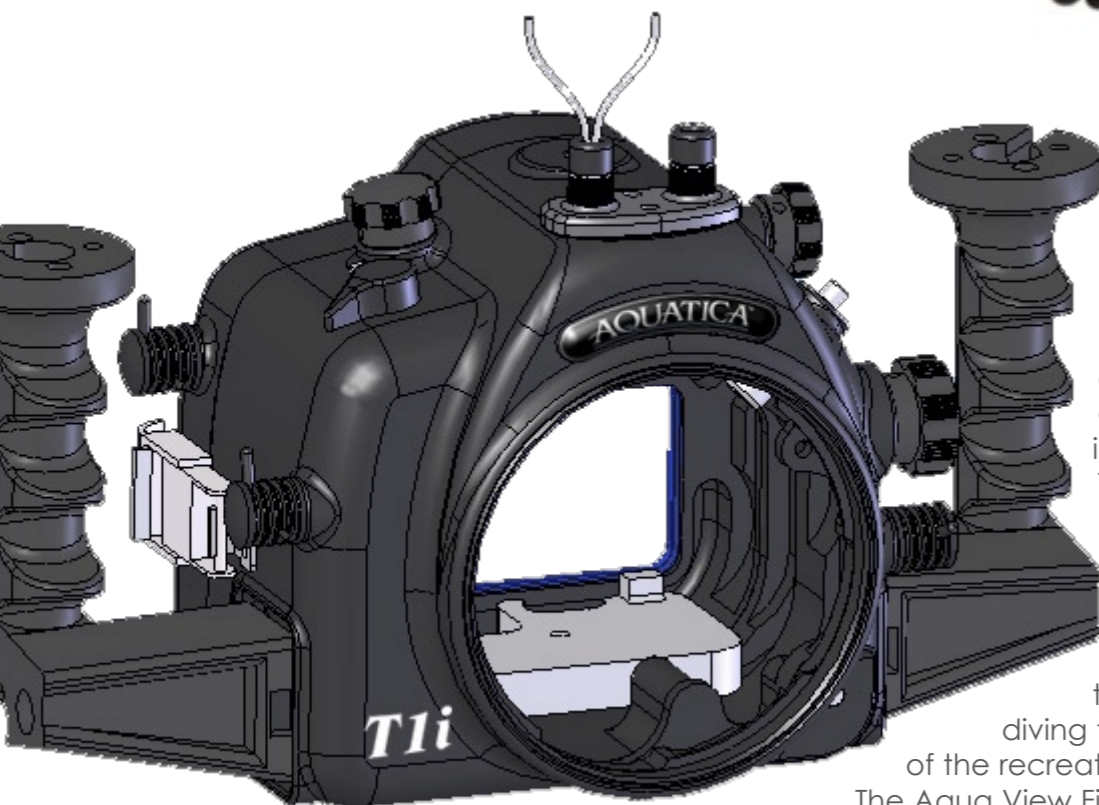
### YS Converter for Canon

This new type of converter lets you use simultaneously two different types of strobes with different discharge characteristics and flash tubes, simply by turning the strobe selector dial. You can also switch between TTL mode and manual mode\* depending on the shooting situation. Moreover, you can check the images taken with TTL mode on the LCD monitor of the camera and use the TTL adjustment dial to easily make fine adjustments to the level of light emitted. [www.seaandsea.jp](http://www.seaandsea.jp)



### PowerShot D10

It is hard to believe that this is actually Canon's first waterproof camera. This camera is waterproof to 10m and will work in temperatures as cold as -10°C. Its lens sits inside the camera's largest bubble-shaped protrusion to give it room to extend its 3x (6.2-18.6mm) zoom while staying within the waterproof case. A powerful flash sits atop that lens, while a range of smooth button controls lie on its back, around a 2.5in LCD screen. Users must control the zoom with two large buttons on the camera's top.



### Aquatika Canon T1i

Optical fiber strobe connections along with the more classic Nikonos and Ikelite bulkhead connectors are now offered as an options, making this Aquatica housing one of the most versatile, as far as strobe connections goes; controls are supplied for accessing the built-in flash of the Canon T1i controls. The Aquatica housing's robust aluminum construction also means no warping or twisting; these reactions to pressure can affect the controls when

diving the deeper part of the recreational diving limit.

The Aqua View Finder, along with many other accessories, is fully compatible with this new housing. [www.aquatika.ca](http://www.aquatika.ca)

### Housing Tripod

This tripod mount can be used with the long Ultralight Sea & Sea adapters and any length of Ultralight arms as legs, and you have an instant tripod. The mount comes with rubber feet to safely rest the housing on a flat surface.

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



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*Unique Dive Site*

# Skookumchuck

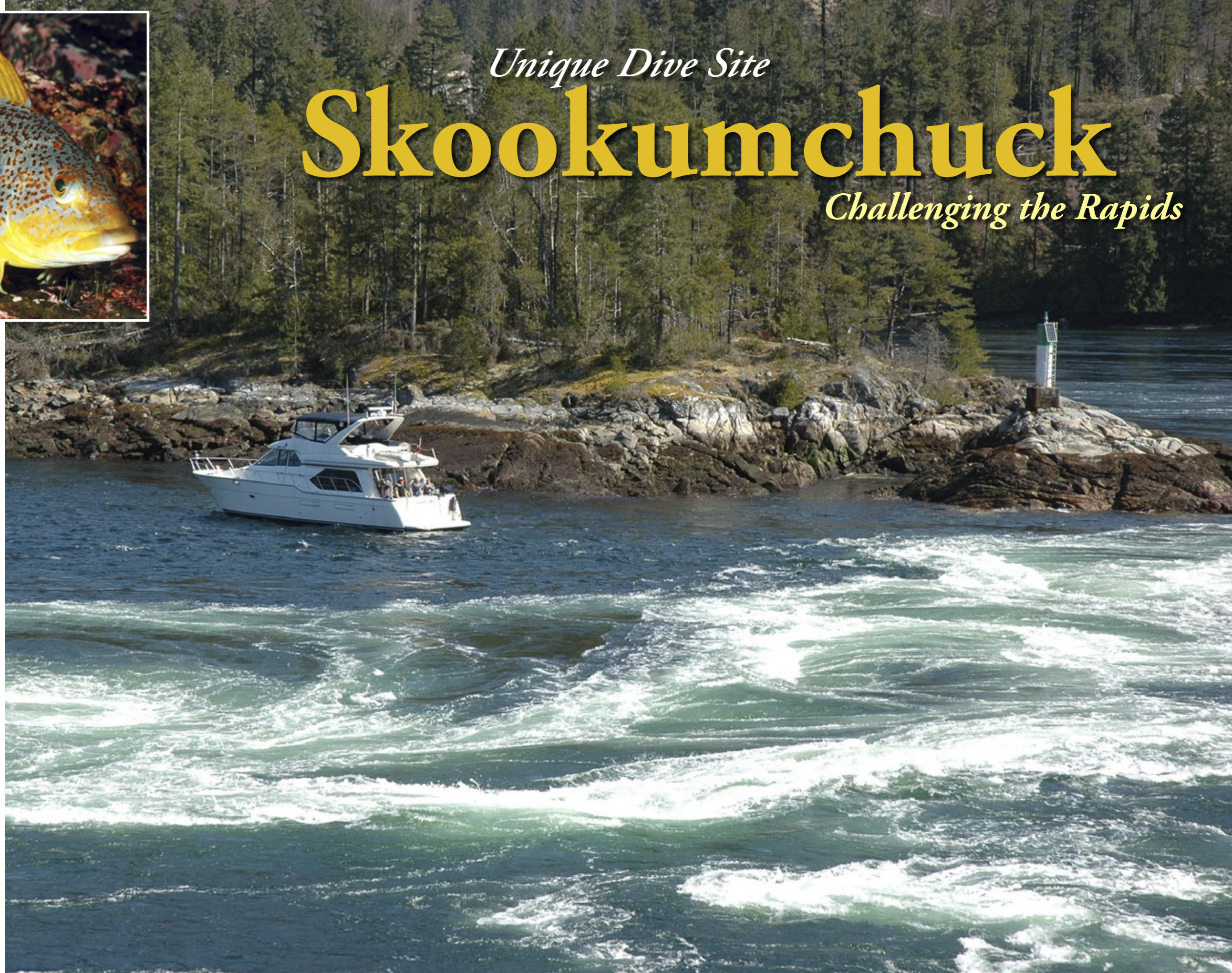
*Challenging the Rapids*



Female Kelp greenling (above)  
Dive boat on Skookumchuck (right)

Text and photos by Barb Roy

Viewing a torrent of flowing liquid turmoil while safe and dry on shore is enough to make anybody hesitate about signing up for a dive charter in the Skookumchuck Narrows. This is also the place where rushing tidal currents commonly reach impressive speeds of 14-16 knots (30 km/hr)! Looking down at churning whirlpools strong enough to challenge 30-foot boats (9m) might make any diver question if it's even possible to pierce this witch's cauldron. Yet hundreds of divers travel to British Columbia's Sunshine Coast every year to take on the "Skook" and test their dive skills for a look beneath. With the help of a professional dive charter operator, the Skook might be tamed long enough for a quick look or a fun exploratory ride.





Purple ochre sea stars and painted anemones



Soaring turkey vulture at Egmont (above)  
View of the Skookumchuck Narrows (left)

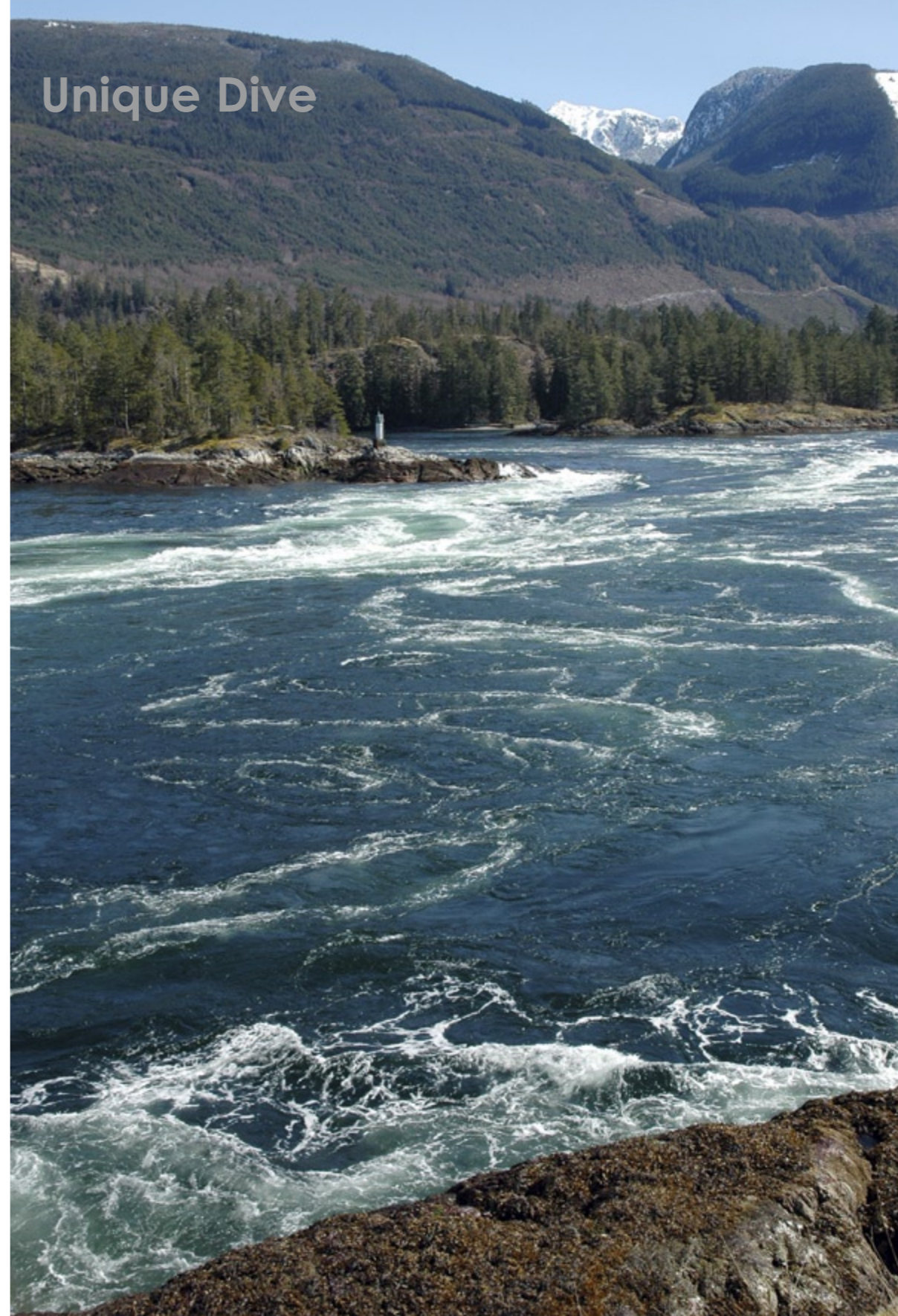
Also known as the Sechelt Rapids, Skookumchuck Narrows consist of a 500 meter (1640 feet) wide passage connecting Sechelt and Jervis Inlets on the inside part of the Sechelt Peninsula. The area is part of Skookumchuck Narrows Provincial Park, established in 1957 and managed by Parks Canada. Topside viewing of the Skook is possible from shore, accessed down a four kilometer trail off the main road to Egmont.

The word Skookumchuck comes from the Chinook language with the word *skookum* meaning "strong" or "powerful", and the word *chuck* meaning "water". Although there are several place names in British Columbia using the word *Skookumchuck*, most refer to it as the area located on the lower part of Sunshine Coast.

Underwater, visiting divers are treated to a collage of vibrantly coloured marine residents at over a half dozen different dive sites within the zone. Each area is quite unique, revealing an array of different fish, anemones, tunicates and even nudibranchs, over a rolling bedrock terrain full of surprises.

"We commonly take only skilled divers to the Skook two to four times a month, all year long," comments Kal Helyar, co-owner of Strong Water Retreat and Porpoise Bay Dive Charters, located a few minutes by boat from the notorious Narrows. "The trick is not only being able to read the water movement, but knowing when to put your divers in and when to safely get them back onboard before the current picks up again. If everyone is ready to go, bottom-time can be any-

## Unique Dive



where from 20 to 45 minutes."

I recently had the opportunity to take on the Skook with my husband, and fellow adrenalin dive junkie, Wayne Grant. Actually, we're not really adrenalin junkies, just photographers, although I'm not

sure if there's a difference, because we tend to go where the critters are, be it at 60 meters (200 feet), under the ice or in a high current channel.

Fortunately for us, Kal knew exactly what he was doing and didn't drop

# feature

CLOCKWISE FROM RIGHT: Dive boats of the Porpoise Bay Charters; Male Kelp greenling; Divers hiking through forest to Skookumchuck

us in a 14 or even a 10 knot current. His timing was impeccable on selecting the proper slack-time (when the water slows to change direction), with no drift felt at all! The site seemed to run parallel to the northern bank for awhile, until we changed direction and headed for deeper water. Our run started in seven meters (21 feet), reaching a maximum of 18 meters (60 feet).

As we swam over the terrain, it seemed deceptively smooth, probably from centuries of pushing billions of gallons of water back and forth. Upon closer observation, however, a thick layer of barnacles added a rough texture to the rock, with small multi-coloured anemones lining every crack and grove, stretching out like branching veins of life. Continuing deeper, we stopped at a garden of critters, all utilizing the shelter of kelp, with most latching tightly to the fingering reef before us. There must have been hundreds of anemones



clustered together in colonies of the same colour. Some were surrounded by purple ochre sea stars, and others surrounded the sea stars. Burrowing sea cucumbers, sunflower stars, sculpins and multitudes of other Skookum marine life thrived in this nutrient rich channel.

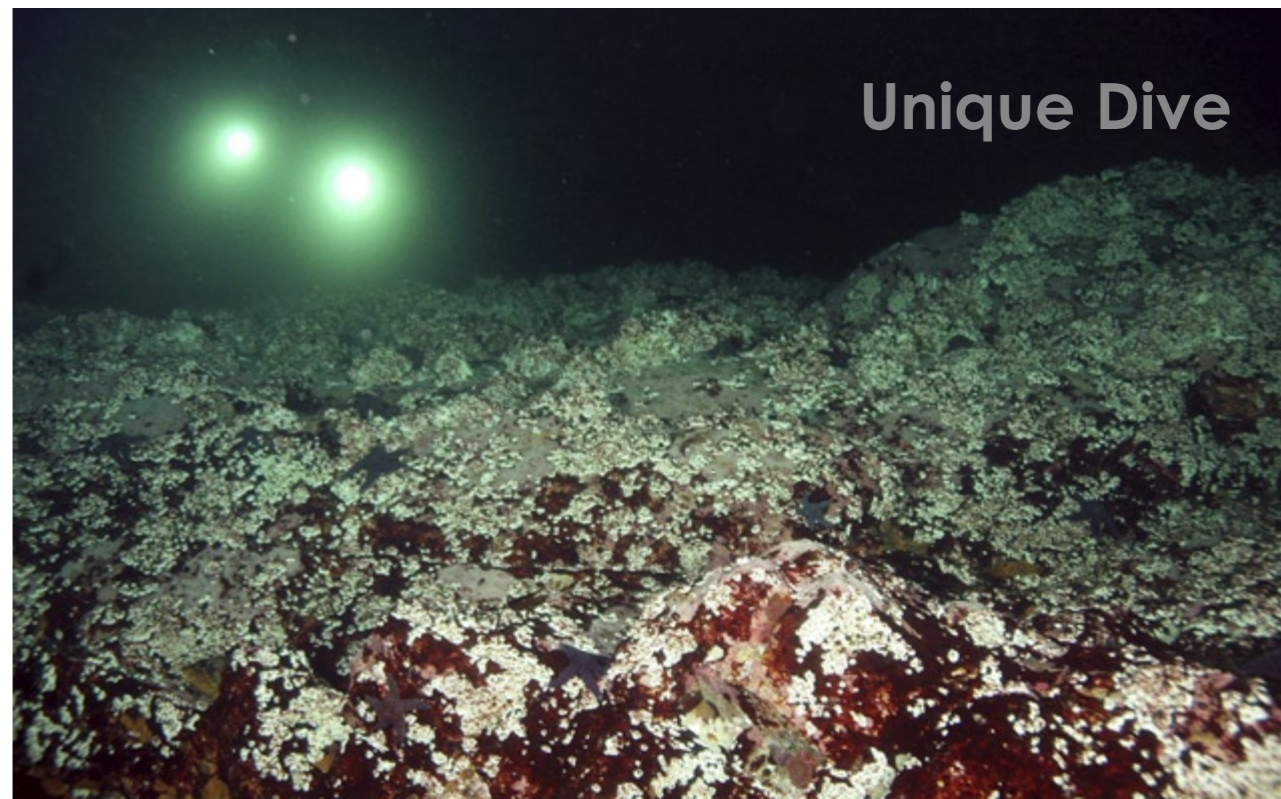
Kelp greenlings (fish) also braved the slack water, as they darted about looking for food and very curious of our presence. Brilliant blue males and bright yellow females didn't shy away when I photographed them. Throughout the dive, more came to investigate us. Tiger and quillback

rockfish even took advantage of the calmness to search for tasty morsels.

Once finished with the reef, Wayne and I headed for the depths of "Glory Hole", a crater-like indentation in the bedrock. I remembered watching from the shore how immense whirlpools formed in this area. Now, I felt very strange, knowing this will soon be the center of so much chaos. Yet noticing a blanket of yellow, orange and tan sponges covering huge boulders distracted my thoughts. Moving more into the center, it looked as if an explosion of invertebrate life had occurred.

I have seen walls in British Columbia with a similar abundance of life, but never like this, or on the ocean floor, with such intensity. Needless to say, when the Skookumchuck permits a slack time of this length (40 minutes), both wide angle and close-up (even macro) video or still photography is possible. We truly enjoyed our experience and recommend the adventure to any skilled thrill-seeking dive junkie, or underwater photographer! Just remember: when the dive operator gives you a maximum bottom time or tells you to be at the surface at a certain time – BE THERE!!!!





Unique Dive

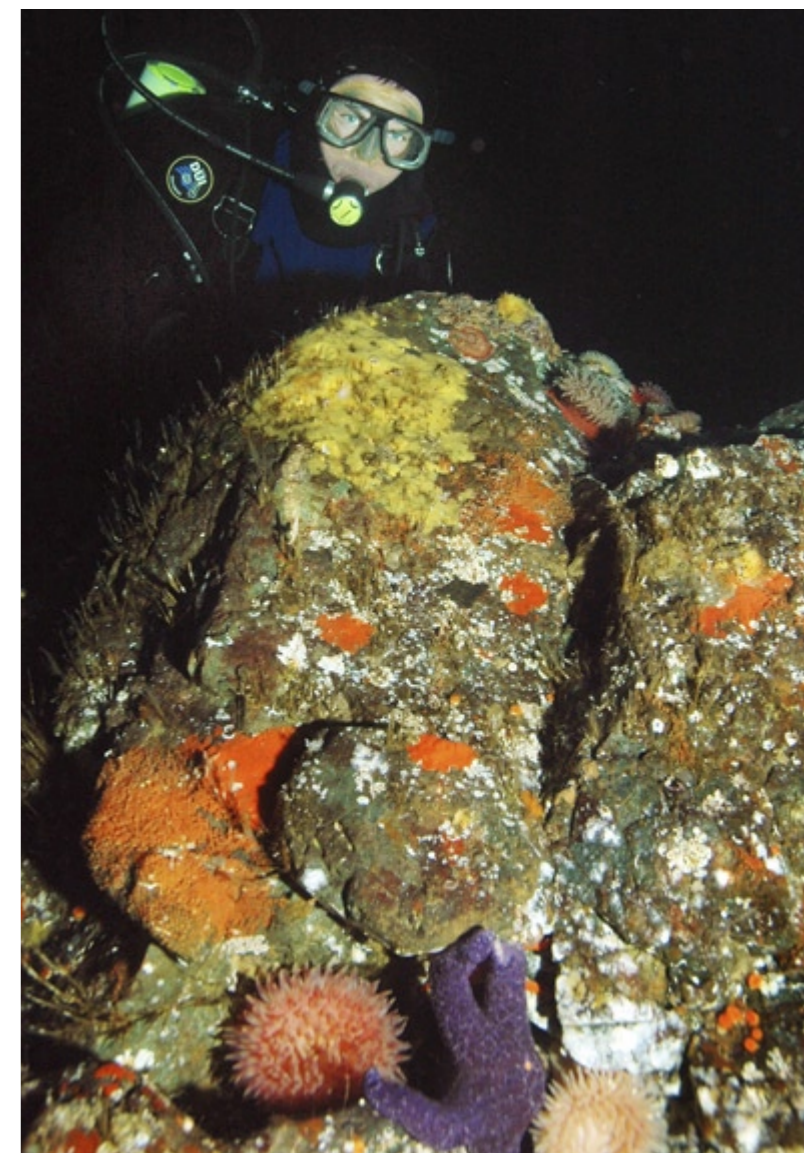
boats provide sectioned buddy-team stations with benches for easy donning of tanks and gear. Both boats are equipped with marine toilets. Nitrox is available with prior notice. Boarding for divers/groups is at the Egmont Government Dock. Since the Skook is a popular location, there are minimum group sizes, with advanced reservations highly recommended. Visit: [www.porpoisebaycharters.com](http://www.porpoisebaycharters.com).

From Mainland Vancouver, take BC Ferries from Horseshoe Bay to Langdale on the Sunshine Coast. Follow the signs to Egmont on the Sunshine Coast Highway, past Gibsons and Sechelt. Turn right at Egmont Road. The Skookumchuck trail is on the road to Egmont, and the Government Dock is located farther ahead.

Dive gear is available for rent at any of the Lower Mainland dive stores in Vancouver and Surrey, or in the town of Sechelt. For a selection of available stores, check out the website of the Dive Industry Association of British Columbia (DIABC) at: [www.diveindustrybc.com](http://www.diveindustrybc.com)

**Travel Information**

- DIABC [www.diveindustrybc.com](http://www.diveindustrybc.com)
- Tourism British Columbia [www.hellobc.com](http://www.hellobc.com)
- Sunshine Coast Tourism [www.sunshinecoastcanada.com](http://www.sunshinecoastcanada.com)
- BC Ferries [www.bcferrries.com](http://www.bcferrries.com) ■



Wayne Grant in Skookumchuck; Bed of barnacles (top)

**Diving**

Diving in the Skook is possible year round with a 6mm wetsuit or dry suit and full body exposure protection. Water temperature ranges from 7.2 – 14.4°C (45-58°F) and although underwater visibility is usually best during winter months, it varies from 9-21 meters (30-70 feet) during the rest of the year.

Strong Water Retreat and Porpoise Bay Dive Charters are operated by Kal Helyar and Ann Beardsell. The husband and wife team have been accommodating divers since 1991. At their current 6.5 acre waterfront property, not far from Egmont, they can handle large and small groups. Accommodations consist of several large yurts, with their dive packages supplying home-cooked hearty meals, tanks and weight belts and plenty of awesome boat diving. Two custom built aluminum dive



Painted anemones (above); View of Skookumchuck (top)



# Marcelo Tatsuyoshi Kato



## P O R T F O L I O





## Marcelo

Detail of *Sea Time* paper sculpture by Marcelo

At one point in my life, I renovated an entire apartment where I lived by myself.

Why I got really involved in paper is because I realized paper can do a lot in various ways—for example, drawing and painting—but paper itself is one of the materials that is very hard to deal with. We can use paper in cutting, folding, bending, piling, brushing, etc. There are many creative methods for paper as a medium, and it has unlimited potential. Even though it is flat, it can also become 3D. Of course, I like other materials, but I love paper the most, because my artistic life started with paper.

I don't think there are any role models or mentors present in my life, but I am quite sure that my family, relatives, friends and environment where I grew up influenced my art. I now create new ideas for art works by getting favorable influences from people around me.

*GS: What inspires you? What inspires you about the underwater world? Tell us how the sea inspires your*

*work and why you use themes of the underwater realm.*

MARCELO: I would love to answer this question! I really like nature and living things, especially marine creatures and bugs. Their shapes, colors, designs

Edited by Gunild Symes  
Translation by Tina Tsuchiya  
All images courtesy  
of Marcelo Tatsuyoshi Kato

**Do water and paper mix? Yes, they do in the Marcelost World created by the Japanese Brazilian artist, Marcelo Tatsuyoshi Kato, who makes magic in paper sculptures and papercuts with themes related to the underwater world. X-RAY MAG's Gunild Symes interviewed the artist to find out how he developed his unique craft and what inspires him about the sea.**

*GS: Tell us how you became an artist and why you chose the medium you use. Who were your role models or mentors?*

MARCELO: First of all, I would like to thank you all for having this wonderful opportunity to introduce my works and say hello to everyone in the world. It all started when I was three years

old, when I started using a pair of scissors and separated a book. The book was a picture book loaded with illustrations of many invertebrate animals like crabs and shrimps. Since



Detail from *Golden Coral* paper sculpture by Marcelo (see full view on previous page)

then, I started using scissors by my right hand spontaneously, and drawing by my left hand as well. When I was a student, I drew, made paper-cutting, creating hand crafts and enjoyed putting together plastic models. I really liked creating things since I was young.



*Sea Time* by Marcelo, paper sculpture. Available at: [www.soleyne.com](http://www.soleyne.com)



## Marcelo

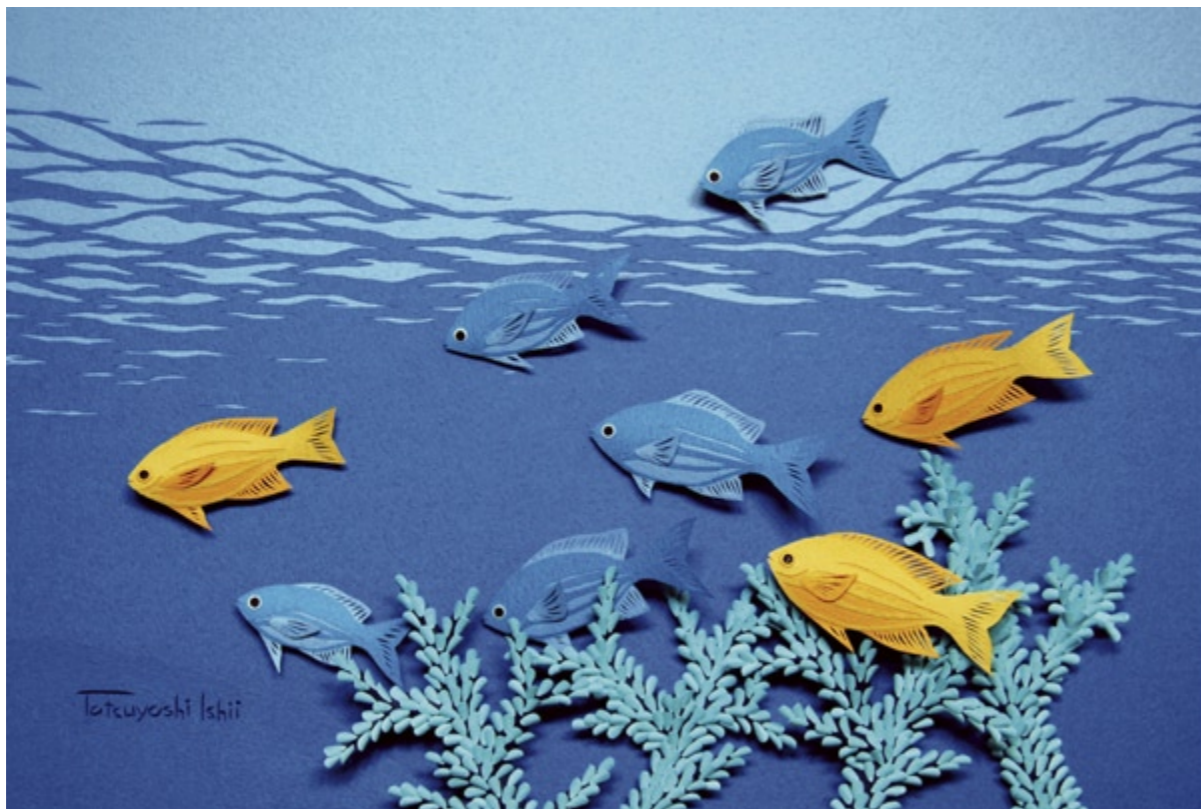
and motions are just amazing! In the underwater world where we cannot see anything deeper than a few hundred meters, we just need to imagine what the creatures are like. It is like imagining aliens from other planets. (Laughs) I do like imagining something like that.

I get my inspiration of marine creatures from photos, movies, aquariums and skin diving, and I create my art works using these sources while adding my imagination.

One good reason why I chose the underwater world for subject matter is that I don't think I can create



CLOCKWISE FROM ABOVE:  
Detail from *Anuanus acropora*;  
Full view of *Anuanus acropora* paper sculpture by Marcelo;  
Detail from *Damselish acropora*;  
Full view of *Damselish acropora* paper sculpture by Marcelo



Detail of *Mermaid Secrets* papercut by Marcelo (left); *Basslets and Soft Coral* paper sculpture by Marcelo (below) available at [www.soleyne.com](http://www.soleyne.com)



everything about the underwater world, even if I spent the rest of my life doing so. Even if I try very hard, I will be able to create around 50 percent of it? So, I will enjoy creating art works all my days.

*GS:* Tell us about your artistic vision and artistic methods, process, techniques, materials, etc.

**MARCELO:** I think that people need art, basically. Each person needs art in any period of time in their lives. By meeting art, in their everyday life, something can be changed. They can be driven by art work. They can be stimulated about something when they see art works right in front of them. That is a fundamental goal in my artistic vision.

When I create a paper sculpture art, I draw a rough sketch first. Depending on the works, I use many techniques to sketch a few pieces. What I mean by "sketch" is using paper-cutting, digital imaging, acrylic, painting in watercolor, etc, to develop an idea. Those "sketches" become themselves art works in some cases.

Even though I draw rough sketches, I need to create many things without preliminary sketches in paper sculpture art. In that case, I imagine the completion of the art work. That

is why small details and color are changed often from the preliminary sketch. I can do so much with freehand.

I try to create paper sculpture art that has good keeping quality. Materials I use are Japanese mermaid paper and French Canson Mi-Teintes paper. Paper and glue are acid-free. For the base, I use light balsa wood or cardboard. Equipment I use is mainly scissors, a cutter knife and tweezers. When I have to cut into very small pieces, I

use a puncher too.

With paper cut outs, clipping, pasting other small parts and bending, one fish, a coral and a mermaid are created. After I create all the parts, I paste everything on a mat board while checking balance by making adjustments. One paper sculpture art is done with all those procedures, however I keep them for six months to one year just hanging on the wall. I need to check them to see if they are ok and stick

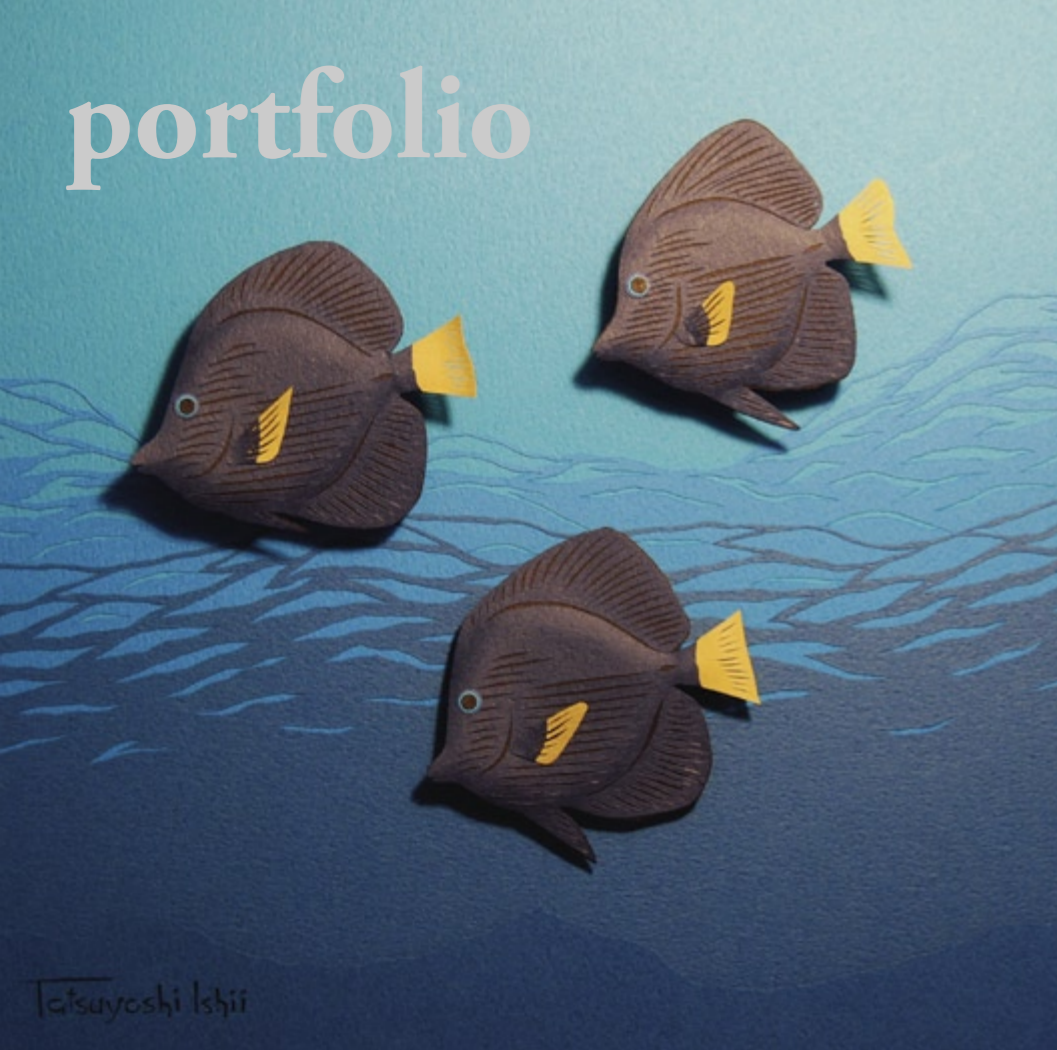


Fish wall decal by Marcelo is available at [www.etsy.com](http://www.etsy.com)

Sea animal wall decals by Marcelo are available at [www.etsy.com](http://www.etsy.com)







Takayoshi Ishii

## Marcelo

wanted to do it since I was young, but I couldn't get any opportunities. I am sure that I will do scuba diving in the near future. Where I would like to dive is Okinawa in Japan, the Red Sea, the Caribbean Sea, on the coral reef in the Pacific Ocean, the Indian Ocean and Brazil, among other places.

*GS: What are your current artistic and/or ocean conservation projects?*

**MARCELO:** My current art project is the Marcelost World, which has four different worlds—Marcelocean, Marcelopolis, Marcelonia and Venezia Secrets.

Marcelocean is the world inside of the sea that I imagine. The theme of Marcelonia is the imagined world of mountains, and Marcelopolis is the imagined world of the city. Venezia Secrets is newly added to my art projects this year, and it is about an imagined urban area that is based on Venezia, Italy. This is a project about ocean conservation that I am currently working on. I donate to WWF Coral Reef Conservation and Research Centre (WWF Coral Reef Centre) located in Shiraho Village on Ishigaki Island, Okinawa, at the moment. I would like to work to protect coral reefs more actively in the future.



well under the conditions of dryness, moisture and sun light. Passing all of the tests, my paper sculpture art goes out into the world!

*GS: Are you a scuba diver? If so, what made you become one and where have you dived? What are your favorite dive locations?*

**MARCELO:** Unfortunately, I haven't experienced scuba diving yet! I have always



LEFT TO RIGHT:  
*Zebrasoma xanthurus* paper sculpture by Marcelo available at [www.etsy.com](http://www.etsy.com);  
 Detail from *Basslets and Soft Coral* paper sculpture by Marcelo (see full view on previous page); *Mermaid Secrets* papercut by Marcelo

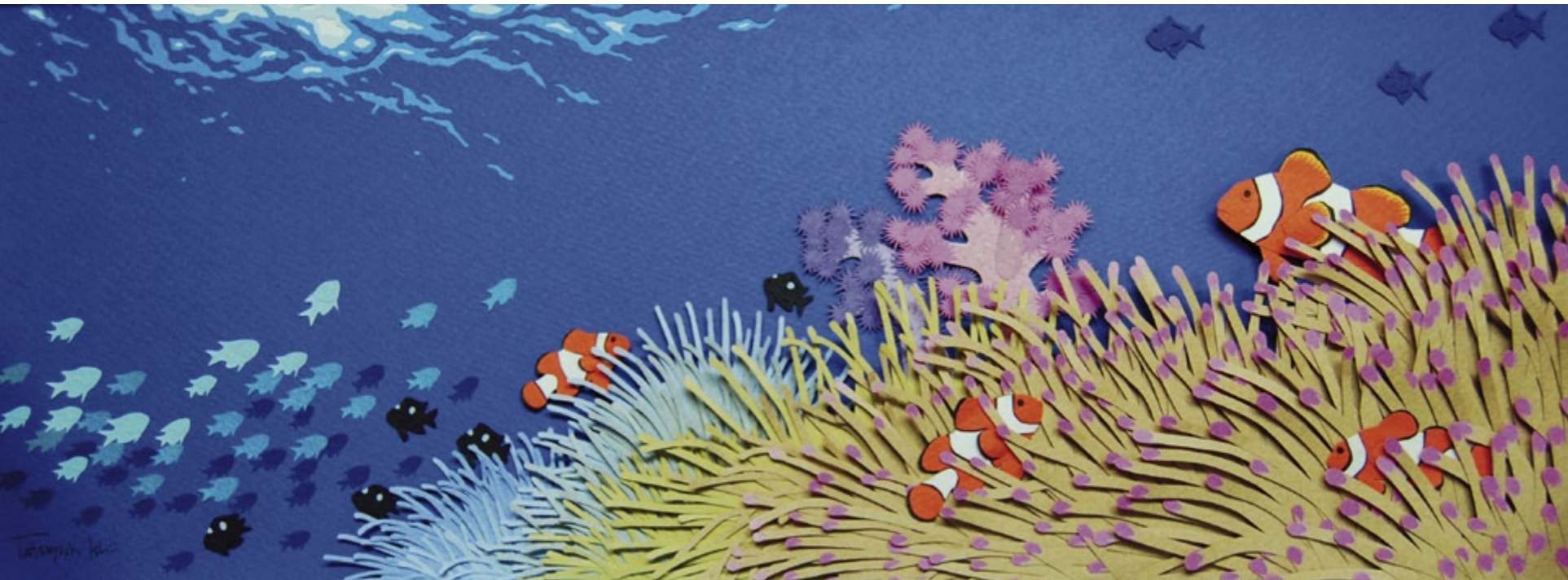
# portfolio

GS: Any future projects in mind? What are they and how do they relate to the sea or ocean conservation?

MARCELO: I have so many future projects in my mind. For example, I would like to create a paper sculpture art based on a theme about the coral reefs. It will be the biggest coral reef made of paper sculpture. The size will be about 10m wide and 2m high. I



Marcelo



Parade paper sculpture by Marcelo (above); Clownfish in Sea Anemone paper sculpture by Marcelo (left)

MARCELO: Since I don't speak English well, if you have any questions, feel free to contact my agent Tina Tsuchiya ([tina@marcelo.jp](mailto:tina@marcelo.jp)) who speaks English. Or, you can visit my internet shopping sites, Marcelost World in ETSY ([www.etsy.com](http://www.etsy.com)) and Soleyne ([www.soleyne.com](http://www.soleyne.com)). We can discuss commissions, if patrons are interested. At the moment, I sell paper sculpture art (US\$800-10,000), paper-cutting (US\$300-1,000), limited edition giclée prints (US\$50-300) and art posters (US\$20-30). ■

guess it will take a few years to create. The message I would like to say through this art work is that, "We have to take good care of the sea. Otherwise, we won't be able to see a really beautiful coral reef. We will only be able to see a coral reef in this unmoving paper sculpture."

GS: Why does art matter and how can art help the world?

MARCELO: I believe that art can move people's hearts by overcoming culture and the language barrier. If people can

be moved by getting a message from the art, the world will follow, too. If there are many arts which are meaningful, the world will be better.

I got a precious gift in 2007—my son Erick. I created the first paper sculpture art in the Marcelocean series for his birth. I just hope he will be able to dive and see beautiful coral reefs when he grows up. If he cannot see this beautiful underwater world, it is going to be really sad. I also made a small reef aquarium at home for him. I think my son will think that it is important to protect nature and living things if he grows up together with

corals and small fishes.

I actually cannot say anything about the underwater world because I haven't dived yet, but you divers know how beautiful the underwater world is. I would like to contribute in some way to society and nature through art. I just hope through my art, people will feel something for nature and think about how to protect it.

GS: How can interested buyers contact you? Do you do commissions? Do you sell fine art giclée prints or posters? What are the prices?



The artist, Marcelo, and his son Erick sit by the sea in Japan

## IN OUR NEXT ISSUE

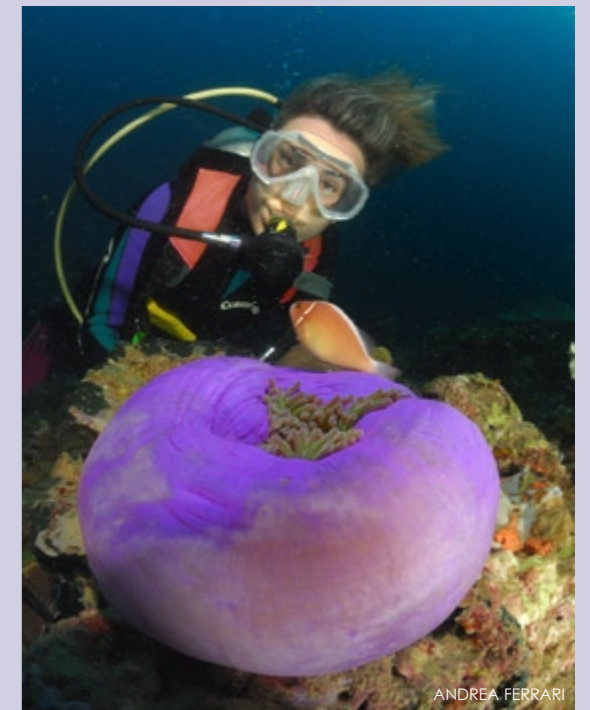
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